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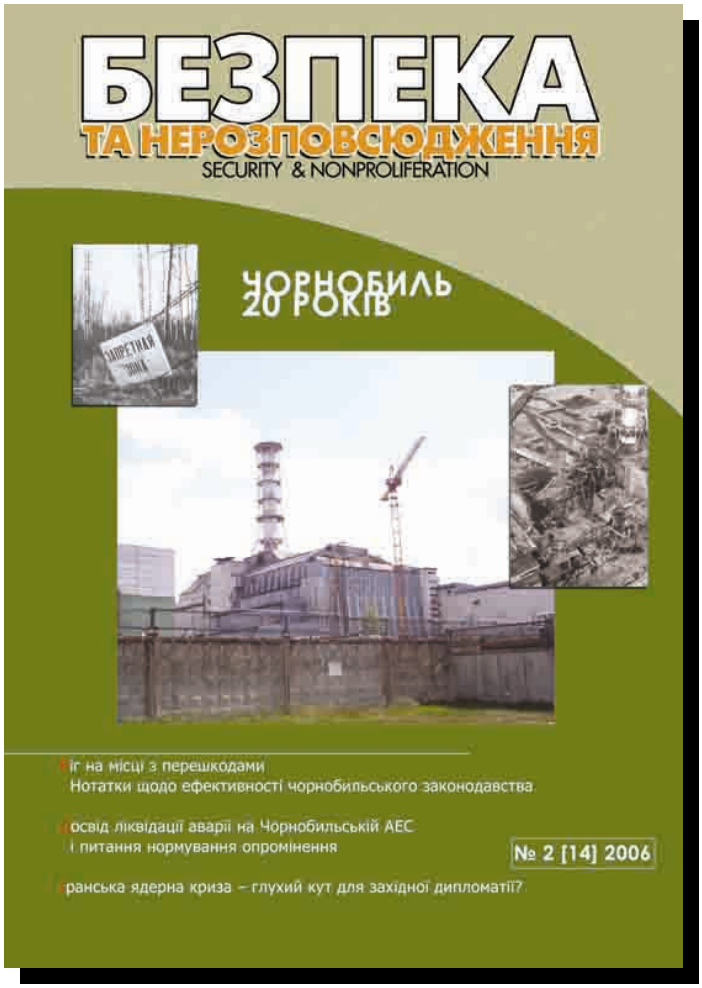

KYIV 2006

LESSONS OF THE CHERNOBYL ACCIDENT

Dear Reader,

On 26 April of this year 20 years will have passed since the world's biggest radiation accident – the one at Chernobyl NPP Unit 4. This horrid event served a powerful impetus to a change in the system of views on the safety of using nuclear technology for peaceful purposes, forced all countries to apply new approaches as they reevaluated the safety of power units then in operation, spurred an intensification of scientific and engineering research along with upgrades of nuclear reactor protection and control systems, including studies of the human factor in that area. A series of activities were launched and maintained to develop NPP accident prevention measures. A new notion of importance for nuclear energy industry was introduced – nuclear and radiation safety culture.

Along with that, the Chernobyl Accident put an end to nuclear programmes in many countries, reduced the scope of innovative nuclear technology research, inhibited development of new generations of reactors. The number of youth seeking to receive higher education in nuclear physics and nuclear energy industry went down drastically. To be true, however, the interest in nuclear energy has been somewhat revived in the world over the last two years, the reason for that being much higher prices of energy resources of organic origin, climate change and required compliance with the Kyoto Protocol. Some countries' efforts to stake on renewable energy sources have yet to yield results hoped for by governments and the public in late 1990s. The pace of accrued input of renewable sources into the overall European energy pool is way behind the schedule, hence nuclear energy development is considered in many of them as the basis for sustained economy development and better public welfare.

In September 2005, an IAEA-initiated Chernobyl Forum took place in Vienna. A report was presented there, prepared by 100 experts from a number of countries of the world including RF, Ukraine and Belarus. It contains the most comprehensive account of the Accident and highlights its socio-economic aftermath, issues of environmental contamination and human health impacts. This fundamental document received approval by eight most influential UN organizations and governments of the three affected States. The key recommendations offered in the Report: "Social and economic remediation of the affected areas in Belarus, Russia and Ukraine, lifting the psychological burden on their populations and the liquidators must become the first priority." For Ukraine, the priority list includes "Object Shelter" transformation to an environmentally safe condition as well as safe radioactive waste management in the Chernobyl Exclusion Zone and its step-by-step remediation. The Report conclusions evoked quite a debate among experts and the public of Ukraine. Particularly heightened discussions still underway to date, concern adequacy and accuracy of assessments of both medical and socio-economic consequences of the Chernobyl Accident.

This Journal issue offers to our readership three articles on the Chernobyl Disaster. In particular, O. Nasvit elaborates on the effectiveness of Ukrainian Chernobyl law, reviews the reasonability of some of its provisions that have contributed to retentive views taking root in liquidators and those resettled from contaminated areas. The article by A. Nosovsky attempts to dispel some myths around Chernobyl concerns, which are artificially upheld by some politicians and, sadly, certain experts who seem to have a vested political or financial interest in that respect. The article by Y. Skaletsky features exclusive information (inaccessible to the public domain for a long time) on the involvement of military personnel in the Chernobyl Accident mitigation, which.

Editorial Team

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Hurdle race on the spot
Notes on efficiency of Chernobyl legislation

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

On the eve of the Chernobyl Disaster 20th anniversary we find it reasonable to look back and see if we have learnt all the lessons taught by Chernobyl. It is a lessons-learned review 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 Chernobyl 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 ensure achieving the set aim. Of primary importance here is scientific validity of the aim, determining further scientific validation of relevant tasks as its components, ways to achieve it, and appropriate terms and resources allocated for it.

Today, 20 years after the Chernobyl Disaster, we have to admit that its consequences have not been overcome yet and that raises the issue of Chernobyl legislation as a means to handle the Disaster effects. Sad as it is, a major part of measures initiated in line with the Chernobyl 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 Supreme Council approved Chernobyl 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 Supreme Council Decree № 797 dated February 28, 1991 "On the Order of Implementation of the Law of Ukrainian SSR "On the Status and Social Security of People Affected by the Chernobyl Disaster" 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 Chernobyl Accident consequences.

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

One can find statistical information about the costs incurred by Ukraine to mitigate the Chernobyl Disaster consequences, and correlation data on planned and actual budget expense aimed at financing necessary measures stipulated by the Chernobyl 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 Chernobyl legislation, nor a correlation between the planned and 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 Chernobyl 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 Chernobyl law implementation. In 1996 – 1998 actual 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 Chernobyl law, yet at the same time they limit budgeting of Chernobyl programmes by suspending the laws (or their parts) 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 Minchernobyl (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 the Status and Social Security of People Affected by the Chernobyl Disaster" [5] were made in terms of radiation safety.

Third, all plans for financing Chernobyl 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.

Table 1. Status of Financing the Chernobyl Accident Consequences Elimination and Social Radiation Security Associated Measures in 1996 – 2005. (million of UAH) [4].

Year	Total Legally Stipulated Requirement	Budgeted for the Given Year	Budgeted to Requirement Ratio%	Financed	Financed to Budgeted Ratio%	Outstanding debt as of the Beginning of the 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 incl. social security 634.6
2003	126567.4	1381.16	11.0	1381.16	100.0	760.3 incl. social security 596.4
2004	14872.5	1710.97	11.5			685.4

The notion of a gap between the legally stipulated requirement and financial resources at the State's disposal does not seem to be something new. It was already in the National Report dedicated to the Chernobyl Disaster 10th anniversary prepared by the Ministry of Chernobyl of Ukraine, where Clause 6.6. "Development of the Chernobyl Disaster Public Security Legislation" 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 Chernobyl 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 Chernobyl 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 Chernobyl Disaster consequences, was the Concept of Popular Residence on Territories with High-Level Radiation Caused by the Chernobyl Disaster (hereafter referred to as the Concept) adopted by the Ukrainian SSR Supreme Council in 1991 [6]. The Concept holds the main population radiation protection principle to be resettlement of population from the affected areas to the radioactively and environmentally clean regions against a temporary criterion of soil radionuclide (cesium, strontium, plutonium) contamination density.

The main argument substantiating this principle referred to unavailability of comprehensive data as to the radiological situation on 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 for the Territories Radioactively Contaminated due to the Chernobyl Disaster” and “On the Status and Social Security of People Affected by the Chernobyl Disaster”.

On July 23, 1991, the Cabinet of Ministers of Ukraine adopted Decree № 106 “On Implementing the Ukrainian SSR Supreme Council Decrees “On the Legal Regime for the Territories Radioactively Contaminated due to the Chernobyl Disaster” and “On the Status and Social Security of People Affected by the Chernobyl Disaster”, which identified a series of measures to implement the current legislation on public protection against adverse Chernobyl Disaster effects and mitigation of its consequences, as well as listing settlements referred to the radioactive contamination zone (numbering 2293 settlements)

It should be noted that the Concept and the Chernobyl laws originally featured essential inconsistency and internal conflicts that drew Chernobyl 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 for the Territories Radioactively Contaminated due to the Chernobyl Disaster” [13], the territories contaminated due to the Chernobyl Disaster include those whose residents were 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 the Status and Social Security of People Affected by the Chernobyl Disaster” [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, inter alia radioactive contamination zoning, Clause 2 of both laws mentioned identifies a strengthened radiation monitoring zone (the so-called 4th zone) including territories with soil contamination density exceeding the pre-Disaster level by 1.0 to 5.0 Ci/km2 for cesium isotopes, or 0.02 to 0.15 Ci/km2 for strontium, or 0.005 to 0.01 Ki/км2 for plutonium, provided the calculated effective exposure dose with radionuclide migration coefficients for plants and other criteria taken into account exceeds a dose received by the individual in the pre-Disaster period by 0.5 mSv (0.05 rem) a year.

That means a number of legal clauses consider the strengthened radiation 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 so-called strengthened radiation monitoring zone.

It also has to be noted that by the Concept, the ground radionuclide contamination density is used as a temporary decision-making criterion pending an individual effective exposure dose is set for the residents. Beginning with 1991 dosimetric passportization of settlements affected by the Chernobyl 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 self-cleaning 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, reducing in its turn the public external and internal exposure dose by 2-3 times as reflected in the changed distribution of settlements by passport dose levels, see Table 2.

For comparison, the same Table refers settlements to the 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 Rivno Regions, which, according to a relevant enactment [28], were transferred from the unconditional (obligatory) resettlement zone to the guaranteed voluntary resettlement zone category. Table 2 shows a striking discrepancy between the normative legislation settlements attribution according to radiation contamination zones and current dosimetric realities, which, however, resulted in no scheme of altering settlements radiation contamination zone attribution with the issue itself having lost its validity acquiring a political coloring instead.

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

Year of Passportization	Average Exposure Dose of 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, CMU Decree № 106	-	1290 (zone 4)	835 (zone 3)	92 (zone 2)

Chernobyl legislation experts highlight one more detail. Up to 1998, NSCU-76/87 norms 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 provided the exposure dose did not exceed 1 mSv and 5 mSv per year respectively, while residents of zones neighboring operating NPPs could be exposed to doses exceeding 5 mSv a year without any compensations, which entailed legal discrimination and social injustice [9].

National reports dedicated to the Chernobyl 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. However 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, for the author only to conclude that resettlement as a countermeasure turned out to be totally unjustified in terms of diverted exposure doses and economical and socio-psychological aspects. Resettlement against the criterion of radionuclide area contamination, the way it was stipulated by the Concept, 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 maintains 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 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 Chernobyl Disaster associated laws proposed to eliminate the controversies between certain clauses and regulations of the laws, bring the current legislation in compliance with economical ability of the country and set up a system of comprehensive security for the affected people, were rejected by relevant committees (formerly acting on a permanent basis) of the Ukrainian Supreme Council 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. This document was prepared and approved by the Ukrainian Government, and was passed to the Supreme Council in 1997 and 1998 for ratification, but 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 Chernobyl 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 Supreme Council of Ukraine with their Decree "On Parliamentary Hearings Dedicated to the Chernobyl Disaster 14th Anniversary" recommended the Ukrainian National Academy, Academy of Medical Sciences, and Academy of Agrarian Sciences to consider the draft Concept. The board sittings of 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 pass the new draft Concept for consideration by the Supreme Council 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 "On Approval of the Draft Concept for the Law of Ukraine "On Implementing Changes to the Laws of Ukraine "On the Legal Regime for the Territories Radioactively Contaminated due to the Chernobyl Disaster" and "On the Status and Social Security of People Affected by the Chernobyl Disaster".

One more aspect worth noticing is a significant difference between exposure dose-based compensation amounts stipulated by relevant Chernobyl laws and those provided for by the Nuclear legislation of Ukraine. The Law of Ukraine "On People Ionizing Radiation Protection" [16] contains clause 19 "On Compensation for Yearly Basic Exposure dose Excess" providing for the yearly basic exposure dose 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, insecure living, work and study conditions, determined by the Chernobyl Disaster context.

The strategy stipulates for the yearly basic exposure dose excess based compensation to make 1.2 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 Physical Individuals 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).

According to the Ukrainian nuclear legislation, the yearly basic exposure dose 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 in compliance with the nuclear legislation in compliance with the 2004 dosimetric passportization of settlements attributed to the radiation contamination zones, residents of 202 settlements only 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 made no more than 4 mSv.

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

To sum it up we can draw a conclusion that the Chernobyl 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; besides that: the scope of benefits and compensations stipulated by it is ungrounded from the perspective of radiation safety; total cost of its provisions is out of proportion with the economical ability of Ukraine; its provision for a yearly basic exposure dose excess based compensation does not comply with the nuclear legislation of Ukraine which is in violation of the social equality principle,

Thus it could never become an efficient tool of eliminating the Chernobyl 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 to public something that was so loved by our people - their uncompromised fight for enlarging and widening the benefits and compensations.

Besides that as stated in [11], the Chernobyl 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

Chernobyl legislation on behalf of the Parliament, Cabinet of Ministers and the President of Ukraine.

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EXPERIENCE OF MITIGATING CHERNOBYL NPP ACCIDENT CONSEQUENCES AND ISSUES OF EXPOSURE NORMING

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20 years have passed since the Chernobyl NPP Accident, and that much time is long enough for a realistic review of consequences of both the accident itself and the efforts to mitigate it. The Chernobyl aftermath has been studied by numerous scientific organizations, a great deal of international programmes have been implemented [1-6]. The results of those studies have been published in scientific publications, monographs, conference and seminar presentations. Still, opponents to nuclear energy ignore objective data and disseminate apparently false information on numerous victims, radioactive monsters and mutants. Mass media are quick to publish those lies. And the principal inspiration for "Chernobyl tales" is the assumption that radiation exposure is harmful however low it may be.

An extremely negative role in the first post-accident period was played by medical workers who were either totally ignorant of radiological medicine or had unreserved trust in mass media communications. Many physicians referred symptoms of conventional diseases to those of radiation origin. Such diagnostics was reduced to absurdity when, for instance, an aching tooth or dryness in the mouth were attributed to radiation exposure. Such diagnostic practice was eventually taken up by expert boards to identify the cause-and-effect relationship between morbidity and the Chernobyl NPP Accident [1, 2]. Throughout the entire post-Chernobyl period political leaders and medical workers were busy convincing inhabitants of radiologically contaminated areas via mass media that the accident had had a tremendously harmful effect on their health. As a result of that information attack, more than half of Ukrainian general public suffer from psychological stress that gives rise to a number of mental illnesses, irregular sleep, endocrine diseases and a great deal of other ailments having nothing to do with radiation exposure [3–6].

Millions of people were declared accident victims eligible for material benefits and compensations. Hence, over 3 million individuals have been registered as those affected by the Chernobyl accident, including a few tens of thousands recognized as invalids, and Ukraine has to expend a considerable portion of its State Budget on their social charges [7].

Both the State Budget and public health incurred enormous losses as people were resettled from radioactively contaminated areas to new places of residence. The dose limits applied during the resettlement were much lower than those of the actual natural radiation background in various regions of the world [8–11]. Those figures lacking scientific justification and based solely on emotional schemes suggested by certain "humanists", caused thousands of people to feel ill-at-ease, spurred them to unreasonable behaviour. People would abandon their belongings, broke the ties with their land and home, become outcasts. All for the sake of reducing the risk equal to that of falling ill from smoking a pack of cigarettes a day. Therefore, the use of recommendations lacking clear scientific grounds resulted in an unjustified mass resettlement, in infecting people with radiophobia with psychosomatic effects. Regardless even of the economic losses for the State, the moral damage done to millions of people by using faulty recommendations can hardly be overestimated at all.

When scientists talk about the non-threshold concept of ionizing radiation effect, it is just a working hypothesis used by radiobiology experts for humane considerations only. It is a formal, scientifically unproved principle of referring harmful

exposure effects from the sphere of high doses to that of low ones. But it does not mean that the non-threshold effect, i.e. harmful impact on living organisms including humans, of radiation in any low dose does exist in nature. If any rise in the radiation background actually intensified negative effects, then the health condition of humans around the globe would depend on the amount of natural radioactivity in the environment: the higher the natural background– the shorter longevity, the more frequent hereditary diseases. But it is not the case. The low-level dose impact appears to find no proof either in nature or in experiment. It can be referred to as a hypothesis, but humankind has no facts and grounds to conclude that any low dose is dangerous.

Furthermore, firsthand research was carried out that demonstrated that living organisms placed in an environment totally shielded from radiation background cannot develop in a normal way. For example, many plants do not blossom, do not give fruit, the organism is depressed up to death [12–16]. It indicates that radioactivity is not so dangerous. It is a well-grounded belief that small amounts of it are even vital.

No data exist to corroborate that a human who is annually exposed to a dose of 0.3 Sv throughout his or her entire life, has health abnormalities of his or her own or of his or her posterity [10, 13, 16]. It has been proved based on observations over radiologists, nuclear workers, scientists permanently exposed to occupational doses; victims of radiation accidents, nuclear tests and use of nuclear weapons. There are quite a few people worldwide who have been exposed to significant doses over their lifetimes.

The exposure risk values applicable worldwide were derived based on reviewing the monitoring data for radiologically exposed residents of Hiroshima and Nagasaki. Here one should realize that the risk values obtained as a result of the exposure of Japanese residents are referred to high-level radiation while transposing those risks to the sphere of low-level doses is done formally – based on the linear dose-effect dependency. Objective data to validate such an approach are missing. Moreover, the radionuclide composition of releases resulting from the use of nuclear weapons is substantially different from that during a nuclear power plant accident.

When analyzing the death rate of population that survived the atomic bombing, we will notice a characteristic feature: deaths are primarily related to high doses incompatible with vitality, but no overall curtailment of longevity is to be observed in those exposed to low-level radiation. The other way around – people who have been exposed to moderate doses have an average longevity two years longer than the rest of population. [17, 18]. The thing is that this category is paid much higher social and medical attention than others. Why then do we seem to have an increase of morbidity in the areas radioactively contaminated due to the Chernobyl NPP Accident? It is not that morbidity is up – rather the population of those areas began to receive intensified medical care and the level of diagnostics improved drastically enough to detect old, but previously undiagnosed diseases.

For quite a while, mass media published information that distorted scientific facts in one way or another [19, 20]. Data on Chernobyl Accident effects was communicated that indicated an increase in cancer, genetic and other illnesses, leading to national degradation and other social disasters. Such information, whenever it appears, must be a desperate need for someone– now that it can help explain any problem in the country by attributing it to the Chernobyl Disaster.

For instance, the public is surprised to learn that the biggest rate of liquidator invalidity retirement and maximum ailment percentage is observed in individuals exposed to low doses whereas much higher doses turn out to be less

hazardous under the same category. We are informed that under low-intensivity exposure to minimal doses believed to be safe, the risk of long-term effects increases by a few orders of magnitude, the likelihood of harming the organism goes up whenever the intensivity of irradiation goes down even for a near-background dose, and a protracted impact poses a higher hazard than a one-time high-level exposure. “Discoveries” of such type that defy the classic principles of radiobiology urge the public to make a groundless conclusion that biological effects of small doses under low exposure rates are intensified by hundreds or even thousands of times.

The photo of a six-legged bull with the extra legs owing to adverse effects of the ChNPP Accident circulated in fairly all mass media. However, they forgot to mention in passing that development anomalies in living organisms including humans had happened before the nuclear technology era was ushered. We may recall some exhibits of the famous Kunstkamera Museum in Saint Petersburg where human anomalies collected back in the times of Peter the Great are exposed in public.

They quote data on birth and death rate in radiologically monitored areas as compared to the same data in reference to the areas of monitoring and for Ukraine overall. As a result some authors conclude on a progressive decrease in births and increase of deaths to be observed in the post accident years. Publications appear on premature aging of liquidators, who, being 30 years old correspond to the age group of 50 years based on frequency and severity of illness, invalidity and death rate. Those and similar anxieties including expected mass genetic effects constitute the pseudoscientific basis for radiophobia infused in the society.

The idea that low exposure doses weaken immunity and cause illnesses spread in the areas radioactively contaminated due to the ChNPP Accident. It mainly has to do with monitoring of local children. In this regard it would be appropriate to inform the public that children’s insufficient mobility, lack of staying outdoors accompanied by elementary anaemia resulting from nutritional deficit due to low content of vegetables, greens and fruit in their nutrition allowance, can be the real cause of a weakened immunity in a child’s organism.

Objectively proven are facts of anaemia developed in a certain part of children due to lack of iron in food. An elementarily balanced diet effectively eliminates it. It was tested on a group of children with an acute anaemia. Once their elementary diet was normalized in the sanitarium where they received treatment, the anaemia was gone as if it had never existed in any of them.

Therefore, improved social conditions of living are the main focus where tangible progress can be made in terms of revigorating the health of people inhabiting areas affected by the Chernobyl Accident. Instead of spending huge funds on resettlement, it would be better to invest them in improving everyday life, medical treatment and service, raising the level of living standards and enabling people to enjoy well-balanced and full-value nutrition.

New empirical data and new knowledge of biological effects of exposure will be collected in the future, which will enable an even more reliable substantiation of the exposure regulatory system. But as of today, all necessary grounds to revise the radiation safety norms are already there.

Solid health condition research of persons exposed to low doses for many years has proved a beneficial effect of radiation exposure, but to date this effect is not so well studied to be the basis for exposure regulation [13]. But it can and must be based on effects of exposure dose limits. Low doses of low-level radiation are not harmful to human

health. It becomes more evident over time that selecting dose limits must not be based on the linear non-threshold model because it does not come true even with high exposure doses.

The results of research done for large groups of personnel and population of radioactively contaminated areas are the basis for developing new exposure norming fundamentals. [13, 21]. This has to consider that radiation safety norms should not only be based on scientific knowledge of radiation factor impact on human health, but also result from an economical compromise based on the known "gain vs. loss" optimization principle. In modern terms occupational exposure can be interpreted as justified exposure of individuals for the sake of extra benefits for the society in general and raising the living standards for the whole population. This said, the level of occupational exposure must not be inappropriately high, i.e. excessive risk of a specific group of people must not be a means to reach a social benefit. Limits of such risk must be socially acceptable, scientifically grounded and economically optimized.

Radiation safety norms must:
Guarantee to the entire population a socially acceptable and economically achievable level of radiation safety for all types of exposure;

When establishing requirements to radiation hazard values, address the fact that the main "contribution" to public exposure comes from natural background and natural sources, medical exposure being next, and the portion related to man-caused background due to nuclear tests, accidents and use of radioactive sources is below 1 %; assume that everyday exposure to normal natural background is safe by today's norms;

Ban occupational exposure at the level capable of inflicting direct health damage, and qualify inflicting such damage as occupational injury to be appropriately compensated for;

Provide for limiting long-term effects of occupational exposure at the modern acceptable level contingent upon informing workers on the level of hazard and potential health damage in connection with their professional duties.

Normative values are not only limits in the interest of health protection, but also interventions into production activities, which ultimately affects the overall well-being of the society. Radiation safety norms and liability for their violation must be consistent with norms for other harmful factors of other production activities. Public radiation safety and security are assured by using the country's general economic resources while assuring security of other risk sources taking into account the total risk source hazard. Because of limited resources optimum public safety and security can be best maintained only at a level that is justified from the perspective of economic development level of the country or a specific region.

Exposure norming provisions must address the social and mental perception of radioactive source-related activities by the society and identify them as a type of production activities for the society to benefit from, provided a socially acceptable and economically justified low level of radioactive impact on the population is assured.

The increasing number of personnel and the public exposed to low levels of man-caused radiation intensifies the importance of developing scientifically grounded impact assessments for low-level radiation exposure. Based on those assessments, a concept for dose norming must be developed in Ukraine. It is to create such a new, scientifically grounded concept of personnel and public exposure norming, which would summarize the experience of mitigating

nuclear and radiation accidents that efforts by radiologists, biologists, medical workers and radiation safety experts must focus on. This concept must become the basis for adopting any administrative and governmental decisions meant to assure optimum development of radiation technologies while using techniques unconditionally preventing emergencies and meeting all radiation safety and security norms. This is necessary because many decisions giving rise to economic, social and political consequences are made today based on flawed ideas of exposure-related risk and benefit.

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TOP

MILITARY PERSONNEL IN THE LIQUIDATION OF CHERNOBYL NPP ACCIDENT CONSEQUENCES: MYTHS AND REALITIES

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The consequences of the Chernobyl Disaster are so immense that some facts of significant interest for radiological experts remain unstudied up to this point.

In this publication we will attempt to present our information available on reasonability and consequences of involving a multi-thousand contingent of military personnel in the ChNPP Accident consequences liquidation (ACL).

It was back in 1986 that those involved in the liquidation of the Chernobyl accident aftermath began to be called “liquidators” for short. This term eventually wandered into mass media, and on to scientific publications. Military liquidators drafted from the reserve to participate in the mitigation of Chernobyl Disaster are sometimes called “partisans” (“guerrilla”), the predominant majority of liquidators were exactly partisans.

As of 1986, the USSR had not yet developed an all-Union system for prevention and response to man-caused emergencies [1]. At best, there were facility-specific and the agency-specific systems of emergency response.

The Strategic Missile Forces and the Navy, armed with nuclear weapons and military equipment with nuclear transport facilities, also had facility-specific and agency-specific systems of response to radiological emergencies. However, these types of Armed Forces (AF) did not get involved in ChNPP ACL.

A system was arranged throughout the entire AF to respond to ACL cases for an aircraft (spacecraft) with a nuclear power facility onboard. The system included on-staff Mobile Special-Purpose Unit 122 subordinated to the AF Staff General (SG), and each military district and each fleet formed consolidated off-staff units from among radiological, chemical and biological protection units. AF, including Civil Defense (CD) military units subordinated to the USSR Ministry of Defense (MO) as of the date of the accident, are believed to be administratively, technically and psychologically prepared to respond to the use of nuclear weapons. These circumstances along with high AF mobilization capability led to involving their units in the accident aftermath liquidation since the very first hours of the Accident.

A mobile unit of CD Kiev Regiment arrived at the accident area already on the afternoon of 26 April 1986. On the morning of 27 April, as commanded by the Head of AF SG, forces properly designed to respond to ACL cases of an aircraft (spacecraft) with a nuclear power facility onboard began to relocate to the ChNPP accident area by Privolzhye military transport aircraft (Mobile Special-Purpose Unit 122) and on its own (a consolidated chemical off-staff unit of Kiev Military District – KMD).

On 27 April, Air Force (KMD) helicopters started to fly around ChNPP on radiation reconnaissance missions and to work out a method for dropping loads into the reactor. The loading of sand and other material to be dropped from

helicopters originally involved, along with locals, servicemen from Chernobyl-2 Garrison dislocated 10 kilometres southwest of ChNPP yet prior to the Accident. The Chemical Security Service of this garrison was the first to conduct a radiation reconnaissance of the Chernobyl – Prypyat Road, the river port and railroad station areas, as well as the ChNPP industrial base and ruined Unit 4.

Since April 29, the loading into helicopters of material to be dropped into Unit 4 was done by a separate Civil Defense special protection battalion. Since the very first days Military Medicine Service units arranged for medical care of the population evacuated from the 30km zone.

Military units were involved in the implementation of the most urgent and dangerous ACL missions.

However the governmental leadership eventually began to task AF with absolutely irresponsible and impossible missions of decontamination of the 30km zone including the town of Prypyat and re-evacuation of inhabitants evacuated by early 1987. This entailed bringing a multi-thousand military contingent into the radioactively contaminated area. Dynamics of the total strength (by ascending total) of military liquidators and the Chernobyl Force strength throughout the entire period of AF involvement in the ChNPP ACL is shown on Figure 1.

By mid-August 1986, the strength of the Chernobyl Military Force had grown up to 40 000. Because of unfeasibility of decontaminating inhabited localities within the 30km zone, the personnel began to be rapidly evacuated from the accident area. By the end of 1986, a half of the Force had been gone. During 8 months of 1986, a total of about 100 hundred servicemen had participated in ACL.

During 1987, the military force's strength in the accident area continued to decrease and reached 13 thousand by the end of the year. The overall number of military liquidators by the end of 1987 was slightly above 120 thousand. In 1988 the Chernobyl Military Force's strength again increased almost up to 20 thousand, and through the year the total number of liquidators was up by almost 80 thousand.

The involvement of major military contingents in ACL was due both to the large scale of missions assigned to AF and predominance of manual labor along with required promptness of liquidation activities. It can be vividly exemplified in the erection of fencing around the 30km zone. This fencing about 200 kilometres long was erected in just 13 days (from 8.06 through 20.06.86), but involved around 7.3 thousand servicemen with manual labor being predominant [3]. Should this activity have been better planned and duly provided with necessary equipment – experts believe that the number of servicemen involved could have been 5 times less.

In general, AF were charged with the following ACL missions: filling the crater of the wrecked unit; carrying out non-stop radiation reconnaissance; decontamination of the ChNPP industrial site and premises; decontamination of inhabited localities and roads; special treatment of transportation means; exclusion zone fencing, as well as forming and making certain functional arrangements for ACL industrial base (concrete-manufacturing plants, communication routes, loading/unloading activities), erection of water-protecting dams and interim repositories to bury the components of the wrecked reactor and other radioactive waste, etc.

The military units were involved in the implementation of the most urgent and normally the most hazardous ACL tasks.

According to official data, the total number of military liquidators over the entire period of AF involvement in ACL amounts to 239.3 thousand [2]. At that, the absolute majority was made up of reservists, other manning counted 17 thousand only, including fixed-term servicemen. I.e, in fact, the absolute majority of military liquidators were not military men. Those were civilians dressed in military uniform, who were neither physically nor mentally prepared to adequately tackle ACL missions.

A major problem that the ACL military units faced during the first post-accident weeks was their rapid increase in strength against the background of a constantly changing radiological situation. Because of that, some military units found themselves in areas with gamma-radiation exposure rates of 50 mR/hr and above. In search of cleaner areas, some units changed their dislocation up to three times – a major physical and psychological challenge for the servicemen in addition to their unjustified exposure to radiation.

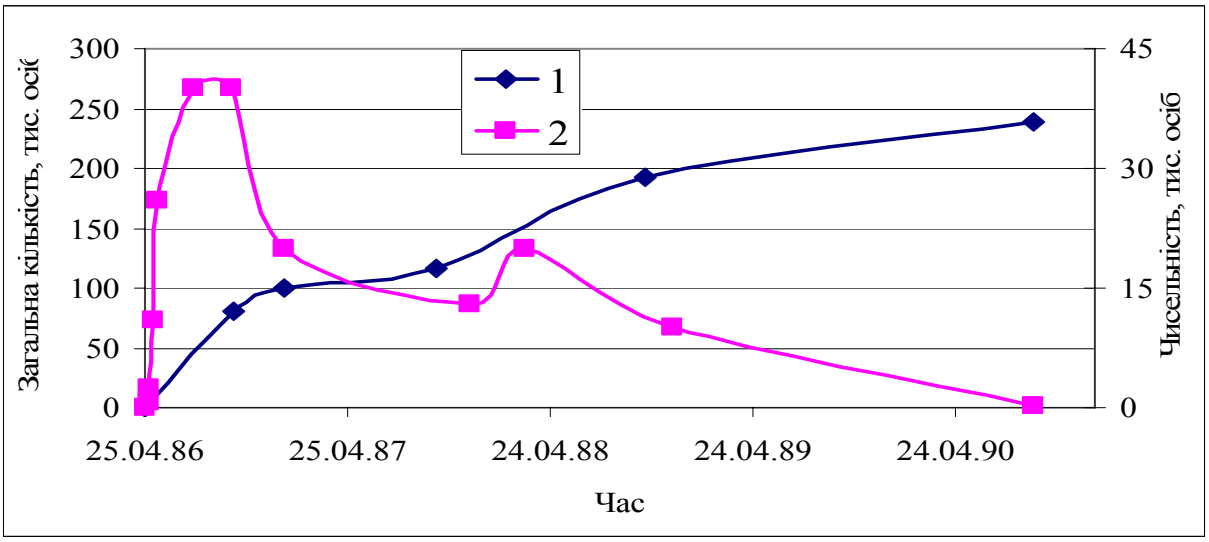

Fig. 1. Dynamics of the total strength (by ascending total) of military liquidators (1) and the Chernobyl Force (2) strength throughout the entire period of AF involvement in the ChNPP ACL.

The ratio among various AF Combat Arms and logistics units in the Chernobyl Military Force is given in **Table 1.**

Table1.

The strength ratio among various AF Combat Arm and logistics units in the Chernobyl Military Force

№№	AF Combat Arm and logistics units in the Chernobyl Military Force	Ratio, %
1	Chemical	40–44
2	Engineering	28–32
3	Civil Defense	6–8
4	Home Front	6–10
5	Logistics	7–9
6	Administrative Bodies et. al.	4–6

Arrangement of military liquidator exposure monitoring

Already since the first days following the Chernobyl NPP accident it became evident, that MD Order № 285 dated 08.12.1983 [4] merely outlines a system of radiological protection of military men and dosimetric monitoring in case of radiation emergencies. For such a system to function effectively, dozens of regulatory and guidance documents had to be prepared and a wide range of arrangements made.

The unprecedented scale of the Chernobyl Disaster, difficulties in forecasting the scope of work to mitigate its consequences were the main reason for a debate within SG between the Military Medicine Service Command, who insisted on setting peacetime norms (25 rem), and the Department Head of the RCB Protection Department, who proposed wartime personnel exposure norms (50 rem) as the basis[2, 5].

However, even with such an uncertainty in exposure limits in the first post-accident days, a Radiological Protection Service (RPS) and Dosimetric Monitoring (RM) within the ACL units did function. Thus, the KMD Air Force Commander – 1 May 1986 [6], and later on the KMD Commander– 4 May 1986 [7] issue orders on RPS arrangements in the subordinate military units involved in ACL. These orders establish exposure limits for military servicemen throughout ACL – 24 rem for Air Force servicemen and 25 rem for the rest of military liquidators.

Therefore, RPS including DM are organized within all units arriving at the wrecked ChNPP area and getting under command by the KMD Force Commander already since the first days of their stay in the accident area. It is primarily indicated by the high level of provision of military liquidators with dosimetric monitoring data during that period in the State Chernobyl Registry [8].

It is worth mentioning, however, that the first post-accident activities of the military radiological protection services did not catch up with the situation as it developed, and regulatory requirements were not fully met. Particularly, already as of 1 May 1986 (issue date of the KMD Air Force Commander Order), the strength of units involved in the accident area activities almost reached 600 persons, including up to 100 representatives of KMD Air Force units, and as of 4 May (issue date of the KMD Commander Order) it was already a multi-thousand military contingent that participated in the emergency activities. In violation of i. 35 of MD Order № 285 dated 08.12.1983 [4] personnel were involved in ACL without orders authorizing work under high exposure doses, the first order of this kind was only issued on 1 May. The permissible dose limit debate lingered until 21 May 1986. The normative uncertainty with respect to external exposure doses resulted during the first post-accident weeks in the exposure of 52 servicemen of Special-Purpose Chemical Force Unit 122 directly subordinated to Department Head of the RCB Protection Force, to doses of up to 72 rem [2, 9]. Meanwhile, the personnel of the military units subordinated to KMD, who carried out radiation reconnaissance missions of comparable radiological hazard or even more hazardous ones (flights over the wrecked unit), were exposed to much lower doses (Table 2). This Table demonstrates a dependence of the average military liquidator dose during the first month of liquidation activities on the set dose limits.

Table 2.

Personnel exposure doses of the military units involved in the ChNPP Accident consequences liquidation during April – May 1986

№	Name of Unit	Number of surveys	Exposure limits, in rem	Exposure dose limits, rem		Average exposure dose, in rem
				Min	max	
1	Chemical Force Unit 122	38	50	40	72	54,2±1,3
2	KMD Consolidated Chemical Unit	25	25	25	30,9	26,7±0,2
3	KMD Air Force	31	24	13,5	29	21,6±0,4

The permissible dose limit uncertainty was ended by MD Order №110 dated 21 May 1986 [10], which set the dose limit for all military servicemen at 25 rem. Item 3 of this Order provides for using "group" and estimated "group" dose assessment methods along with individual dosimetry. In addition, the permissible daily dose of 2 R [11] is introduced to prevent mass exposure of liquidators to major doses in the accident area. This measure made it virtually impossible to use common military dosimetry equipment to monitor exposure doses of military liquidators (Table 3).

Table 3.

Precise characteristics of domestic common military dosimetry equipment

№	Time	Recorded range	Option of automated information reading and collection
Military dosimetry means			
1	ID-I	20–500 rad	not available
2	RMP-50A	2–50 R	not available
Individual dosimetry means			
3	DK-0,2	10–200 mR	not available
4	ID-II	10–1500 rad	not available
5	DP-70M	50–800 R	not available

In addition, another 30 various regulatory and guidance documents were developed [12, 13, 14], which detailed specific provisions for radiological protection of military liquidators.

Despite all instructions, the ACL Units failed to establish IRM based on individual dosimetry (ID). Therefore, the Chernobyl Military Force favored «group» (one ID per group of servicemen) and estimated «group» (dose estimate per group of servicemen according to workplace gamma radiation dose rate and work duration) methods of dosimetric monitoring. According to some authors[15], these DM methods had errors of 250 % and 500 % respectively. The single exception would be the work to decontaminate the roof of ChNPP Unit 3 during 19 September – 2 October 1986, where mandatory operative monitoring of liquidator dose was performed, using dosimeters of the RMP-50A type [16, 17]. That work involved a total of 3026 military men. Thus, assuming the total number of military liquidators to be almost 300 thousand, the dosimetry instrumentation monitoring covered not 14% of military liquidators, as V. Chumak believes [8], but only 1%.

It should be noted, however, that the organization of ChNPP Unit 3 decontamination work also gave an example of failing to meet the Order-established norms: Guidance For Work Organization And Performance [I-86], in defiance of

all the then existing orders, the one time exposure dose limit of 20 rem was established for participants of ChNPP Unit 3 decontamination work. And because military man were involved, who had already been exposed to some doses, in certain cases the total dose exceeded 25 rem.

Another attempt– another failure – at organizing dosimetric monitoring exposure doses were fairly low military liquidators, using DPG-03 dosimeters (jointly with the Dosimetric Monitoring Dept. of the Research& Production Association Prypyat) was made in late 1989 – early 1990.

The liquidator contingent with reliable doses can not be expanded by individuals from groups where doses were monitored by the «group» method, since servicemen who wore ID were constantly replaced.

Therefore, total individual exposure doses for military liquidators, identified based on individual dosimeters are virtually missing.

It should also be borne in mind that the estimated “group” dose assessment would normally use the military roentgenometer-radiometer DP-5, while the “group” assessment method– the DP-50A dosimeter. Both devices were calibrated in Roentgens, accordingly, the records in the ACL military unit exposure logs were also made in Roentgens. However, when filling out Registry questionnaires, instead of Roentgens, the same value but in rem was entered automatically, without factoring in the conversion rate of 0.67–0.71, which also contributed to overestimating the official dose records (ODR).

Therefore, on the one hand, military liquidators are best provided with official dose records [8], while on the other hand – there are serious doubts about the quality of those dose values because of the predominance of the “group” and estimated “group” methods of their assessment. A major effort to verify those doses would be needed if we were to use the data on the exposure of military men in epidemiological studies [8, 15].

Verification of military liquidator exposure doses.

The first stage of verification addresses the objectivity issue of dosimetric monitoring. A whole series of verification methods to deal with available dosimetry information has been proposed, the predominant majority of which are based on variation statistical methods.

Due to monitoring of the doses with near-permissible values, the distribution of doses around the boundary value becomes normal. The so-called hybrid lognormal distribution (combination of logorhythmically normal and normal distribution) gives a good reflection of data observed in many of such cases [18].

The attempts to clarify the dosimetric monitoring objectivity situation in the ACL Units that we know of were made based on a statistical analysis of too generalized information [15, 18], or using insufficiently accurate database of the All-Army Registry [19] without considering the organization specifics of service, work and dosimetric monitoring in those units.

The irregular distribution of military liquidator exposure doses being generally limited within a range of 10–25 rem, led some authors to conclude that the main source of distorted dosimetry information in Chernobyl Registrys are the

relevant Services of MD units [15, 18]. These authors believe that the range of activities performed by MD units was very wide and only a portion of it was related to exposure to significant individual doses. In other words, a wide range of tasks to deal with must correspond to a wide enough and smooth distribution of individual doses.

To clarify this issue, we have analyzed the military liquidator exposure doses for various ACL activities, which differed in principle by nature of activity and health conditions.

The outcome of this analysis for May 1986 - May 1987 is given in Table 4 and Figures 2–6.

Table 4.

Average exposure doses in ACL Units depending on area and nature of activities performed

№	Name of Unit and AF Combat Arm	n	Area of activities performed	Nature of activities	Average exposure dose, cSv
1	Separate mechanized regiment (SMR), CD	4704	ChNPP	Decontamination	22,57±0,10
2	Military engineering battalion (MEB), sappers	3489	ChNPP, 10-kilometre zone	Decontamination, construction	20,02±0,08
3	Chemical protection brigade (CPB), Chemical warfare force	2465	ChNPP, 10- and 30-kilometre zones	Decontamination	20,08±0,15
4	Home front and logistics units	2158	30-kilometre zone and beyond	Home front and logistics	7,82±0,91
5	Operative Group (OG) 817, administrative body	1164	30-kilometre zone	Work organization	9,23±0,60

The Table 4 data indicate that the average military liquidator exposure doses are determined by the area and nature of ACL activities performed. Specifically, the average doses are much lower for units that did not performed work directly at the ChNPP industrial site. Maximum doses are observed in CD, chemical and engineering units; much lower ones in administrative units; and minimum ones in logistics units. Accordingly, the exposure dose values for SMR i MEB, which worked under the most radiologically hazardous conditions, are skewed towards the permissible dose limit of 25 cSv (Fig. 2, 3). Because various CPB units were both onsite at ChNPP and at various distances from it, the exposure dose distribution for this part of liquidators has a somewhat different nature, but most doses still are placed around 25 cSv (Fig. 4). In the opinion of some authors [8], that we share, such an irregular distribution of doses for CD, chemical and engineering units results from a stringent dose management rather than total falsification. Therefore the major doubts held by some authors as to objectivity of dosimetric monitoring in ACL units are primarily due to these researchers' insufficient awareness of the organization of dosimetric monitoring and activities of this liquidator contingent. Yet one cannot totally dismiss facts of dose falsification, nor the possibility of unmonitored exposure of a certain part of liquidators to doses significantly exceeding the permissible ones [9].

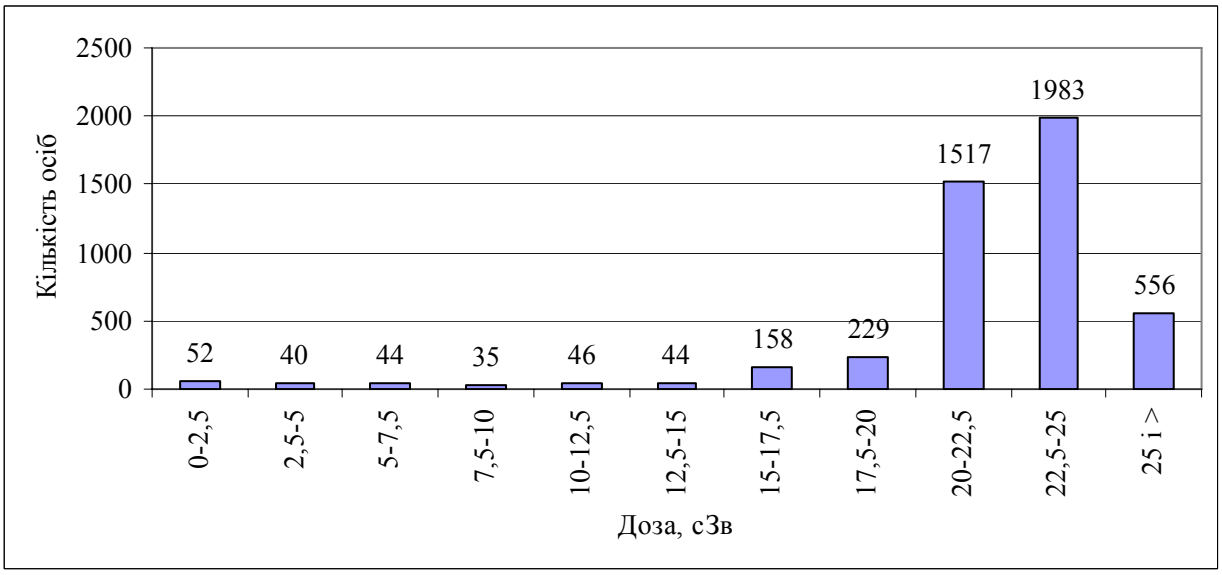

Fig. 2. Distribution of exposure doses for servicemen of the Separate mechanized regiment (SMR) during May 1986 – May 1987 (n-4704).

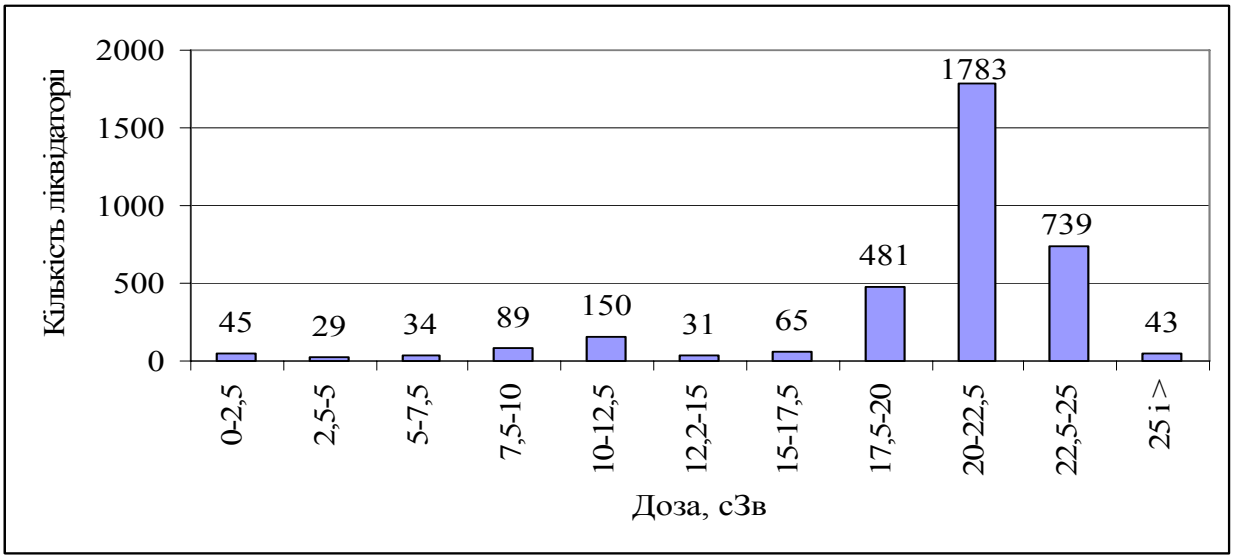

Fig. 3. Distribution of exposure doses for servicemen of the Military engineering battalion during May 1986 through May 1987 (n-3489).

It should be taken into account that a monetary compensation adding up to 5 monthly remuneration rates was provided for exposure to a dose of 25 cSv and above. In other words, there was a significant material “interest” in receiving a dose of 25 cSv and higher. Once the dose limit was set at 10 cSv, cases of reaching the dose limit became singular, and cases of exceeding 10 cSv went virtually unrecorded, which can support our assumption. It should be noted however, that cases of modifying exposure doses for social reasons had place among liquidators from other ministries and agencies [8].

For OG 817 and especially for the logistic units that worked under more favorable conditions in terms of radiation exposure than the aforementioned ACL units, the exposure dose distribution is close to logarithmically normal (**Fig. 5**).

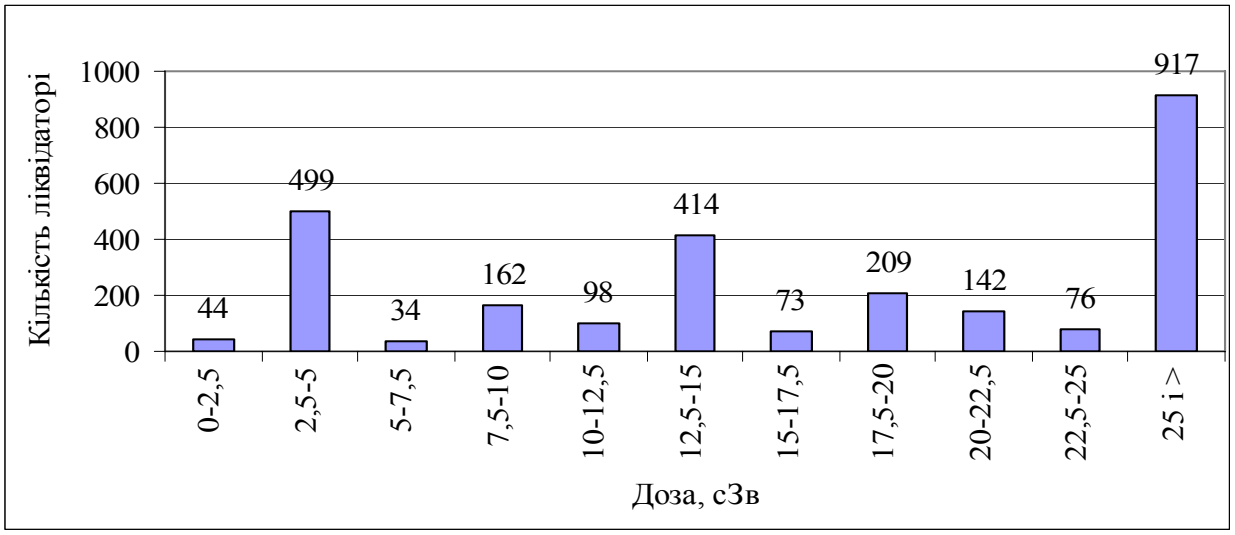

Fig. 4. Distribution of total individual exposure doses for CPB 25 personnel during May 1986 -- May 1987 (n-2465).

Therefore, the exposure dose value and the nature of dose distribution in military liquidators are generally consistent with the nature of ACL activities and health conditions. But in general summaries the dose distribution specifics in serviceman of ACL units, which worked under safer radiological conditions, is offset by the data on exposure doses in the more numerous CD, chemical and engineering forces.

Another step in dose verification is to establish a ratio between officially recorded (obtained via the “group” and estimated “group” methods) and specific reference military liquidator exposure doses, which objectively reflect the real situation.

As reference ones, we will use 2447 records for military liquidator exposure doses measured with thermoluminescent dosimeters, courtesy of the archives of Kombinat Production Association (eventually transformed into RPA Prypyat)

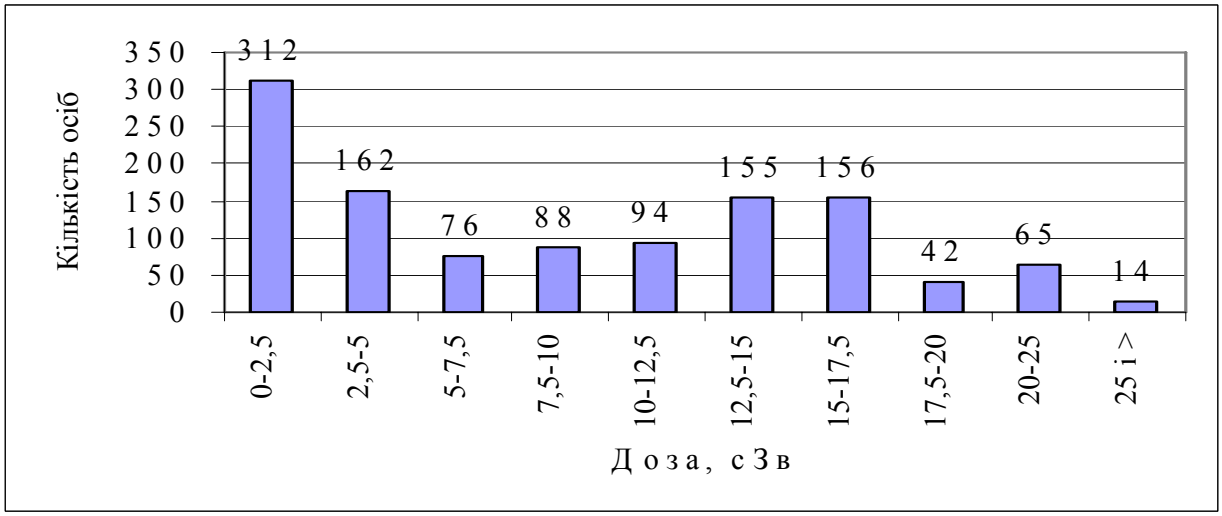

Fig. 5. Distribution of exposure doses for OG 817 personnel during May 1986 -- May 1987 (n-1264).

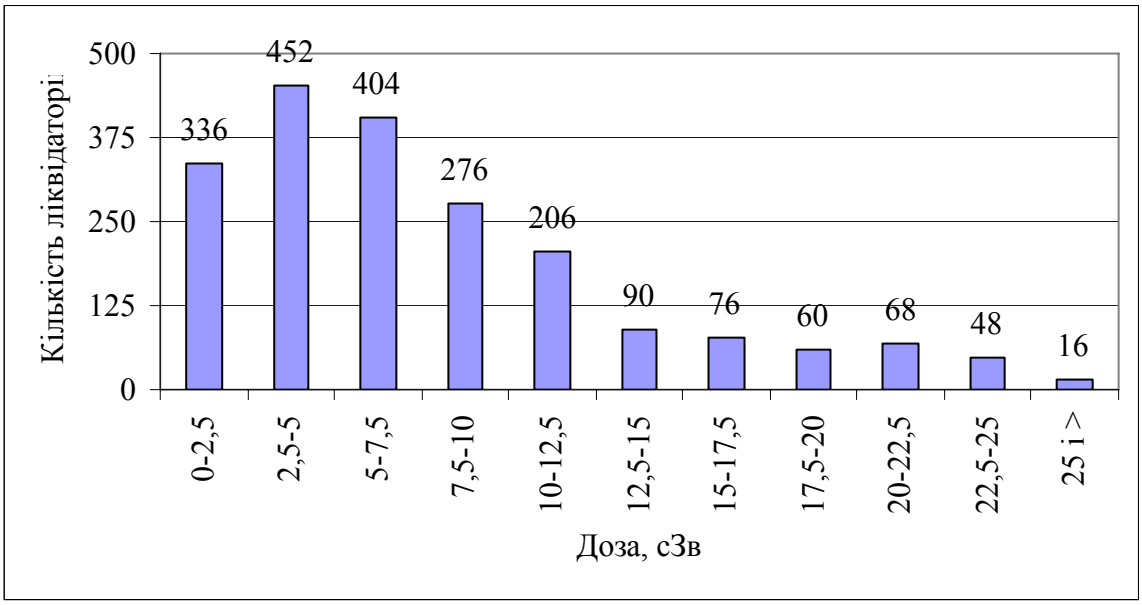

Fig. 6. Exposure dose distribution for logistics personnel during 22.06.1986 through 8.08.1987

Based on these data we have calculated the average doses received by servicemen for two weeks (basic term of wearing a dosimeter), total exposure doses were calculated for 12 weeks – a duration of military liquidator stay in the ChNPP area that is also a conservative enough assumption.

A comparison of doses calculated based on measurement and official dose records (ODR) in the same contingents is shown on **Table 5.**

The **Table 5** data indicate that ODR exceed the doses obtained through individual dosimeters, by an excess of 4.5 times in1988 and more than twice – in 1989 and 1990.

Table 5.

Ratio between estimated doses and doses measured by individual dosimeters of military liquidators

№	Year	Average dose obtained by estimation method, cSv/number of persons in group	Average dose measured by individual dosimeters DPG-03, cSv/number of persons in group		Ratio between estimated and measured exposure doses
			For two weeks	For three months	
1	1988	5,56 ± 0,97/7502	0,2± 0,05/68	1,2	4,63
2	1989	3,12 ± 0,12/5862	0,22±0,03/568	1,32	2,36
3	1990	4,94 ± 0,22/2748	0,36±0,03/1811	2,16	2,29

Also noteworthy is the ratio between projected (estimated) and actually measured with ID of the RMP 50A type exposure doses of the military men who decontaminated the ChNPP Unit 3 roof. Table 6 provides literature [17, 20] and archive data on the exposure doses of this contingent. Again we see that the projected (estimated) dose in average is twice that actually obtained.

Table 6.

Ratio between estimated and actually measured exposure doses of the military men who decontaminated the ChNPP Unit 3 roof

№ з/п	Date of activities	Number of liquidators	Average dose by estimation method, cGy	Average dose measured by individual dosimeters, cGy	Ratio between estimated and actually measured exposure doses
1 [20]	28.07.86	8	1	0,4	2,5
2 [17]	19–20.09.86	133	20	8,5	2,35
3 [17]	21.09.86	307	20	10	2,0
4 [17]	22–23.09.86	953	20	9	2,22
5 [17]	24.09.86	376	20	10,6	1,89
6 [17]	26.09.86	270	20	13	1,54
7 [17]	27.09.86	300	20	16,2	1,23
8	14.10.86	30	20	8,26	2,42
9	15.10.86	16	20	9,9	2,02
10	16.10.86	28	20	10,29	1,84
	Total	2421			2,07

When analyzing other archive materials, we have detected cases of dose exceeded for the purpose of pre-term release from training assemblies [21], as well as due to a variety of methodology problems [22, 23]. By the way, the «group» method being a more accurate one was used quite rarely, and dosimeters of the D-2R type that it applied under hard beta-radiation overestimated the exposure dose at least twice.

I.e. the exposure dose analysis for major military liquidator contingents indicates that ODR are at least two times higher than the exposure doses actually received.

Data on early dismissals of servicemen SMR and CPB for health considerations is given on Table 7. First of all it should be mentioned that these data are not fully consistent with the realities and are insufficient for well-grounded conclusions. In particular, it is unlikely that the aforementioned units should have had more cases of dismissals for health considerations in 1987 than in 1986. Yet these data are quite enough to state that in a predominant majority of liquidators dismissed for health considerations, the exposure doses and duration of stay in the accident area were significantly less than in their colleagues who had no health concerns.

In a predominant majority of liquidators exposure doses were also at the level where there exists but some likelihood of physiological deviations unrelated to health dysfunctions. The radiological factor being a very insignificant contribution to deterioration of liquidator health can be attested by the fact that two out of the three liquidators deceased on the third and fifth day of their stay in the wrecked ChNPP area, and the duration of stay of the third deceased was also within average for their unit. The main cause of death in all these cases is acute cardiovascular deficiency.

Table 7.

Dismissals, exposure doses and duration of stay in the accident area for servicemen of SMR and CPB during 1.05.1986 through 31.12.1987

Year of ChNPP ACL activity	Period	Exposure dose		Average duration of liquidator stay in the ChNPP area		Number of liquidators dismissed for health considerations	
		SMR	CPB	SMR	CPB	SMR	CPB
1986	April-May	23,23±0,2	18,4±0,4	28,9±0,6	21,6±0,8	-	1*(7)/(25)
	June-August	22,17±0,4	14,3±0,6	55,7±0,5	29,3±0,4	1	1*(36)/(2,5) 1*(28)/(14)
	September-December	23,1±0,2	24,3±0,3	57,3±0,3	41,7±2,2	1	-
1987	January-June	22,1±0,19	18,1±0,5	69,6±0,7	69,1±1,9	1**(53) 1**(3) 1**(5) 1*(53)	-
	July-December	10,7±0,28	9,3±0,2	72,1±1,2,	54,1±1,5	1*(20) 1*(21)	1*(39)/(4,8) 1*(51)/(7,02) 1*(30)/(0,2) 1*(49)/(6,0) 1*(47)/(4,3) 1*(39)/(8,8) 1*(71)/(3,7) 1*(35)/(5,5) 1*(44)/(9,1) 1*(35)/(5,7) 1*(69)/(8,9)
Total dismissed in 1986 and 1987						10	14

* liquidators dismissed for health considerations (in brackets, the duration of stay in the accident area (days) is given in the numerator; exposure dose (rem) – in the denominator);

** liquidators who died during their stay in the accident area (in brackets – duration of stay – days).

In some orders issued by military unit commanders we find records on other lethal cases among liquidators, but no summary information available on this issue. Therefore we can provide but very rough estimates of total lethality by extrapolating the ratio of the number of SMR serviceman and number of deaths among them onto the total number of liquidators. Since the total number of persons who served in SMR in January – June 1987 was about 2–3 thousand, then the total death toll for the contingent of 300 thousand could have been about 300–450 cases.

The Chernobyl Military Force Commander Order № 5 dated 29 January 1990 [25] indicates that in a majority of military units no in-depth medical examinations are conducted, resulting in cases of late diagnostics of ailments, up to lethal ones (private K. – shower & laundry detachment, praporshchik D. – military trade unit 960, Private S. – military detachment 63279 etc.). And that happened in 1990, when the military liquidator exposure dose did not exceed 5 rem.

Researchers of the morbidity problem detected no essential connection between availability of liquidator complaints and duration of their stay in the accident area, as well as the location and nature of recovery activities [26].

The **Table 8** data can also confirm that it was other factors rather than the radiological one that was the cause of liquidator health condition deterioration.

Table 8.
Dismissals and exposure doses for military liquidators of the first and third sectors during 20.12.1986 through 30.03.1987

№ з/п	Pertinence of liquidators	Terms of liquidator dismissals	Number of dismissed for health considerations	Average exposure dose for liquidators dismissed for health considerations	Average exposure dose for liquidators in 1986–1987
1	Sector 1 (Belarus Military District)	20.12.86–16.03.87	84	2,39±0,13	5,7±0,3
2	Sector 3 (Carpathian Military District)	03.01.87–30.03.87	23	9,57±1,29	15,17±2,3

The exposure doses for military liquidators of the first and third sectors, dismissed for health considerations also did not exceed the average for elephants sectors and those levels, that could even theoretically cause changes in their health condition.

In our opinion, the sudden conscription with a drastic change of habitual living and working conditions, frequent relocations in the accident area provoked a major strain of adaptive mechanisms and transition of certain body parts and systems, primarily the cardiovascular one, to a critical functioning mode. It was what induced the aggravation of chronic diseases and sometimes – emergence of critical conditions and lethal cases. The radiation factor is seen from the exposure doses available to have been one of the least significant ones.

A large number of liquidators dismissed for health considerations intensified the socio-psychological consequences of the accident, people developed a belief that recovery work at ChNPP was extremely dangerous, hence the liquidator contingent grew and so did the ACL costs.

Conclusions

1. The State's unpreparedness for action in emergencies; charging the Armed Forces with unfeasible tasks; predominance of manual labour in ACL; use in DM of methods that overestimated the dose by about twice; imperfect system of medical selection of reservists drafted for a training assembly for ACL, –that altogether unreasonably

enlarged the liquidator contingent, increased ACL costs and intensified the socio-psychological consequences of the Chernobyl Disaster.

2. The system of radiation safety and security of the Chernobyl Military Force, whatever its shortcomings may have been, has not permitted that military servicemen be exposed en masse to doses capable of inflicting radiation injuries.

3. The exposure doses and duration of stay in the accident area of military liquidators who were dismissed for health considerations or died during their stay in the accident area were notably lower and shorter than average for the unit where they served.

4. Due care has yet to be taken of the impact of non-radiation factors on liquidator health conditions during recovery work and in a long term.

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TOP

IRANIAN NUCLEAR COLLISION: A DEADLOCK FOR THE WESTERN DIPLOMACY?

Dariya Fridman
Press Secretary for Chairman of the State Nuclear Regulatory Committee

Analyzing the effect of the military operation on Iraq, the Unites States, to its bewilderment, is brought to accept that ruining one defiant state has lead to a substantial strengthening of another state's political positions. The war on Iraq is over… Iran won. This is how some wits in Washington tend to be joking lately.

Analysts of the issue allege that Americans in their strenuous war on terror have done all dirty work for Iran. To start with, the "Taliban" holding back the Iranian influence in Afghanistan was crushed. Then the U.S. Army broke Iraq – the main Tehran's military rival in the region. (In 1980-1988 Iranians failed to score the victory). Finally, efforts of the "world's most developed democracy" came about to bring Hamas to power in the Palestinian Autonomy.

While the U.S. has been destabilizing the region – Iran has never missed its chance to take advantage of the situation and increase its weight in the region. The outcome is the region with the world's largest oil and gas reserves happens to be falling under Iranian influence. Are there grounds for Iran to aspire at regional domination? Without any doubt. With its population of around 68 million, Iran is the biggest country in the region being favorably situated between the Persian Gulf and the Caspian Sea, the Mesopotamia and South Asia, the Caucasus and Central Asia, which makes Iran capable to control the Straits of Hormuz, a narrow neck of the Gulf to potentially block tanker traffic out of the region providing near one fourth of the world's oil production. Besides that, Iran enjoying the advantage of being an important transport junction in Central Asia, can, if need be, block both the latitudinal traffic between East and West and longitudinal transit between the south of CIS and the Indian Ocean. A major presence of various national minorities (Azaris, Mazanderani, Gilanians, Kurds, Arabs, Baluchis) residing on the Iranian territory gives Tehran a tool to interact with the neighboring countries. The main wealth of the country is huge oil (ranking fourth in the world) and gas (second in the world) reserves. Special attention has to be paid to the military potential of the country. Nowadays the Iranian military industry covers basically all types of modern armament production. Unlike other states of the region Iran avails of the most diversified economy. The national produce by parity of the purchasing capacity is estimated at $552 billion (ranking 20th place in the world). According to the Economist Intelligence Unit prognosis, by 2020 the Iranian economic capacity will hit $ 1.2 trillion.

As one may notice, the stated facts might serve a reason for a happy economic and political anticipations in the future! However, will the West be happy with Iran's influential presence in the Caspian Sea and Central Asia region, whose uncompromised strategic significance can hardly be overestimated – the country that in the foreseen future will grow to compete not only with the former colonial countries, but America as well.

It was after the 1979 Iran Revolution when the power of the pro-American Shah Mohammad Reza Pahlavi was taken over by the religious opposition leader Ayatollah Khomeini and especially at times of the aforementioned Iran - Iraq war that relationship between the West and Iran dramatically worsened. Soon the country's exit from CENTO,

1 The Central Treaty Organization (CENTO) – a military political block created on the initiative of the U.S. and Britain in the Near and Middle East with Britain, Iran, Pakistan, and Turkey as its members. The U.S.A, formally not being a CENTO member, was a participant in its main committees. The Organization started its activity in 1955 when Iraq and

Turkey concluded a military treaty, which later was joined by Britain, Pakistan, and Iran. In 1959 the U.S.A signed an agreement with Iran, Pakistan, and Turkey to cooperate against a threat of direct or indirect "communist aggression". CENTO participants conducted navy, air, and land military forces exercises on a regular basis.

cessation of contacts with the U.S. and other Western countries, withdrawal from the agreement with the International Oil Consortium, and removal of the U.S. military bases with 50 thousand U.S. military personnel were announced by the new leadership of Iran. Iran – Israel diplomatic relations break-off followed as well as foreign companies and banks closure. Formerly friendly relationships with western countries were soon commuted for mutual hostility.

The outcome of the Islamic Republic presidential election last year still further aggravated the conflict. Unlike his predecessor, who conducted a balanced policy avoiding conflicts with other countries, the new President Mahmoud Ahmadinejad keeps to a harsh anti-American stance. Soon after his election, Ahmadinejad declared that he did not see any sense in maintaining any relations with the United States.

It is natural that such statements can never contribute to alleviation of the tension existing in the relations between Iran and the U.S.A, which only got still more intense with George Bush entering the White House. It was in March 2001 that Washington chose to resume the unilateral embargo on trade relations with Iran and American investments into its economy. In early 2002 Bush called on Iran to stop backing the international terrorism. The U.S. is actively impeding Iran's joining the WTO, and foreign oil companies whose trade business with Iran exceeds $ 20 million are not allowed to the U.S. market. Time and again Bush has been making it clear he would not accept the presidential election results in Iran as "ignoring the democratic norms".

It is clear that in the given context the policy practiced by one side will inevitably be taken by the other side with a good deal of suspicion. Nowadays the climax in the standoff between the West and Iran is represented by the nuclear programme of the latter, considered a key element of Iran's strategy to become a regional leader.

The foundation for the Iranian nuclear project was laid by West Germany, France, and the U.S.A back in the 70's. In 1974, Tehran invested $1 billion in purchasing a 10% share in a French plant specialized in uranium enrichment, which gave Iran the right to obtain the produce of the plant and get access to uranium enrichment technologies. However, the Islamic revolution put an end to this cooperation in 1979.

In addition, yet before the shah regime overthrow, the W.German company Siemens engineered a Bushehr nuclear project for Iran with scheduled construction of two nuclear reactors. During the Iran – Iraq war, the project site underwent destruction with luckily no nuclear fuel present in the premises. Later Russia agreed to continue the project construction. Nowadays, Russian specialists proceed with building the Bushehr nuclear plant equipped with the WWER-1000 type power reactor. According to the contract, the projected reactor will comply with all IAEA norms and regulations. It also stipulates the return of spent fuel from the first nuclear unit to Russia which will make its potential use for military production impossible. It is worth noticing that the Iranian nuclear programme of the shah time was quite ambitious. The recommendations by the Stanford University experts maintained that the projected energy production would reach 20 thousand megawatt in 20 years.

Iran is a signatory to the Nuclear Non-Proliferation Treaty (NPT) which provides for close international inspection of any member country's nuclear activity.

In 2002, undeclared nuclear activity by Iran was detected. The West came to a categorical conclusion: Tehran is in violation of NPT Clause 2 and pursuing a secret nuclear programme. There were a number of reasons to back this accusation against Iran.

In 1987, Iran made its first claim to purchase 2000 uranium enrichment centrifuges. At that time no reactors were operated in the country, which led specialists to doubt the centrifuges were needed for nuclear fuel production purposes. Later on Iran did manage to purchase 500 centrifuges at the black market. What reasons called forth the necessity to purchase them remained unclear for the international community. Besides that, IAEA inspections revealed two objects being not reported by Iran timely and properly in defiance of the NPT regulations. In particular, huge underground premises for uranium enrichment activity were found to be secretly built. 164 centrifuges were known to have been installed there, and a number were stored disassembled. On the surface above the complex an agricultural farm was set up for camouflage. The motives for all that remain unclear.

One more reason to bring accusations against Iran was the prompt deployment of a missile programme featuring missiles with range of over 2 thousand km. Experts state the missiles of this range are normally engineered for mass destruction applications while being ineffective for other purposes due to low targeting accuracy. The targeting error with this type of missiles reaches one kilometer which renders it useless to equip them with conventional explosives like TNT.

In the outcome all these facts merge into a good cause to believe Iran is pursuing a nuclear programme. According to CIA, Tehran resumed its nuclear programme-related efforts as early as in the mid 90's and today is about to reach its final stage – manufacture of nuclear weapons. Files found in an Iranian laptop computer that got into CIA hands in 2004 work against Iran too. They resemble design drawings of the nuclear bomb used by the U.S.A on Nagasaki in 1945. The laptop computer that, by one of the versions, was stolen by CIA from an Iranian nuclear technology specialist, contained documents that served a proof of existence of the Iranian nuclear weapons programme.

Secrecy, contradictions, and inconsistency noted in the Iranian nuclear policy grew into a serious irritating factor for the international relations and gave Washington grounds to initiate a campaign against Iran involving IAEA and other international organizations.

In September 2003, IAEA in fact challenged Iran with an ultimatum: within one month Iran was to sign an Additional Protocol to the NPT with stipulated safeguards and settle the issue of its secret nuclear programme, otherwise the case would be passed to the UN Security Council with sanctions to follow. To solve the issue, Iran agreed to deal with the EU's three biggest powers (Britain, Germany, and France), the then opponents in policy to the Bush administration regarding the issue. Besides that, Iran started to cooperate with IAEA which resulted in signing a protocol for additional inspections.

The Eurothree's activity was initially targeted at reaching a compromise that would alleviate the tension around the Iran nuclear issue and at the same time give a chance to the ambitious country to enjoy scientific and technical progress in the nuclear sphere. A solution seemed to be found: Tehran had to pledge to the world no intentions to create nuclear weapons and suspend its large-scale uranium enrichment programme, while retaining its right to practice a pilot

uranium enrichment programme engaging 500 – 600 centrifuges. The international inspection regime had to be strengthened, to closely monitor the implementation of the above. However, in late 2003 the U.S.A came up with an idea to put forth one more obligation for the NPT non-nuclear-weapon members – to abandon any uranium enrichment activities, sourcing instead nuclear reactor fuel from an international consortium that had to be set up for this purpose. The Eurothree, seeking ways to improve the relations with Bush administration, chose to follow the American approach to the issue. That resulted in altering "suspension" to "cessation" in the negotiation process. One word – but to what effect!

Negotiations went on during 2004 and resulted in an agreement on uranium enrichment activity moratorium signed by Iran and the EC. The agreement stipulated for the moratorium to be a temporary measure, more of a trust gesture on behalf of Iran. However no sooner the contract was signed the sides were found to exhibit opposite interpretations of the document. Iran accentuated the temporary nature of the moratorium meaning they can cease it any time with no consequences. The EC contended for the agreement to be the just the first step for Iran on its way to complete cessation of its uranium enrichment activity. The conflict remained covered up for some time while the West was waiting for the presidential election results in Iran hoping the new government would comply to cooperate more efficiently, which eventually would lead to the issue being solved by the American scenario. Ahmadinejad's victory in summer 2005 made it clear that the Islamic Republic would never back down over its nuclear programme. The hoped-for "triumph of the Western diplomacy" never came about.

In January 2006 Russia joined the process. At the EurAsEC Summit President Putin came forth with a sensational proposal to create an international uranium enrichment centre in Russia. The initiative was mainly addressed to Iran that was offered establishing a joint uranium enrichment enterprise for the Iran's nuclear industry needs located on the Russian territory with no access for Iranian specialists to enrichment technologies and training, plus resuming the enrichment activities moratorium. Nonetheless, on March 12, a Foreign Affairs Ministry official Hamid-Reza Asefi stated that the Moscow proposal was taken off the agenda.

Iran's rejection of the Russian proposal was most likely determined by the results of the IAEA Board seating in Vienna on March 6, 2006. One more way to relay the concern on behalf of Iran about IAEA's decision to pass the IAEA Director General Mohamed El Baradei's report to the UN Security Council. It has to be noted that the expected passing the nuclear case to the UN SC did not take place.

The report containing 55 clauses sums up the IAEA inspectors' job in Iran since November 2005. Special attention has to be given to Clause 53 which states that "all declared nuclear materials in Iran have been registered", however, "albeit no transfer of the nuclear materials for the weapons creation purposes or other nuclear explosive devices were detected by the agency, it is impossible to draw a conclusion as of the absence of any undeclared nuclear materials or activity in Iran". The controversy between Tehran and IAEA lies in the fact that inspectors found no proof of military component in Iran's nuclear programme, while Iran failed to convince the IAEA of its exclusively peaceful nature.

Should Iran choose not to comply, further escalation of the conflict is possible which will bring about a regime of both political and economical sanctions (restriction for Iran officials to visit other countries, limitation of culture relations, Iran's foreign financial accounts frozen, etc.) However experts are sure it is a long way to the sanctions. The UN Security Council will start about with urging Iran to suspend its uranium enrichment programme and will suggest that IAEA study Iran's compliance with the demand.

No matter the sanctions. Would they scare the Islamic Republic? They would serve another stimulus for the ambitious nation that has suffered enough mistrust on the part of the international community. The sanctions will be likely to push Iran to obtain nuclear weapons even quicker. The West has to find other ways to deal with the Asian mentality, diplomatic ways being the best.

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MODERN EUROPEAN POLITICAL SYSTEMS SECURITY IN THE CONTEXT OF INFORMATION SOCIETY DEVELOPMENT

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Any political activity of states, political parties, their leaders, or separate individuals is normally influenced by economical, social, cultural, and national factors. On the one hand, these factors contribute to political institutions security and stability, while on the other, they may spawn revolutions, civil disorders, or even lead to a state collapse [1, p. 7–8]. To avoid insecure developments, a political "system" seeks to control the society and establishes stable connections with modern mass society institutions that are in charge of social communications. It is why the fundamental importance of the actively forming information society and its qualitative influence on the political system formation and functioning is substantially growing. For instance, the 20th century practice shows novice technologies are initially tested in military operations both on the communications level and in fighting tactics. The accumulated experience then enables the country that applied the modern technologies, to promote and improve political parties operation and state government functioning. The new society theoreticians maintain the society is a fairly conservative formation, which only gives way to social changes and critical processes due to inconsistency in the informational technologies progress, the so called "digital gap". It is politicians who cultivate this inconsistency to control the society and keep the "problem" policy in practice [3, 4]. So can we speak of the information society as being essentially a "democratic" system where the society controls politicians and not the other way round, and where G. Orwell's forecast about the "Big Brother" able to control thoughts and feelings of every individual does not come into reality? Here the main problem of politics is raised: how to provide for its activity and power and not let the political system to turn into an "information society dictatorship". Eventually, every country has its own ways of responding to informational technologies progress in society, for example the EC tends to prioritize building a civil society with as much informational technologies engaged in it. The EC's leaders may know more about the advanced technologies potential, or maybe things are simpler – it goes about dynamically growing high tech markets… It is also worth keeping in mind that availing of modern technologies may essentially change the country's or region's place in the globalizing world.

From this perspective the European countries represent a mixture of different information society development levels, a close look at which may give a better understanding of how countries with different capabilities may progress in this interaction. In particular, better developed countries are normally more active in promoting modern patterns of their citizen's social involvement trying to overcome their citizen's reluctance to participate in elections or get engaged in other political processes. The less fortunate countries, that happen to be passive observers of the European integration processes (the last integration wave countries like Portugal, Central and West European countries), are noted for the political system transition stage when their governments tend to keep the existing system in order to govern the countries and gradually integrate in the EC context. It is the way the political systems seek ways to secure their leading position and connections with other social institutions, particularly those of the information sphere. Finally, some European countries may find themselves in a certain state of political "chaos", having, nonetheless, its order, rules, potential for progress and predicted character. The European countries progress in the information society context may be described within notions of the synergetic theory approach. However some details of it may be found dubious, this analysis serves an attempt to elaborate additional methodology for the modern society social and political phenomena study.

One of the synergetic principles states we cannot study the European countries by one and the same pattern. Instead, distinctive features of every country should be taken, including natural surrounding and resources, its current situation and historical stage. We will focus on five models characterizing a state of the political sphere in the context of the information society: unstable stability, unstable cyclic recurrence, localization, dynamical stability, and its opposite – dynamical instability. On the basis of these models we can study the security level of interrelations between political institutions and informational surrounding and establish the influence of this context on political processes dynamics.

Dynamical stability of a political system emerges provided a big number of coordinated actions preventing rapid transitions exist. In the given conditions the political process participants focus on achieving the political stability, declared in the government programs and political parties' statements. It gives rise to a situation when political parties and their leaders tend to increase their activities at the expense of insignificant actions with their political activity freedom expanding, which needs for the coordination and plausible risks shift mechanism to be engaged. This mechanism is characteristic of major parties long term presence on the scene which is based on relative public opinion stability in regards to main political actors. Society is noted for changing its opinion slowly and gradually which allows for keeping stability in minor structural change situations and determines soft crises developments, in particular around-the-government scandals. In that case elections, being the main democracy tool, turn to become political process landmarks that fix political parties' place in the political system and social consciousness. This political actors' activity naturally determines social life complications in general, and particularly in the mass-media sphere when the circle of people controlling the mass-media shrinks while public opinion does not influence the information broadcasted by these channels. Which situation generates a process of mass-media and government interaction process [5]: the government is interested in mass-media resources and opportunity to influence the public opinion, and mass-media are interested in "modeling" the political actors' activity transparency. To implement this strategy, corresponding technologies of strengthening or weakening information flows are used, engined by the notion of "human behavior reflexivity" existing in any society irrespective of its political system or economical situation as far as, according to S.Moscovichi's definition, "propaganda strategies are aimed at forming a crowd of individuals and direct it at certain activity" [6, c.179]. An example of this model is Germany where the last Parliament election rendered a proof of retaining the dynamical stability tendency. First, this election revealed a phenomenon of autoflactuation when the issue of a new government forming came up. Secondly, the federative, split political system that was called to secure the political system operation, emphasized the issue of its coalition nature. The basic coordination elements of it are theatrelization of politics (symbolic politics and pseudo-actions), constant thematic management, personification strategy (personalizing and TV-duels), Internet as a means to coordinate the parties activity on a state level ("opposition monitoring").

Theatrelization turns politics into a "democratic ritual" when the message meaning is given less attention than the actor's image or script quality that determines a political scenic success. Politicians grow to perceive the society as an onlooker, whose emotions are greatly dependent on the actor's talent. Among informational technologies engaged for this purpose, German politologists define the following: Autopilot Strategy, Sprint Strategy, "Quick Finish" Strategy, Real Show Strategy, etc. These strategies encompass four theatrelization aspects: (1) staging politics, that is a specific regime of symbols use in political activity; (2) creating images as a result of visual factor implementation; (3) performance, the process of voice and body performing in front of physical viewers; (4) viewer's perception being the onlookers function.

It means the main theatrelization function lies in inspiring an emotional response with the help of metaphors and images, abstract nature of which brings forth aggressive polarization tactics domination, demonization, and simplification, essential for the aggressive election campaigns. It leads to forming a predominantly negativity based campaign (Angriffswahlkampf), that is considered by specialists as an "Americanization"1 component. Pursuit of public opinion control calls forth immediate response to the counterpart's performance, active media monitoring and sociological research. It leads to spin-technologies implementation, directed at forming an agenda, for example with the help of posters, talk-shows, etc. composing directed thematic management. At the same time the urge for permanent election activity readiness on behalf of political leaders brings about a phenomenon of permanent thematic management. For instance, in August-September 2003 the top themes relayed by German TV became the flood, external politics/Iraq issues, and TV duels.

Political actors' intensified conflict behavior brings about another political model type – unstable stability – which can be found in the French political process of recent time. This political process type is characteristic of "escalations regime" shaped by high intensity of processes development leading to a critical point situation in the political sphere. Securing the political system in this case is ensured, according to G.Golitsyn, by "…proper victory tactics, that lie in dominating forces concentration in the right place and time, and not wasting them by dispersion. Concentration of energy may even entail certain spheres temporary deprivation of resources – the final result is expected to justify it… It is concentration that allows to reach a critical forces building up, increasing its action efficiency radically to make not just a quantitative, but a qualitative breakthrough" [7] as an outcome of the artificially created "controlled chaos". With all that this activity has to be fixed, otherwise the political system will retreat to a previous stage, the society finding itself unsecured. To avoid this outcome even a great event has to be followed by another national scale event (even artificially urged) to fix the new society state. It is a part of the "great event" and "happy end" 2 strategies aimed, according to J. Chirac, at "the state power strengthening, being a prerequisite connected with transparency, clarity, and trust" in the presidential power, at the same time representing the globalization process in the French political system dominated by the information society development as a society mobilization factor.

From perspective of the social informational security, an emotional perception of images, judgments or words comes forth that makes it possible to create artificial political sphere escalation regimes. Emotional means of influencing minds is inherent to political systems requiring to alleviate the social consciousness tension as for the sake of future political system progress achieved as an effect of transition process risks and instabilities. One of the means of political stabilization is political manipulation, that is any actions initiated by political authorities to provide for the desired system state and shown as directed influence on the social consciousness with the help of mass communications channels predominantly owned by political or financial forces interested in stabilization [1].

Peculiarities of this model are well represented by a confrontation (partially manipulated) inspired between Chirac and Jospin during the 2002 election campaign. The president's actions then represented closeness policy and network strategy principles (to a great degree reinforced by the government in mass media and implementation of Minitel network). This approach reveals itself in favorable "setting off" Chirac at the expense of Le Pen and engagement of counterpropaganda, psychological programming, authority support, and ignoring methods. The main president's activity principle in the information society is closeness policy which can be considered as a wish to be accessible by

[1] Other Americanization components are: 1) personalization instead of thematic intercourse; 2) election campaign in form of candidates' confrontation; 3) symbolic politics and pseudo-actions; 4) professional management; 5) campaign strategy dependence on scientific research and polls; 6) actions and themes management; 7) electronic pre-election campaign (for example maintained in the Internet); 8) deideologization.

every voter, and at the same time, have access to every citizen, and every judgments leader in the Internet, while the President is gaining significant resources to shape the public opinion. Here a notion of not just the Internet user appears, but that of "a network campaign initiator", influencing the neighborhood and able to simultaneously mobilize the sympathizing population throughout the country. It made it possible to single out two political escalation regime stages –preceding the first election round and intermediate between the first and the second rounds (mass protest actions, judgment leaders in the Internet, virus attacks, network anti-NF campaigns). The final stage is stabilization brought about by the parliamentary election. France being actually one of the isles of European democracy showed how "information society crowds" can be formed. It was not without a reason that one of the presidential election campaign consultants and a well-known information society philosopher characterized specific relationship between the French government and information technologies as l'amour et l'etat (love and state).

The powerful influence of surroundings may completely determine political actors' behavior. Integration processes embracing Central and Eastern Europe can be taken as an example. Complex adaptive systems theory allows for observing the integration as a localization formed owing to the nonlinear positive feedback and causing not a chaotic roaming of the system but just "a state that gets into a limited, determined sphere of the phase field [8, c. 16]". At the same time research proves new structures formation processes often not to change the internal political behavior dynamics, as their minor "perturbations" do not reach the center of the system, which increases prominence of information technologies and ties between authorities and mass media in the localization processes. In this localization state the share of political information shrinks as a result of its conveying form transformation – in shape of information analytical programs and artificial "information stimuli" (media events) containing elements characteristic of the entertainment sphere, and in particular: transience, negativism, personalization, excessiveness [9]. A German media sociologist M. Hermann defines each of these elements: (1) Transience – is formulation issues and themes to be discussed within short period of time and their immediate including in the agenda aimed at political positions improving. (2) Negativism – is a political campaign "negative strategy" implementation aimed at proliferating negative information about the political opponent. Negativity is also significant in the process of creation a political element balanced image. (3) Personalization – is focusing attention on political leaders while limiting attention on the parties ideology and policy.

An example of the Czech Republic before joining the EC proves the importance of the political security information component, in particular to ensure the stable EC integration process. The process had its respective information provisions, like mass media "German" ownership issues, public TV and CzTC issues, media involvement in the political campaign gearing TV revolution, the Parliament election engaging international scandals (the Benes decrees), three rounds of the Presidential election, and finally a unilateral campaign for the EC integration referendum. However, the issue of the political information security stands relevant since the Czech political process finds itself still in the localization regime. To be more exact, that is not just an urge towards complying with all EC requirements, but more that of defining the EC partners and formulating their own political tactics. It was not without purpose that in 2004 the Czech government implemented the campaign to create a favorable image for the Czech Republic abroad, engaging Czech cultural centers in particular.

The lack of the social structuredness and political aim clarity are inherent to the political actors dynamical instability. Distinctive features of the political system in this case are its instability and openness. It is worth noticing that according to the so-called "growth of the little" principle (by I.Prigozhin), the significance of little events tends to be growing both

[2] Actions consistency during a political campaign is created according to the conveyed information and can look like this: informing – interest stimulation – emotional involvement - memorizing.

for the instability support and for the structure formation. The instable process dynamic character is connected with internal and external sources of positive feedback that ruin the system and lead to its exposure to any outer influences, no matter how insignificant. In other words, social institutions consider their amorphous state conditioned by further progress uncertainty to evade premature structuredness that can cause unexpectedness in ways of achieving the target.

Information significance in this case lies in backing the positive feedback as a feature of uncertainty since shrinking of the complex processes generated by the information field stabilization would mean a stable system emergence. However, it is plausible in case of political actors definiteness, otherwise an "alliance" of positive feedback and control comes forth. In the chaos context, control serves a conservation factor depending on will of key political actors. The situation with no political actors being defined on the political scene stimulates the government to fight for and concentrate the resources with other sides of the process being unable to progress which brings forth integration of all sorts of resources to achieve the main target (political power "hard localization") resulting in preserving instability for the sake of further political field structuralizing. An example of it is the administrative resource information component. At the same time under conditions of international nonlinear information flow intensification, the information field control can not ensure the chaotic fluctuations "threshold". It necessitates for political behavior strategy to be commuted into engagement of political marketing and information society management as power resources. Of course we consider Ukraine an example of dynamic instability too, where the system of government appointment and functioning corresponds to instability and positive feedback principles. In its turn it defines weakness of the political parties fighting for all power resources, especially informational ones enabling to provide small, often virtual, actions. Hence the network information flow becomes more significant for the opposition political actors using the Network's main feature – it's but limited control on behalf of the state. At the same time we notice the growing activity of legislative power to establish a political status for the Network by means of legislative influence and taking over the initiative.

The latter statements have special importance as the information society forms network principles for the political actors' activity. The new society exerts its major influence on model types close to the dynamic stability, such as the escalation regime, coordination, and unstable cyclic recurrence. Political actors of the mentioned models tend to be actively approaching the Internet, establishing intense and disproportionate feedback [10], that undermines the new technologies estimation as a democratic tool of forming more active political society. Hence, coordination can be observed according to the realistic intensification theory supposing the modern information system influence to increase the social inequality and consequently a political activity level.

An example of coordinating actions in the information society is the use of high technologies in globalization processes forming and clashing harmonious - global and conflictogenic areas as an effect of increased national borders transparency [11, c. 44]. It determines the main characteristics of the Internet as "a complex, self-organizing and self-referent communicative system with emergent (appearing unexpectedly) features description of which necessitates taking into account theoretical quantum mechanics observation and supplementation principles, as well as subordination and synergic cyclic determination principles" [12]. It creates a complexity in defining the Internet role in democracy as even some European countries aspire to limit the internet content for the sake of citizens' security. "Freedom House" 2001 freedom report conveys the following characteristics for the Internet: "political systems both of the former USSR and democratic countries are not certain how the obvious anarchy of the Internet will influence the power of authorities or state security, or culture…"[13]. Consequently, the Internet uncontrollability in relation to the state elements determines the Network as an instability source as there always will be certain percentage of people

able to undermine the Network stability by means of hacking or virus attacks, contributing to formation of the regional, state or other world Network sectors. It means the Network takes in the notion of borders: the state can resort to controlling or managing the Network to ensure the stability.

Considering these features it is possible to state that ICT create the information society controlled chaos. It confirms the idea of the information society as a tool of supplementing the power of political actors who are currently using other types of media. As a result, network principles of the information society political behavior are formed, in particular accelerating most political system institutional actions, that calls for political actors intense participation. This statement was thoroughly elaborated in one of the first studies (1982) that defined the ICT role in the organizational politics of the US regional government bodies [14]. Its authors came to a conclusion that political competition forms computer projects and configurations that later come to influence the power share. They called this phenomenon an "intensification policy", considering the computers "a conservative technology". The authors do not state nothing is changing – the political actors will engage new technologies that promise to increase their power and besides these technologies new organizational forms will emerge. In this perspective the new elements may be strengthened to cause structural changes, especially in case different forces stay in constant tension [15]. At the same time, political actors' activity growth is connected with the ICT potential to involve more people in the political process, that is to form "an information society crowd". Evidence of the "network crowd" formation is a statement that people frequently using online political information are normally those already interested in politics. That is why getting connected to the Internet does not automatically mean that the user becomes an active political process member. The research also defines that stable and coordinated political groups are able to cause and manage artificial events formation in the Network.

Unstable cyclic recurrence is characteristic of limited internal resources generating internal political conflict potential. At the same time a dynamic transformation of the political aim itself takes place that leads to a decrease of the political actors' activity stabilization resource. The fluctuation phenomena get intensified and are able to cause deviation from the defined aim, and as a result the system transition to a different aim. Hence, unstable cyclic fluctuations in the political actors' activity determine its high dynamics, however not conditioned by the stabilization purposes, instead the one determined by the need to permanently correct the transition process, which is problematic under conditions of limited internal resources. In the outcome a permanent search for the new aim of the progress takes place.

Escalations regime models representing a behavior and coordination principles formation process as a political actors activity strategy in the information society, define a peculiar aim of the unstable cyclic recurrence model. First of all it is elaborating the political field progress concept and respective search for resources. This model requires engagement of the Noopolitics (Noopolitik) concept based on the soft power as the main means of ensuring the national interests. It is connected with the supernational and national political actors' interests fragmentation process. "Fragmentation causes the power dispersion, distancing from the states and increasing the importance of decentralized governments, non-government institutions, mass media, social movements and other international non-government networks as primary international actors" [16], which most probably is characterized as a transition period with a big quantity of asymmetrical relations between state and non-state actors including separate individuals. J.Rosenau refers to these phenomena as "spheres of power" based predominantly on the problem politics. Hence the states external politics concepts transformation and change in the diplomacy process itself. Noopolitics and one of its actualizations – Cyberpolitics (Cyberpolitik), according to J. Arquilla and D.Ronfeldt [17], is an approach to diplomacy based on ideas, values, norms, laws, and ethics forming and sharing through the moral persuasion. As the soft power notion is

connected with ensuring the public support through mass communications institutions, importance of the Internet grows forming the so-called social diplomacy. According to V.Partridge, it can be utilized "…to gain backing of people and institutions; introduce people to certain freedoms and values; attract and convince others of who we are, what we do and what we are, teach by sharing ideas, people, experiences, and trade; demonstrate good will and initiative to carry out political arrangements only…" [18, c.17]. An example of political cyclic recurrence is Portugal where de facto information society became a political activity slogan in the following "sequence": internal stability and political system security is possible provided political elites ensure rapid integration into the EC with the aim of its resources efficient use. One of the main integration elements is the information society, formation of which is tackled by media groups having control over mass media and close ties with the political system. However, the information society is important also from the perspective of the country foreign policy status, as an information component leads to the transition of Portugal into the globalization object.

Analysis of the information factor in the modern political field gives grounds to draw a conclusion that the most feasible result of the new communication technologies is the dynamism intensification, simultaneous political processes fragmentation, and atomization of the group interests pluralistic policy. This process can be described within notions of the group elites democratization, resulting in the politics personification. At the same time decrease in the political activity dependence on the stable public and private institutions will contribute to the political process instability and unexpectedness.

What significance can these models have applying to the political activity in Ukraine? First of all they enable one to forecast relations types of two society subsystems – political and informational. The first scenario lies in separating political parties from the political field and further political fight. Information field will function as a source of fluctuations within clearly fixed limits. Consequently, relations of mutual interest instead of strict control on behalf of the government is generated between mass media and political actors. Examples of the Czech Republic and Portugal show that issues of creating the public TV under the given conditions is but a political slogan. As these countries are the closest to Ukraine by their dynamics, the issue of information institutions separation from the politics will stand relevant for decades. It is connected with weakness of the political parties and limitedness of their resources. It is why another scenario is also plausible: certain blocks formation on the basis of political parties and movements. However, as a manifestation of coalition character it will also mean a necessity to structure the information field on the level of a number of media groups tied with the political blocks.

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KALEIDOSCOPE

Ukrainian Energy Strategy for period through 2030 presented in March.

The document, elaboration of which was initiated under Yushchenko's Prime Minister term, provides for Ukraine, while keeping its steady economical growth, to expectedly reduce energy resources consumption by 47% and overall energy dependence five times, diminishing energy resources import share from 54,8% to 11,7%. That means except energy sparing technologies implementation, the key target of the adopted strategy will eventually be achieving energy independence for the country. In the light of technological, financial, and ecological issues associated with the heat energy production, the main stake will made on the nuclear energy production with its share in the national energy balance reaching 52,1%. These expectations are predominantly based on availability of local uranium deposits, steady nuclear power plants operation, and the country's potential to increase its nuclear power production facilities. According to the adopted Strategy, the key elements for it will be power-generating units with PWR type pressurized water reactors with their planned quantity over 20 units. In our estimation, with all the importance of the document, its nuclear power security aspects are insufficiently elaborated in view of growing international terrorism threats and nuclear weapons proliferation issues – the Strategy only stipulates for certain limitations pertaining to uranium enrichment equipment and technologies trade and used power fuel processing.

Ukraine to elaborate its National Security Strategy

March 24, 2006, the National Security and Defense Council (NSDC) Secretary Anatoliy Kinakh gave an interview to "The Voice of Ukraine" articulating his point that the country cannot move further with no clear strategy on the table that has to be adequate to the global changes and challenges, as well as domestic and foreign threats. As Kinakh said, the President set up a special expert group headed by the first NSDC Vice-Secretary Vasyl Krutov to proceed with the task. A number of prominent analytical centers and institutes are engaged in the project. A.Kinakh said the draft National Security Strategy is to be ready in a rather limited period of time – expectedly within two months, and shared his hope for the document, being targeted at the national scale issues, to contribute in the Ukrainian society consolidation. Particular emphasis will be placed on strengthening the national energy security sphere. To assist with the task a number of long term measures are scheduled incorporating energy sparing and energy use efficiency issues, energy sources diversification, prioritizing local resources exploitation, etc. As for the so-called "gas agreements", A.Kinakh considers them "a temporary compromise, reached in a critical context", keeping in view that relations between Russia and Ukraine in the sphere of natural gas transit and supply yet need to be improved. At the same time, he stressed the growing significance of the nuclear energy for the national energy security to reduce the outer energy dependence for the country. In terms of a rapid oil prices growth the nuclear energy gains a special importance. To more efficiently avail of the local potential in the sphere, as A.Kinach has it, Ukraine has to focus on building a range of nuclear cycle components – including nuclear fuel extraction, manufactory and used fuel processing and depositing. Besides it, the NSDC Secretary touched upon important issues like overcoming a stagnant crisis in the coal production and national borders security issues highlighted by the recent Pridnistrovye events, stressing that all efforts applied by Ukraine are directed solely on ensuring an efficient goods transit control and contraband prevention in compliance with international law regulations.

Russian Federation ratified the Federal Law "On Suppression of Terrorism"

The document came into forth March 10, 2006. The Editorial Board of "The Security and Non-Proliferation" greets the efforts of RF aimed at both international and domestic regulations elaboration in the sphere, their importance being highlighted by International Convent for Nuclear Terrorism Counteraction adopted and opened for signing by the UN, that one authored by Russia as well.

(Prepared by S.Kondratov based on materials of "The Voice of Ukraine" and "The 2000".

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