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Risk assessment for violation of anti-trust legislation by state executive authorities

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ABSTRACT

The article deals with a problem of building an anti-trust compliance system in state executive authorities from the point of view of contemporary risk management. The authors expound a well-known instrument based on the bow-tie diagram construction which successfully helps to develop effective measures to prevent violation of anti-trust legislation cases by state executive authorities. They also give some numeric results of statistical modelling of anti-trust legislation violation risks by state executive authorities by means of the Monte-Carlo method.

KEYWORDS:

Anti-trust compliance, risk management, risk analysis, risk evaluation, bow-tie diagram, ISO 31000, Monte-Carlo method.

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1. INTRODUCTION

It is a common knowledge that market economy (it goes without saying, that the Russian Federation economy is market-driven, despite a substantial proportion of a public sector) implies a free competition presence. And for a wonder, exactly the free competition requires a state protection, which is performed in particular by means of antimonopoly legislation creation. In the Russian Federation the basis of the system of statutes and regulations, constituting antimonopoly legislation, is a Federal Law No. 135-FZ "On Protection of Competition" dtd July 26, 2006[1]. In the art. 1, para 2 it is stated that "the goals of the present Federal Law are providing of economic space unity, free movement of goods, economic activity freedom in the Russian Federation, protection of competition and creation of the needed conditions for an efficient functioning of goods markets".

Like every system document, the Federal Law "On Protection of Competition" contains a needed conceptual framework. In particular, it defines a notion of competition the following way: "Competition is an emulation of economic units, during which self activities of each of them exclude or restrict their opportunity to in one's sole discretion have an effect on general conditions of commodity circulation on a particular goods market".

It must be defined as well what is meant by restriction of competition and which breaches must be repressed by the present Federal Law. These are the breaches (see art.4 of the stated Law):

- creation of discriminatory conditions of access to the marketplace;
- unfair competition, that is actions of the economic units aimed at getting advantages during conducting a business, which are contrary to the Law of the Russian Federation, customary business practices, honesty, rationality and justice requirements and which are capable of creating losses or damage to goodwill of the other economic units;
- monopolistic activity, that is abuse of the dominant position etc.

It is clear that the breaches classified in this Law result in administrative or even criminal penalty.

The present article is not aimed at full disclosure of economic aspects of the antimonopoly legislation activity, suffice it to point out that in the sphere of economic scientists there are opposing views concerning necessity and usefulness of the antimonopoly legislation (AL). In the minds of the AL followers, it protects economic interests of the consumers and promotes economic development. From the perspective of the opponents, AL is neither more nor less than a breach of property rights system and often or even usually leads to negative aftereffects for the consumers and economy on the whole.

Nevertheless, AL exists in all developed countries of the world. Speaking about the situation in the Russian Federation, it should be mentioned that Russian marketplaces are not quite competitive. It is explained by a heritage of command-and-control system, ruling the economic space of the USSR, and by specific political and economic challenges faced by Russia during the last years. Being aware of all these circumstances, the government of the country realizes a National development plan concerning competition, the fundamentals of which are set out in the Edict of the President of the Russian Federation dtd December, the 22nd 2017 №618 "On major public policy concerning development of competition"[2].

In this Edict greater attention is paid to the executive authorities of the government (EAG) and budget organizations. It's not just the state authorities are economic

[1] Federal Law of July 26, 2006 No. 135-FZ "On Protection of Competition". URL: http://www.kremlin.ru/acts/bank/24149.
[2] Edict of the President of the Russian Federation dtd December, the 22nd 2017 №618 "On major public policy concerning development of competition". URL: http://www.kremlin.ru/acts/bank/42622.

entities too, but violation of the Russian Federation Law (not only antimonopoly) by them results in tremendous reputational losses.

Let's explain this. Notorious repute was obtained by the case, highlighted in the interview to journalist Starostovaya E. in a TV project "Topic" of the TV channel "BelgorodMedia" by Shirkov A.V., a director of the Federal Antimonopoly Service Administration (AFAS) of the Belgorod region [3].

In 2019 some state-funded organizations of education and healthcare of the region stated in competitive documentation the inclusion of Private Security Agencies (PSA) into Association of security providers of the Belgorod Region in the capacity of requirement while selecting private security organizations. As a result, AFAS of the Belgorod Region received a few complaints from the PSA, which were not the members of this Association. Shirkov stressed that there is no demand of the kind either in the Law on security business or the Law on licensure. According to the data of the Russian Federal National Guard Troops Service, there were registered 216 private security agencies at that moment on the territory of the Belgorod Region, but only 43 of them were the members of the mentioned association. Obviously, such actions of the state-funded organizations can be treated according to the Federal Law "On Protection of Competition" as creation of discriminative circumstances of the service market access. Investigating the appropriate circumstances, the staff members of the AFAS of the Belgorod Region found out that the state-funded healthcare institutions followed the recommendations, described in the letter of the Belgorod Public Health Department. Accordingly, the Public Health Department was given a reprimand from the AFAS about inadmissibility of actions of the kind. The Healthcare Department fulfilled the demands stated in the AFAS reprimand. In case of not meeting the requirements the AFAS would have initiated a case about AL violation. In such situations according to the RF Administrative Offense Code (art. 14.9) a public individual shall pay penalty from 15 000 to 50 000 rbs., and in case of the further violation the public individual shall face a three years of disqualification.

Of course, it should not be supposed, that public individuals act in such a way out of malice. Just in many connections it happens because of lack of knowledge, absence of a methodic work on preventive measures concerning the AL violation.

Edict of the President of the Russian Federation №618 dtd December, the 22nd 2017 "On major public policy concerning development of competition"4 instructed federal authorities and authorities of the constituent entities of the Russian Federation to take measures to creation of the antimonopoly compliance system by March, the 1st 2019, and in a majority this requirement was completed by the executive bodies of state authority, at least on paper.

2. ANTIMONOPOLY COMPLIANCE SYSTEM IN THE EXECUTIVE BODIES OF STATE AUTHORITY AND RISK MANAGEMENT

By definition, an antimonopoly compliance (from English antimonopoly (antitrust) compliance) is a community of legal and organizational measures, aimed at meeting AL requirements by a company and preventing of violation of the AL[4]. Still it is obvious that if understanding the antimonopoly compliance system as a company activity, but not an element of the inner regulatory documents (IRD), then this activity should be aimed at prevention of the AL violation risks and (or) at elimination/easing of these risks realization aftereffects.

Every time we face a notion of compliance, that is conformance of the company's activity to some external requirements, we should realize, that here exists an obligatory formal part, for instance, IRD coordination with requirements of compliance or creation of particular business units. But there is an informal aspect without which it's impossible to strike life into every compliance system. As for the formal part, it is anyway described in "Guidance notes about creation of the system of the inner conformance to AL requirements by the Federal agencies of executive authority"[5]. The system of the antimonopoly compliance (AC), according to the cited document, consists of three parts. These are:

- documentation (Act about the AC and periodically issued report about the AC);
- organizational structure (authorized department / public individual and collegial body);
- processes (finding out and assessment of the AL violation risks, measures for reduction of the AL violation risks, evaluation of the AC functioning efficiency in the federal executive authorities / authorities of the constituent entities of the Russian Federation).

Nevertheless, it is not enough to create once and for all an inner regulatory documentation, to organize an authorized department and to make a report about AC once a year, to have the AC work. The Russian FAS gives briefings, emphasizing that:

- compliance shouldn't be implemented for the sake of appearance, because it won't work;
- regulatory compliance of the AL must be a part of the ethical principles of the government authority activity;
- government authority should realize that each of their decisions influences a competitive environment.

[3] The interview of Shirkov A.V, the director of the Federal Antimonopoly Service administration of the Belgorod region 18.12.2019. URL: https://www. youtube.com/watch?v=RWZlH0PdXnA.

[4] See., for example: Federal Law dtd 01.03.2020 № 33-FZ «On amendments being made to the Federal Law "On Protection of Competition" », art. 4, para. 24. URL: http://www.kremlin.ru/acts/bank/45225.

[5] Guidance notes about creation of the system of the inner conformance to AL requirements by the Federal agencies of executive authority . Government Resolution of the Russian Federation dtd 18.10.2018 № 2258-r. URL: https:// mintrud.gov.ru/docs/government/rasp/1285.

From this point of view, we should remember that the AC functioning task is a risk-management task in some quite specific sphere. Accordingly, one can rest on the National Standard in the area of risks management GOST R ISO 31000:2019 "Risk management: principles and guidance"[6]. Despite the fact that structurally cited standard is quite similar to the described AL system, since it is triune, too, and consists of the following parts: risk management principles, risk management structure (this is what provides a successful implementation of the risk management into organizations), risk management processes, - still there are essential differences, which allow to make the AL system resilient. These differences are innate in the principles according to which the following provisions regarding the AL system as well can be made. In particular, these are:

- risk management - not a separate functional activity within a company but a link in decision making processes;
- risk management goals provide achievement of tactical as well as strategical company goals;
- a risk owner, that is a person possessing skills and resources for risks management and who is responsible for risks regulation is actually a person who makes a decision, as a result of which the present risk occurs, but not an abstract member of the risk management department.

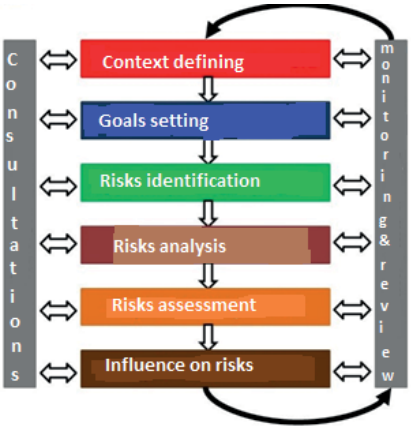
In reference to AL this means that activity connected with management of the AL violation risks is *permanent* and the leader of the executive power who makes decisions resulting in AL breaching risk, is actually the risk owner. If we consider these provisions with all solemnity as the Executive authority activity philosophy, the so called AL violation risks maps will hardly be formal.

3. RISK MANAGEMENT PROCESSES AND QUALITATIVE ASSESSMENT OF THE RISKS OF THE AL VIOLATION BY THE EXECUTIVE AUTHORITY

Let's finally proceed to studying of the risk management processes according to the standard GOST R ISO 31000:2021. According to the mentioned standard the scheme of the risks management processes can be described the following way (pic.1).

The stage of a *context defining* is description (and understanding) of the collective of external and internal factors, under influence of which a company conducts business (the list of the particular factors groups can be found in the cited standard[7]). It is possible to reach a stage of *goal-setting* only in case of the total understanding of context. This involves the risk management goals, which obviously, must correlate to the goals of the very company. The matter

Pic. 1. The scheme of the risks management processes



is, risk management is no meaning without a correct goals setting, because even definition of risk according to the standard GOST R ISO 31000:2021 sounds like influence of uncertainty on the goals. In more large-scale phrasing: risk is some event or condition which is uncertain in the context of the fact that it is unknown if it is being realized indeed or not, and which can influence the stated goals. Consequently, at the next stage of *risks identification* one should clearly understand risk management goals. Not understanding of this problem leads to the situation when risks maps of the AL violation of some regional executive authorities contain 1st-order risks aftereffects or restrictions instead of the risks, that can be found during a thorough examination of the documents. Talking about the *o1st-order aftereffect* we mean the very fact of the AL violation, whereas in contrast *a restriction* is a requirement which is already present or an event with almost 100% likelihood of happening.

Incorrect definition of the risk leads to misunderstanding of its nature and, as a result, to a formal approach towards development of measures for its minimization.

As for identification instruments, for the AC case they are described in "Methodic recommendations"[8]. In December 2019 Economy Ministry of Udmurtia realized a training session-workshop concerning risks management of the AL violation by the executive authorities, where the following instruments were distinguished:

- analysis of compliance risks maps of the other executive authorities in the capacity of standard;
- goals decomposition;
- analysis of the regulatory documentation and defining of risk generating articles;
- analysis of the company activity processes scheme (for example, the processes of holding of competitive tendering concerning supplier selection);
- risks classifiers development (factorial analysis);
- cross interviews with the employees;
- causal analysis (SWIFT);
- 5WHYs technology;
- Crawford's cards method.

[6] National Standard of the Russian Federation GOST R ISO 31000:2019 « Risk management: principles and guidance ». URL: http://www.docs.cntd.ru/document/1200170125.
[7] URL: http://www.docs.cntd.ru/document/1200170125.
[8] URL: https:// mintrud.gov.ru/docs/government/rasp/1285.

In the theory and practice of risks management these instruments are well-known. Procedure of their application is described, for instance, in the National Standard of the Russian Federation GOST R ISO 31010:2010 "Risk management: risk assessment methods"[9], but in the cited standard specificity of the application of the present instruments with the task of the AL violation risks identification is certainly out of the question. The given list is a result of the creation of the approaches, stated in the "Methodic recommendations" and in the standard GOST R ISO 31010:2010.

A stage of *risks analysis* cconsists of revealing of the reasons for their appearance and aftereffects of realization. Please note that exactly at this stage an approximate list of measures concerning impact on the risk is being made. This list doesn't mean that each of the stated measures must be realized. The choice is made at the stage of *assessment*. In a classic qualitative assessment this means that the risks must be put on the front burner. And if, for instance, a risk is considered to be serious, one should select the measures, which influence the risk appearance reason and which have a "before the event" character; in the ISO terminology such measures are called *preventive*. Post factum measures (or *corrective*), which are aimed at moderation of risks realization aftereffects, are selected in case when the risk is rated as unessential.

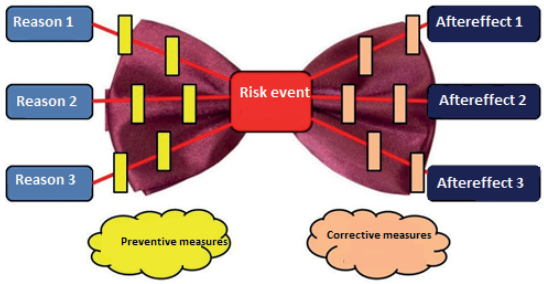
In the sphere of professional risk-managers the most frequently used at the stage of risks analysis is a "bow-tie" diagram (pic.2). Firstly, such a graphic representation provides a good risks visualizing. Basing on it we understand that risk is not only aftereffect nor even the indefinite event. Generally, risk is a triad: reason-event-aftereffect.

Secondly, this picture allows to visualize the key reasons and aftereffects of risks realization and to see the internal connection between them and, consequently, to develop the most adequate list of measures to influence risk.

Talking about a specific risks class – AL violation risks, it cannot but be mentioned that AC system possesses a zero tolerance towards them, since it is created exactly for these risks *prevention*. Accordingly, a priori, there is no point in this case in speaking about correcting measures, that is here we deal only with the left part of the picture. As for the preventing actions, they must be precisely mentioned in risks maps. For this very reason we strongly recommend to the members of the authorized department of the executive authority in the AC structure to use this instrument for development of measures in AL violation risks maps.

By way of illustration let's consider the list of the measures concerning minimization of the AL violation risks, prepared by a deputy administrator of the Udmurt Administration of the Antimonopoly Service of the Russian Federation E.I.Sterkhovaya in 2019 (table 1). Apparently, the suggested measures in one way or another repeat the logic, designed in the algorithm of the "bow-tie" diagram usage.

Pic. 2. A "bow-tie" diagram



Let's proceed to description of the risks *assessment* stage, and first of all settle upon qualitative or score models of rating. In "Methodic recommendations"[10] a four point scale of prioritization of the AL violation risks is suggested. In the Udmurt Republic Ministry of Economic Affairs their individual three-factor methodology of the AL violation risks rating (prioritization)[11], is developed on the basis of the ideas stated in the "Methodic recommendations". This methodology is considered to be one of the most advanced in the Russian Federation in the sphere of the professionals from the regional and federal antimonopoly bodies[12]. AL violation risk magnitude (in points) is calculated using the formula:

$$R = P \times I + C,$$

where P = 1, 2, 3, 4 – probability score (likelihood) of the AL violation risk realization, I = 1, 2, 3 ,4 – score of the seriousness of the AL violation consequence (level of the risk effect), C = 1, 2, 3 – score of the controllability of the AL violation risk, involving reasonable assurance of the fact that risk management objective will be realized.

P = 1 – minimal level of probability (likelihood) of the AL violation risk realization; P = 2 – на low level of probability (likelihood) of the AL violation risk realization; P = 3 – an essential level of probability (likelihood) of the AL violation risk realization; P = 4 – the AL violation risk is largely most certainly realized.

The score of the controllability of the AL violation risk is calculated according to the following reasons:

C = 3 – a low level of controllability, that means that likelihood degree and severity degree of the consequences of the AL violation risk realization scarcely hinge on the executive authority employees actions; C = 2 – a middle level of controllability, likelihood degree and severity degree of the consequences of the AL violation risk realization can be potentially changed as a result of the executive authority employees actions, but success is not guaranteed; C = 1 – a high level of controllability, that means that likelihood degree and severity of the consequences of the AL violation risk realization can be for sure changed as a result of the executive authority employees actions.

[9] National Standard of the Russian Federation GOST R ISO 31010:2010 "Risk management: risk assessment methods". URL: http://www.docs.cntd.ru/document/gost-r-iso-mek-31010-2011.
[10] URL: https:// mintrud.gov.ru/docs/government/rasp/1285.
[11] URL: https://economy.udmurt.ru/prioriteti/konkur/standard/komplaens.php.
[12] See., for example, Antimonopoly compliance in the states of the Russian Federation (2020). Federal Antimonopoly Service of the Russian Federation. URL: https://fas. gov.ru/content/105/2464.

Please note that rating of the severity of the AL violation consequences (degree of the risk impact on a company's objectives), used in the described methodology, fully conforms to the "Methodic recommendations".

I = 1 (minimal level) – negative influence on civil institutions attitude towards government authority's activity concerning promotion of competition. There is no opportunity of raising a warning, institution of the cases concerning a violation of antimonopoly legislation, imposition of fines. I = 2 (low level) – raising a warning by antimonopoly bodies. I = 3 (essential level) – raising a warning and institution of the case concerning a violation of antimonopoly legislation. I = 4 (high level) – raising a warning, institution of the case concerning a violation of antimonopoly legislation and imposing of administrative sanctions (fine, disqualification).

In such a way, in accordance with the given formula, the magnitude of the inherent antimonopoly law violation risk falls within the limits of:

$$R = 2 \div 19.$$

Please note, that exactly at the stage of risk *assessment* selection of the measures for risk affecting is performed. These measures, according to the "Methodic recommendations", together with information about the AL violation risks must be recorded into compliance-risks maps and roadmaps – plans of measures for their reduction[13]. With a purpose of presentation the AL violation risks can also be recorded in so called heat matrixes. The colors in these models mean a degree of severity of any given risks. Red zone configuration represents in a certain sense "risk appetite" of the executive authority in relation to the AL violation risks, that is to the risks with which the government body is not ready to bear (pic. 3).

Pic. 3. Matrix of the inherent compliance risks

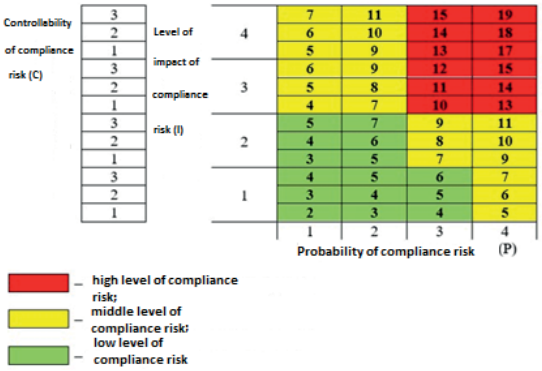


Table 1
An example of a list of the measures concerning minimization of the AL violation risks

Risk realization reason	AL violation risk	Measures concerning influencing risk
Insufficient skills and experience of the employees Insufficient rating of the reached materials, reporting and another kind of documentation Untimely tracking of the current legislation changes Granting of preferential conditions to the particular economic entities Non-observance of the established procedures	Discovery of documents, not provided by regulations and requirements, during holding of competitive tenders concerning the right for getting the State support, conclusion of agreements, which restrict competition	Regular training of staff (self-education, raising of qualification, educational activity – seminars, webinars etc.) Periodic discussion of the employees with the "unfavorable" reputation during Staff Communications Sessions Compliance with law, coaching Monitoring and analyzing of the revealed violations
Presence of competitive interests Untimely and improper work on revealing and repression of the competitive interests Insufficient level of the intradepartmental and interdepartmental interaction Insufficient skills and experience of the employees	Composition of register of economic units examination not taking into account a risk-oriented approach, that leads to strengthening of administrative pressure regarding one or a few economic entities	Compliance with administrative provision, coaching Providing of the intradepartmental and interdepartmental interaction Regular training of staff (self-education, raising of qualification, educational activity – seminars, webinars etc.) Escalation of measures concerning revealing of competitive interests
Incomplete studying of the issue concerning the characteristics of the goods, presented on the market Presence of competitive interests A low level of expertise of the procurement department employees	Overestimation of the requirement during description of the scope of procurement, that can lead to restriction of the members quantity	Providing of the intradepartmental and interdepartmental interaction Escalation of measures concerning revealing of competitive interests Carrying of market monitoring Employee training and education

[13] Examples of the particular documents for the Udmurt Republic Ministry of Economic Affairs see: URL: https://economy.udmurt.ru/prioriteti/konkur/standard/komplaens.php.

To the critical risks we refer the risks which lead to institution of the case by the antimonopoly bodies and to bringing to responsibility, and note that the level of probability of such risks realization is at the least essential. The matrixes of the kind could be used for the purpose of presentation, but we should remember, that the AC system organization in the executive authorities is aimed at prevention of realization of the AL violation risks, that actually means a zero tolerance towards them.

Nevertheless, if we assume that all measures, recorded in the *road maps* concerning reduction of the AL violation risks, are fulfilled on the due date and full and complete, there appears a task of risks re-evaluation: identification-analyzing-evaluation[14].

But apart from that, since resources for risk management are expired, a magnitude of the AL violation risk (in points) is calculated using the formula

$$R = P \times I.$$

An again we can use compliance risks matrix for visualization of the residual AL violation risks (pic. 4).

Consequently, a score of the magnitude of the residual AL violation risk is enclosed within the framework

$$R = 1 \div 16.$$

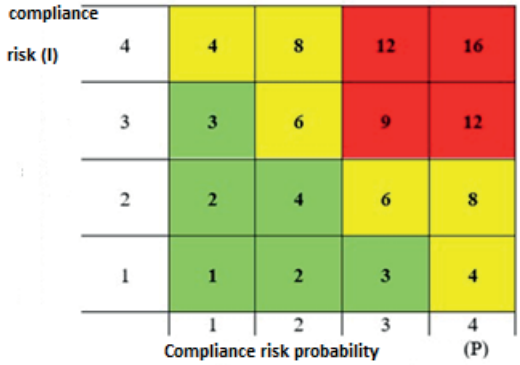
By way of "red" unacceptable risks we can take risks with the magnitude $R = 9 \div 16$. If the risks of the kind are present during the repeated assessment, the only opportunity is refusal by the executive authorities of realization of the decisions, causing the risks of the kind. Once again, the goal of the AC system creation is a zero tolerance of the executive authorities towards the described type of risks.

4. STATISTICAL MODELING OF THE RISKS OF THE AL VIOLATION BY THE EXECUTIVE AUTHORITY

Today in the sphere of the risk management experts there dominates a composed skepticism towards qualitative risks scores. During risks assessment, occurring because of making one or another regulatory decision, the individuals who make this decision (they are actually risks owners), increasingly frequently demand an "evidential basis" from the risks managers. The role of such a "basis" is played by statistical modeling results. Today for grounds for one or another decision, calculation of its effectiveness parameters according to one script (even if it is moderately pessimistic) is considered to be clearly insufficient. Nevertheless, modeling of the risks of the AL violation on the part of the executive authority faces quite serious methodological problems.

1. Aftereffects of the AL violation risks possess not only and not so much financial nature. Reputational aftereffects of these risks realization are much more tremendous, that's why impact of compliance risks on company's goals can't be squared for example with the amount of imposed penalties on the government body or its representative. Accordingly, the impact of compliance risks on company's goals can't be expressed in terms of some common physical value.
2. Even abstracting mind from non-financial aftereffects of the risks of the AL violation on the part of the executive authority and focusing exceptionally on the penalties sizes, there are no objective standards concerning what sum of recovery is considered to be low and what sum of recovery is high. Moreover, in public sources of the federal level there is no statistics regarding collecting of the mentioned fines.
3. As for the frequency of the AL violations by the executive authorities (these information is needed for modeling) it is not always possible to find in public sources (FAS data) statistics in analytic plans of regions, according to departmental identity etc.
4. The AL violation risk assessment according to aftereffects is based on derivation of an event tree with a binary logic (unfavorable outcome vs favorable outcome), where each of the outcomes should be attributed with some prior probability. In case of absence of satisfactory statistics of aftereffects of the AL violation by executive authority, one can talk only about a subjective probability of one or another outcome. But even if we assume that there are the needed statistical data, this still entails only *mid-values*.

Pic.4. Residual compliance risks matrix

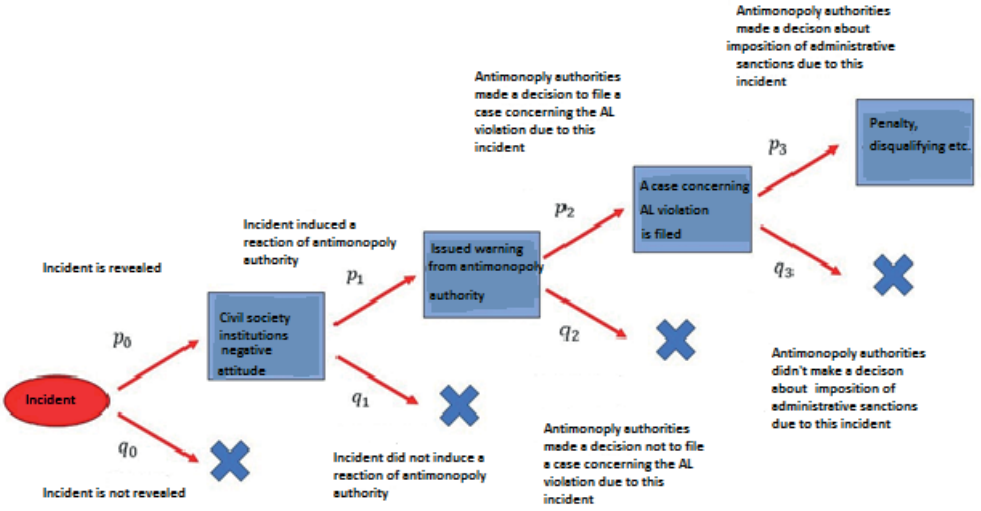


In such a way, all things considered, at the present moment modeling of the risks of the AL violations on the part of the executive authority can be based only on the following assumptions.

1. The magnitude of the impact of the AL violation risk on companies goals is designed by means of an integral-valued score ($0 \le I \le 4$), where a zero value of the risk impact $I = 0$ means that the AL violation is not revealed. An essential disadvantage of this model is of course a limit $I = 4$ for a maximal magnitude of the impact of the AL violation risk on the companies goals.
2. The subject of the statistical modeling is a probability of entry of one or another event tree offshoot, whereby

[14] Terminology is given according to the previous version of the National Standard GOST R ISO 31000.

Pic. 5. AL violation on the part of the executive authority (an event tree)



under conditions of statistical data absence we can use either equal distribution or distributions usually applied in expert estimates – triangle or *PERT*.

So, let's imagine, that an incident has happened, which can be interpreted as the AL violation by the executive authority. Now let's consider an appearing event tree due to this incident (pic. 5).

In each of the branch points of this tree two outcomes appear: unfavorable – with probability p_k and favorable – with probability $q_k = 1 - p_k$, $k = 0, 1, 2, 3$.

An expected value of the AL violation risk is calculated using the formula

$$R = \sum_{k=0}^{4} P_k \times I_k,$$

where:

- for $k = 0$ $I_0 = 0$, $P_0 = q_0$ risk event – an incident, connected with the AL violation, is not revealed;
- for $k = 1$ $I_1 = 1$, $P_1 = p_0\, q_1$ risk event – an incident, connected with the AL violation, is revealed, a negative civil society institutions' attitude towards this incident has developed, nevertheless it did not induce a reaction of the antimonopoly authority;
- for $k = 2$ $I_2 = 2$, $P_2 = p_0\, p_1\, q_2$ risk event – an incident, connected with the AL violation, is revealed, a negative civil society institutions' attitude towards this incident has developed, a warning is issued by the antimonopoly authority, but the case concerning the AL violation is not filed;
- for $k = 3$ $I_3 = 3$, $P_3 = p_0\, p_1\, p_2\, q_3$ risk event – an incident, connected with the AL violation, is revealed, a negative civil society institutions' attitude towards this incident has developed, a warning is issued by the antimonopoly authority, the case concerning the AL violation is filed, but decision concerning imposition of administrative sanctions is not made;
- for $k = 4$ $I_4 = 4$, $P_4 = p_0\, p_1\, p_2\, p_3$ risk event – an incident, connected with the AL violation, is revealed, a negative civil society institutions' attitude towards this incident has developed, a warning is issued by the antimonopoly authority, the case concerning the AL violation is filed, and decision concerning imposition of administrative sanctions is made.

In summary, input parameters of the statistical modeling are probabilities p_0, p_1, p_2, p_3. We are going to make some assumptions concerning functions of the present values distribution, and at the outlet we will receive a sample distribution density of the expected risk value $R = \sum_{k=0}^{4} P_k \times I_k$ and a diagram "tornado" – susceptibility of the value R to parameters p_0, p_1, p_2, p_3. In these conditions, it's absolutely obvious even before the statistical modeling, that an expected risk value R is maximally susceptible to changes of parameter p_0 and minimally susceptible to changes of paramete p_3.

The modeling was performed in the environment of the Palisade@Risk[15] software application using a standard method of Monte Carlo for number of iterations, equal to 10^6.

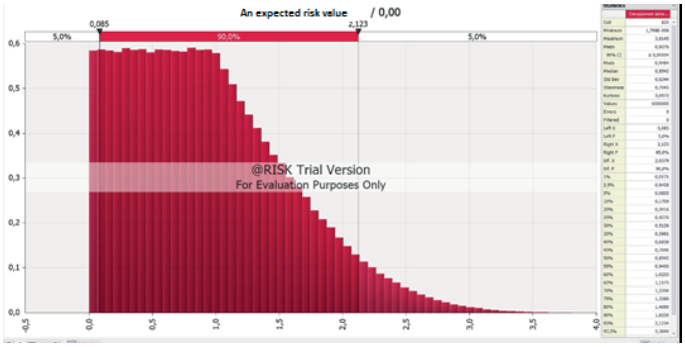
The first assumption is modeling of parameters p_0, p_1, p_2, p_3 by means of an equal distribution on a closed interval [0,1] RiskUniform (0;1). The results of the modeling are given on pic. 6a and 6b.

The modeling shows that with a confidence probability 95% VaR (Value-at-Risk) of the expected risk value of the AL violation R is equal to 2,123 points, it means that in around 95% of cases the incident won't lead to filing a case concerning the AL violation, moreover it won't result in imposition of administrative sanctions. Please note that "tornado" diagram looks symmetrical, that appears from symmetrical character of distribution of inlet model parameters.

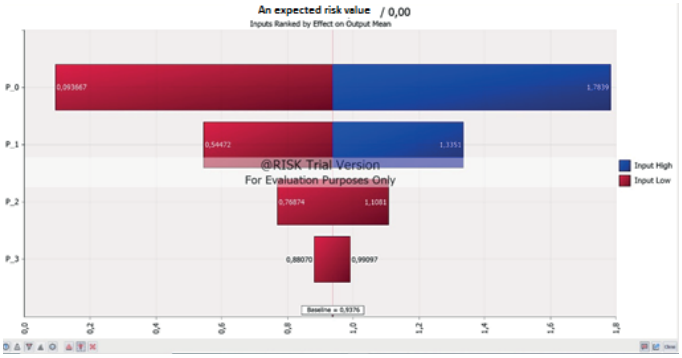
Let's consider now various types of an "expert" distribution of probabilities, which are characterized by 3 points: O – an optimistic value of inlet parameter, P – pessimistic value of inlet parameter and M – the most probable. In the investigated case it is obvious, that $O = 0$, and $P = 1$. The value M depends on the level of an expert's pessimism.

[15] Concept of modeling is described in detail in Palisade@Risk Getting Started Guide. URL: https://help.palisade.com/v8_1/en/Guides/@RISK-Getting-Started-Guide.pdf.

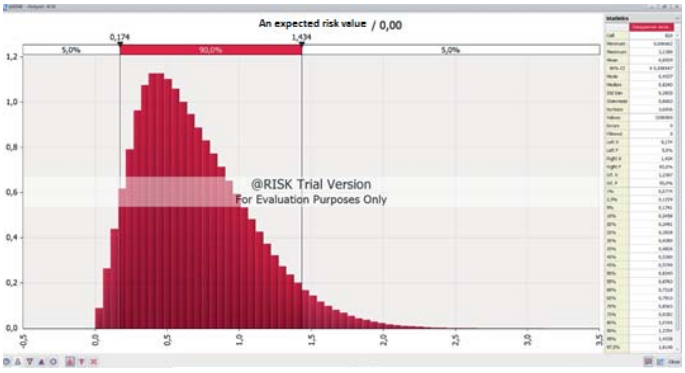
Pic. 6a. Modeling results of the risk of the AL violation on the part of the executive authority – an equal distribution of probabilities, sample distribution density



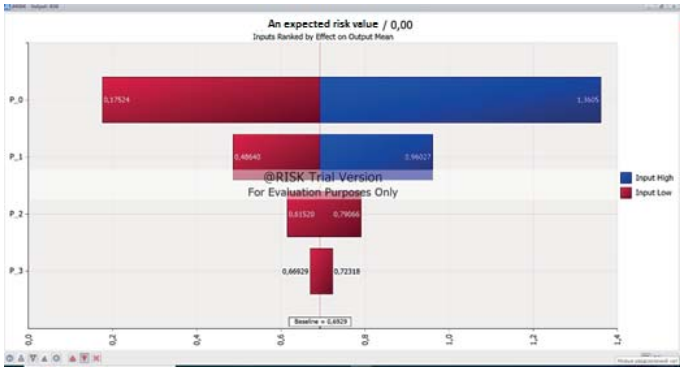
Pic. 6b. Modeling results of the risk of the AL violation on the part of the executive authority – an equal distribution of probabilities, "tornado" diagram



Pic. 7a. Modeling results of the risk of the AL violation on the part of the executive authority – moderately optimistic scenario, triangle distribution of probabilities, sample distribution density



Pic. 7b. Modeling results of the risk of the AL violation on the part of the executive authority – moderately optimistic scenario, triangle distribution of probabilities, "tornado" diagram



Let's examine a moderately optimistic scenario, making an assumption, that probabilities rates p_0, p_1, p_2, p_3 gravitate toward $O = 0$. For certainty we select $M = 1/4$ (a half of the left half) and look at two distributions with stated parameters: triangle (RiskTriang(0;0,25;1), pic. 7a and 7b) and *PERT* (RiskPert (0; 0,25; 1), pic. 8a and 8b).

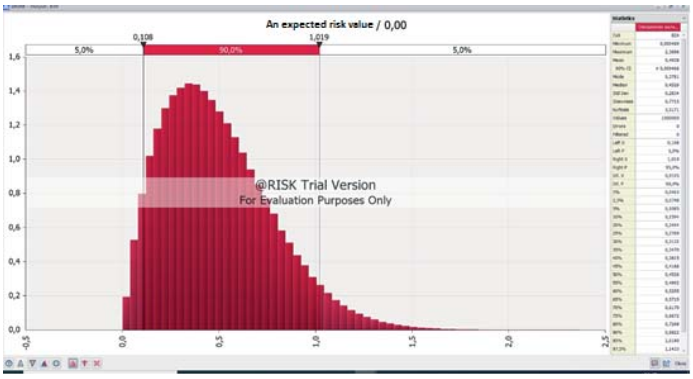
If it goes about magnitude of *VaR* of the risk expected value of the AL violation *R* with confidence probability 95%, for the triangle distribution it is 1,434 points, and for *PERT* – distribution it is 1,019 points, consequently this modeling results are quite tolerant towards assessment of the consequences severity of the initial incident. Please note, in both cases "tornado" diagram is asymmetrical (with right asymmetry) and *PERT* distribution produces a less amplitude in comparison with triangle, that is not surprisingly, as it is known, that for the values close to extreme ($\approx O$ or $\approx P$), triangle distribution gives wrong understanding of probabilities density.

For moderately pessimistic scenario, that is when probabilities rates p_0, p_1, p_2, p_3 gravitate toward $P = 1$, let's take the most probable value $M = 3/4$ (a half of the right half). Modeling results for the triangle distribution RiskTriang (0; 0,75; 1) are given on pic. 9a and 9b, and for the *PERT* distribution *PERT* RiskPert (0; 0,75; 1) – on pic. 10a and 10b.

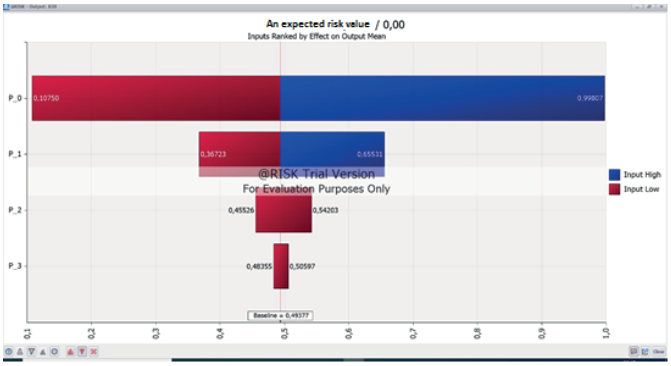
An asymmetric character of the "tornado" diagrams in both cases (with left asymmetry) should be noted as well as the fact that *PERT* distribution gives again a little less amplitude in comparison with triangle distribution. In case of a moderately pessimistic scenario of modeling a right border *VaR* with confidence probability equal to 95% is coming closer and closer to episodes of filing a case concerning the AL violation ($I = 3$) and of imposition of administrative sanctions against guilty of the AL violation ($I = 4$), because for the triangle distribution $VaR_{95\%}$ (R) = 2,148, and for *PERT* distribution $VaR_{95\%}$ (R) = 2,491. Nevertheless, the above mentioned negative outcomes of risk realization of the AL violation on the part of the executive authority lie technically inside of 5% interval, that is they get into "heavy tails" category. On the one hand, this fact can be explained by means of imperfection of the model, because maximally possible level of the AL violation risk impact on the goals of a company is limited to a final value $I = 4$. On the other hand, when analyzing famous cases, filing of cases concerning the AL violation and moreover imposition of administrative sanctions are in most cases a painful surprise for the executive authority, representing in a certain sense a taleb black swan.

Everything abovementioned says that despite a relatively small value *VaR* for the expected value of the AL violation risk when confidence probability is 95%, the individuals in the executive authority who make decisions, which can result in realization of the AL violation risks, should

Pic. 8a. Modeling results of the risk of the AL violation on the part of the executive authority – moderately optimistic scenario, PERT distribution, sample distribution density



Pic. 8b. Modeling results of the risk of the AL violation on the part of the executive authority – moderately optimistic scenario, PERT distribution, "tornado" diagram



not at all let hair down. We highlight statistical modeling data exactly for drawing of attention of all those who are in some way or another involved into the process of AC creation in the executive authorities, to the fact that despite a low probability, negative outcomes (I = 3, I = 4) are possible and can produce quite unpleasant aftereffects for the executive authority.

This fact can be easily proved by means of statistical modeling. Let's look at a so called pessimistic scenario, when $M = O = 1$ – in each branching of the event tree a probability of a negative variant realization is maximal. Below you can see the results of the statistical modeling with usage of a software application Palisade@Risk for the inlet parameters p_0, p_1, p_2, p_3, designed by means of the triangle distribution RiskTriang(0;1;1) (pic. 11a and 11b), and also by means of the *PERT* distribution RiskPert(0;1;1) (pic. 12a and 12b).

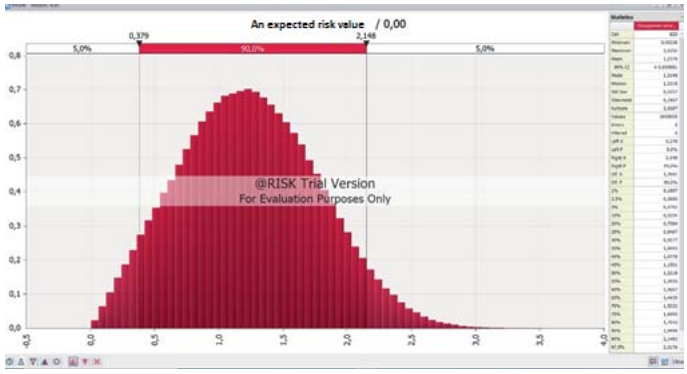
According to the pic. 11a and 12a, for confidence probability 95% and triangle distribution $VaR_{95\%}$ (R) = 2,803, and for *PERT* – $VaR_{95\%}$ (R) = 3,437, distribution whereby the events during which a case concerning the AL violation is filed (I = 3) or even guilty of the AL violation are administratively liable (I = 4), do not already seem to be improbable.

Finally, the last stage in the risks regulation processes scheme (pic.1) is *impact on a risk*. After selecting of the measures at the *estimation stage* from the list, which appeared at the *analysis* stage, a risk owner should realize the present measures. Thereat one should be realistic, that implementation of the actions concerning impact on risks can essentially influence the context, consequently the process of regulation of risks, including the AL violation risks, must be adaptive and cyclic. It should be noted as well, that risks regulation processes must be performed under constant consultations together with all the interested parties (stakeholders) of the company and constant monitoring of the processes.

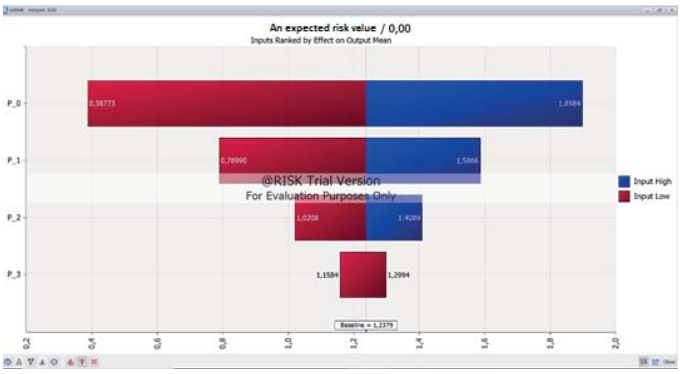
5. CONCLUSIONS

Coming to conclusion it should be emphasized again, that work in the frame of the AC system should not be in progress from time to time, from one report concerning the AC to the next one. This work should be fulfilled systematically, and the AC system functioning processes must as a matter of fact run through the whole activity of the executive authority. Only in this case creation of the AC system will bring success. The AC system in the executive authority must develop on the basis of a kaizen philosophy, – that is a steady improvement of the company regulation processes, which is, in particular, innate in the risk management principles according to the National standard GOST R ISO 31000:2019.

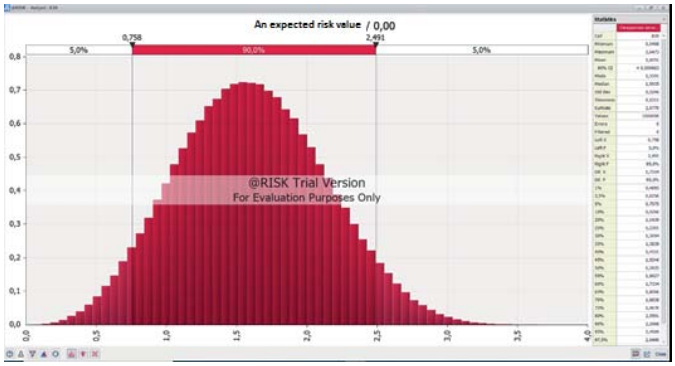
Pic. 9a. Modeling results of the risk of the AL violation on the part of the executive authority – moderately pessimistic scenario, triangle distribution of probabilities, sample distribution density



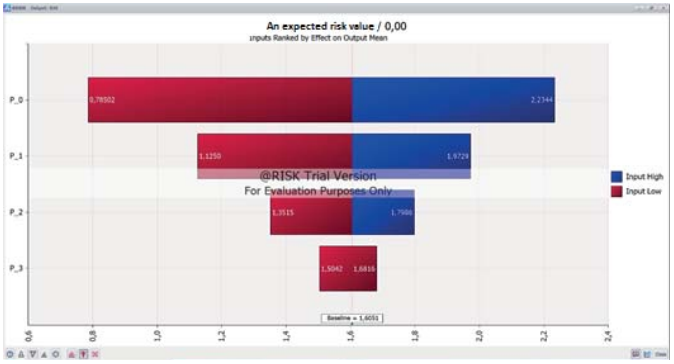
Pic. 9b. Modeling results of the risk of the AL violation on the part of the executive authority – moderately pessimistic scenario, triangle distribution of probabilities, "tornado" diagram



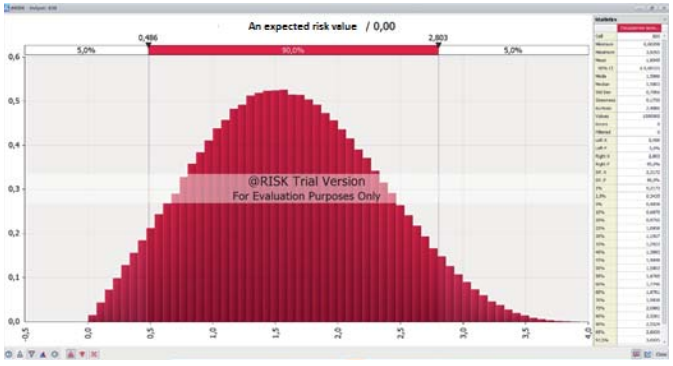
Pic. 10a. Modeling results of the risk of the AL violation on the part of the executive authority – moderately pessimistic scenario, PERT distribution, sample distribution density



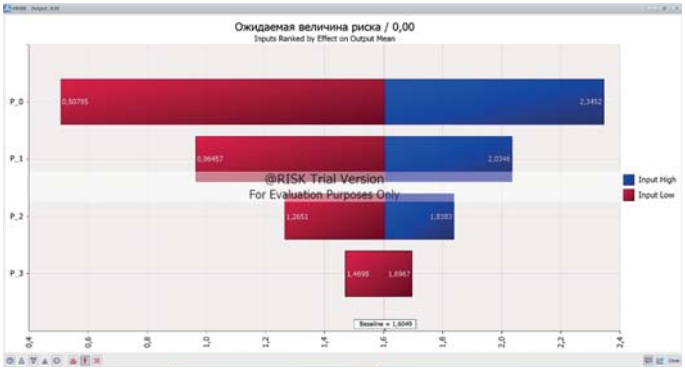
Pic. 10b. Modeling results of the risk of the AL violation on the part of the executive authority – moderately pessimistic scenario, PERT distribution, "tornado" diagram



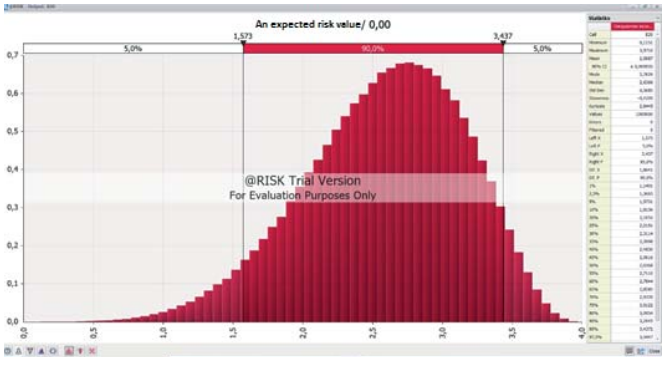
Pic. 11a. Modeling results of the risk of the AL violation on the part of the executive authority – pessimistic scenario, triangle distribution of probabilities, sample distribution density



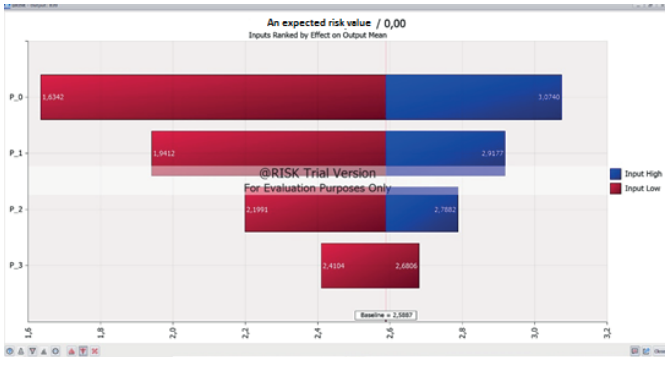
Pic. 11b. Modeling results of the risk of the AL violation on the part of the executive authority – pessimistic scenario, triangle distribution of probabilities, "tornado diagram"



Pic. 12a. Modeling results of the risk of the AL violation on the part of the executive authority – pessimistic scenario, PERT distribution, sample distribution density



Pic. 12b. Modeling results of the risk of the AL violation on the part of the executive authority – pessimistic scenario, PERT distribution, "tornado" diagram



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