ISSN 2076-2429 (print)
ISSN 2223-3814 (on line)

UDC 005.8:621.311.25

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THE SYSTEMATIZATION OF TERMS IN PROJECT MANAGEMENT OF THE NUCLEAR POWER FACILITIES SAFETY IMPROVEMENT

Т.Г. Григорян, Є.А. Квасневський, К.В. Кошкін. **Систематизація понять в галузі управління проектами підвищення безпеки об'єктів атомної енергетики.** Розглянуто особливості понять в галузі безпеки об'єктів атомної енергетики з точки зору управління проектами. Запропоновано терміни проект і портфель проектів підвищення безпеки об'єкта атомної енергетики. Показано взаємозв'язок між АЕС, контролюючим органом і експлуатуючим підприємством протягом життєвого циклу подібних проектів.
Ключові слова: атомна енергетика, підвищення безпеки, управління проектами.

Т.Г. Григорян, Е.А. Квасневский, К.В. Кошкин. **Систематизация понятий в области управления проектами повышения безопасности объектов атомной энергетики.** Рассмотрены особенности понятий в области безопасности объектов атомной энергетики с точки зрения управления проектами. Предложены термины проект и портфель проектов повышения безопасности объекта атомной энергетики. Показана взаимосвязь между АЭС, контролирующим органом и эксплуатирующим предприятием на протяжении жизненного цикла подобных проектов.
Ключевые слова: атомная энергетика, повышение безопасности, управление проектами.

T.G. Grigorian, E.A. Kvasnevskiy, K.V. Koshkin. **The systematization of concepts in project management of the nuclear power facilities safety improvement**. The features of notions in the field of nuclear energy safety are considered in terms of project management. The terms nuclear power safety improving project and portfolio are proposed. The relationship between the NPP, the controlling organization and the operating enterprise during the life cycle of such projects is shown.
Keywords: nuclear power, safety improvement, project management.

Power units safety improvement in the nuclear power plants is an integral and priority component of National Nuclear Energy Generating Company of Ukraine "Energoatom" (NNEGC) activities, as the operating organization according to the Law of Ukraine "On The Use Of Nuclear Energy And Radiation Safety" and the International Convention "On Nuclear Safety" [1, 2]. This is caused, first of all, by the need to extend the operation term of power units of Ukrainian NPPs beyond the usual period, because the overwhelming majority of them with a designed service life of 30 years was put into operation in the 1980s. As a result, today the extension of the operation period of power units of Ukrainian NPP has become the most important strategic task of the Cabinet of Ministers of Ukraine according to "Energy Strategy of Ukraine till 2030", approved by the Cabinet of Ministers of Ukraine order of 15.03.2006 №145-p. and "Complex Program of Works to Extend the Service Life of the Existing Nuclear Units", approved by the Cabinet of Ministers of 29.04.2004 № 263-p.

The main document, regulating activities, directed to the power units safety improvement of the nuclear power plants, is the Complex (consolidated) safety improvement program (CSIP), developed in 2012, which includes all unrealized actions, recommended by international experts, safety regulations and activities aimed at the replacement of equipment important to safety, that spent its service life [3].

After the events at the nuclear power plant "Fukushima Daiichi" in March 2011, a need to review

the approach to the work aimed at safety improvement and extending service lives of nuclear power plants has appeared. As a result, the status of CSIP was promoted to the governmental one by the decision of the National Security and Defense Council, and the program was put into action by the decree of the Cabinet of Ministers of Ukraine of 07.12.2012. Meanwhile CSIP was supplemented with the results of the extraordinary revaluation power units safety at the extreme resistance to external influences (the so-called "stress tests"). Thereby, according to the CSIP in the next 7 years "Energoatom" must hold a set of activities to improve the safety of prolonging service life of 10 nuclear power units and in 2014, 2016, 2017 and 2019 — 2 units at the same time [4].

According to the General regulations of nuclear power plants safety improvement, the NPP safety means "a NPP feature under normal use and violations of normal operation, including accidents, to limit radiation exposure to workers, the public and the environment by the fixed limits" [5].

The safety assessment is settled in accordance with the methodology of the probabilistic safety analysis (PSA), proposed in the USA [6]. The absolute safety of the NPP is not realistically achievable. Therefore, in accordance with the concept of PSA the acceptable safety level (acceptable level of risk) is determined. This approach allows to quantify the contribution of each of them (refusals) and formulate a comprehensive quantitative assessment of the safety level of nuclear power plants on the basis of the probabilistic assessments of subsystem failures [7]. Thus, *the level of safety of the nuclear power facilities* is the result of interaction of project solutions, operational safety and operation of the nuclear power plant personnel, which is characterized by the level of risk of the project and extra design accidents, measured on the basis of probabilistic models. Hence, increasing safety is a consequence of the activities at the nuclear power plant, leading to reduction of the risks of occurrence of the project and extra design accidents [3]. In the context of CSIP improving the safety of nuclear power facilities is implemented through the *combined activities*, developed for the power units of all operated in Ukraine nuclear power plants, taking into account their peculiarities.

Meanwhile, both the activities, aimed to the safety improvement, and activities, connected with maintaining required safety level, in fact, provide the NPP safety improvement equally. As examples the following actions can be performed [3]:

— reliability defense improvement of the 1st circuit against the high pressure in the cold state (*safety level improvement*);

— preventing the consequences connected with the pipeline rupture of the second circuit outside the pressurized volume (*safety level preservation*).

In this work increased safety means both the preservation of the current safety level and its increasing.

In the general case, the data structure of the activities model, aimed at safety improving is described as tuple:

$$M = <B, P, A, R>,$$

where B — the set of factors, that indicate the need of the activity;

P — the set of parameters, that describe the problem and includes reference to the requirements of norms, nuclear and radiation safety rules and standards of Ukraine, the reference to the international recommendations and the detailed description of the problem;

A — the set of characteristics, that describe carried out activity, the concept activity description;

R — the set of factors, that describe existing experience and the available solutions to this problem.

Thereby, the activity aimed at the nuclear power facilities safety improvement possesses the following features:

the goal presence — despite the fact that every activity is aimed at reducing of the risks of loss in case of accidents, each of them has as a technical or organizational purpose;

uniqueness — every activity is developed for the certain power unit in the conditions of the certain NPP;

limited time — the effectiveness and productivity of activities is directly related to their lifetime, so it is extremely important to solve the tasks of providing safety in the shortest terms;

ISSN 2076-2429 (print)
ISSN 2223-3814 (on line)

As we can see, the activity aimed at the nuclear power facilities safety improvement, possesses the basic features typical to the concept of the project [8]. Therefore, these activities, which are regulated by CSIP and aimed at the nuclear power facilities safety improvement, are the projects. Thus, it is necessary to apply the methods and models of effective management, developed in project management, in the implementation of activities aimed at nuclear power plants safety improvement. The usage of the best practices of project management during implementation of CSIP will allow to:

— significantly increase the efficiency of activities of the nuclear power plants safety improvement;

— ensure a more rapid implementation of activities;

— reduce costs and increase the commercial component of the work in the structure of CSIP.

We introduce the term of the *project of nuclear power facilities safety improvement*, by which we mean a project which includes a range of activities aimed at reducing the quantitative risk assessment of the project and beyond design basis accidents at nuclear power plants and at reducing the negative influence of their effects through a set of organizational and technical activities. The formation of the term satisfies the basic rules of logic definitions [9] and fits the term *activity* applied in CSIP [3].

The classification of nuclear power facilities safety improvement projects [10] allows to:

— uniquely identify a project in managerial tasks;

— structure and systemize knowledge about nuclear power plant safety improvement projects;

— develop best practices by summarizing projects attributes;

— increase productivity and effectiveness of data maintenance in computer aided project management systems at the NPP.

However, a single activity is not implemented at each NPP at the same time, but a set of them. By analogy with the project management, this set forms the current *portfolio of nuclear power facilities safety improvement projects* — a set of projects or programs and other works, united together for the purpose of effective data management activities to achieve the goals and meet the requirements of nuclear and radiation safety. The power of the projects set in the portfolio of NPP can reach a number of 400. It is caused by the fact that the current portfolio also includes projects aimed at safety improvement, however, they are not parts of the CSIP. The general scheme of interaction of operating and controlling organizations throughout the nuclear power facilities safety improvement project life cycle is shown in Figure.

As shown in Figure, the project initiation takes place at the NPP, and the bases for initiation are [11]:

— the requirements of the norm, rules and standards on nuclear and radiation safety of Ukraine;

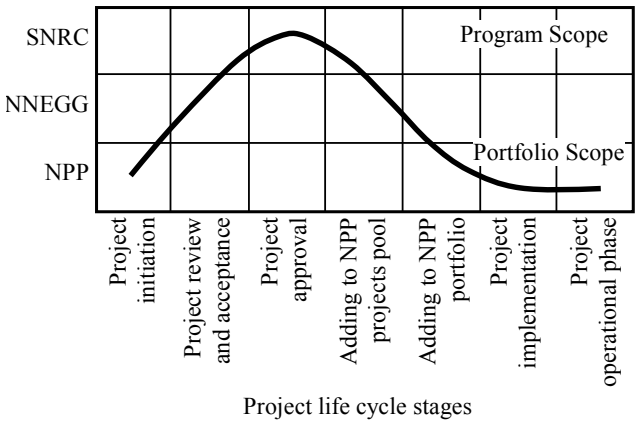
— international recommendations (IAEA, RISKAUDIT);

— the results of the safety analysis;

— requirements / regulations of the national Supervisory authorities;

— cumulative experience.

After the initiation and development of conceptual decisions on the NPP, the project is submitted for consideration to the operating organization — NNEGC “Energoatom”, after that passes the examination and approval of the regulatory agency — The State Inspection of Nuclear Regulation of Ukraine (SNRC) takes place. As a result, the project is placed into a common pool, which is controlled by the NNEGC in relation to a particular nuclear power plant and already from that pool at the power plant the work on realization of the project in the framework of the current portfolio is initiated.



The relationship between organizations, program, portfolio and lifecycle of NPP safety improvement projects

In the work the definition of term nuclear power facilities safety improvement project is suggested and the relationship of this concept to the life cycle of the project and organizations involved is shown. Further research should be directed to the subsequent analysis of the characteristics of this type of project and the development of best practices in their management.

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Received December 15, 2012

UDC 339.138:659.113.7

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AN EVALUATION OF PERFORMANCE INTEGRATED MARKETING COMMUNICATIONS: USE OF THE "FUNNEL EFFICIENCY" METHOD

І.О. Башинська. **Оцінка ефективності інтегрованих маркетингових комунікацій: використання методу** "**воронка ефективності**"**.** Розглянуто, в чому полягає суть "ефективності" інтегрованих маркетингових комунікацій (ІМК). Проаналізовано якісні і кількісні критерії оцінки. Запропоновано метод "воронка ефективності", представлено практичний приклад використання запропонованого методу.

Ключові слова: "воронка ефективності", інтегровані маркетингові комунікації, кількісні і якісні критерії, ефект, ефективність.

И.А. Башинская. **Оценка эффективности интегрированных маркетинговых коммуникаций: использование метода** "**воронка эффективности**"**.** Рассмотрено, в чем состоит суть "эффективности" интегрированных маркетинговых коммуникаций (ИМК). Проанализированы качественные и количественные критерии оценки. Предложен метод "воронка эффективности", представлен практический пример использования предложенного метода.

Ключевые слова: "воронка эффективности", интегрированные маркетинговые коммуникации, количественные и качественные критерии, эффект, эффективность.

I. Bashynska. **An evaluation of performance integrated marketing communications: use of the "funnel efficiency" method.** The "efficiency" of integrated marketing communications (IMC) is discussed. The quantitative and qualitative evaluation criteria are analyzed. The method of "funnel efficiency" is offered, the practical example of using the proposed method is presented.

Keywords: "funnel efficiency", integrated marketing communications, quantitative and qualitative criteria, effect, efficiency.

In today's economy with a high level of society informatization, a very important role is played by complexes of integrated marketing communications (IMC). Performance evaluation of the integrated marketing communications in the modern terms of hypercompetition should be perceived as one of the most essential directions of activity of enterprises, aimed at providing stable and steady functioning.