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Conditions for Increasing the Viability of Critical Infrastructure Objects

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Concept of increasing the protection capacity of key critical infrastructure objects in Bulgaria is developed. Methodology of planning and Model of Business Continuity Management System of critical infrastructure, which constitute the basis of their viability are proposed in the concept. In addition developing criteria and indicators for assessing the risk of terrorist attacks or methods of increasing security and protection of critical infrastructure including creation of a model of making a decision when modality terrorist attack are given.

KEYWORSDS Business Continuity Management, critical infrastructure sites, methodology, model

INTRODUCTION

There are two main lines in the policy concerning the consolidation and development of the antiterrorist activity: struggle against the source of threat and protection of the particular individual and infrastructure (Stoychev, 2011). The struggle against the prime source is the function of the intelligence bodies, the base of their activity being the "uncertainty"—where, when and how the terrorist attack will be realized. The protection of the particular individual and infrastructure is a society product and as such it is a function of the state bodies of all levels.

The degree of uncertainty and the necessity of protection exercise considerable influence on the economical and physiological expenditures

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and lead to painful changes in the established behavior standards and way of life.

In order that the achievement of permanent and efficient results of overcoming the threat of terrorist attacks is possible, it is necessary that the efforts be purposeful and focused for solving the problems in key points.

Recognizing these truths, in 2009 the Institute of Metal Science, Equipment and Technologies "Acad. A. Balevski" with Hydroaerodynamics Centre at the Bulgarian Academy of Sciences (IMSETHC-BAS), has developed a conception of protection capacity improvement of the critical infrastructure key objects in Bulgaria. The conception is unique and first not only in Bulgaria but in the European Union as a whole and initiates a systematized approach of security and protection of the European critical infrastructure.

With the conception development and realization, the following main purposes are fixed: increase of the counteraction capacity to terrorist threats against key for the economy and country development power and transportation objects, and improvement of the decision making process management in case of multivariant terrorist threat.

The usefulness and effectiveness of the conception realization can be clearly identified in the planned results. For the purposes of the systematic research approach and increase to the maximum degree of the practical and applied results of the R&D activities, the concept is divided into four interdependent and complementary modules that are:

First module—Analysis of the System continuous operation conditions in NPP "Kozloduy" for removing heat and its transforming into kinetic energy of the steam generator and increase of its protection against terrorist threat—with results:

- *continuous operation module* of the System for removing heat and its transforming into kinetic energy of the steam generator which will underlie in the base of the Nuclear power plants operation in EU with generators of WWR-PWR type—*Czech Republic, Slovakia, Hungary and Finland*; and
- model of improving the System protection capacity against terrorist threats.

Second module—Increase of the antiterrorist protection of underground gas depot «CHIREN» (UGD «Chiren»)—with results:

- unified methodology of gas depository protection against terrorist threats in EU member countries;
- assessment of UGD «Chiren» protection system risk in terms of adequate reaction against terrorist threats;
- model of gas depository protection against terrorist threats; and
- procedures of action in case of terrorist threat and in cases of critical circumstances in the gas depositories.

Third module—Improvement of "Sofia" airport protection capacity against terrorist threats by means of increasing the security of the adjoining areas—with results: methodology for building security system of the airport outer perimeter with the purpose to increase the internal security, and model for security and protection of the outer airport perimeter for the purposes of internal security.

Fourth module—Operative management procedures in high risk environment of multivariant terrorist threats—with results:

- operative procedures of decision making in case of multivariant terrorist threat;
- engineering and technological solution of management integrated system in case of multivariant terrorist threat;
- model of management integrated system in case of multivariant terrorist threat applicable at national, regional, and European level with approved parameters and characteristics; and
- trained operators and personnel for action in situation of multivariant terrorist threat.

On this basis Methodology of planning and Model of Business Continuity Management of objects of the national and European critical infrastructure will be developed which initiates the process of creating conditions for viability improvement of the critical infrastructure objects.

NATURE OF THE PROBLEM

The scope of the technological/business continuity processes comprises management activities and integrated plans that create conditions to maintain the continuity of critical for certain organization processes (Business Continuity Institute, 2008). This scope covers all aspects of an organization unit, which takes part in the maintenance of the critical processes and they are personnel, buildings, suppliers, technologies, and data. Its determinative role particularly grows when the case in point is to guarantee the continuous operation of critical infrastructure objects and most of all those defined as such in power engineering.

The assurance of nuclear power plants continuous operation is the key moment of their function connected both with the risk of considerable economical losses and with presence of danger for the health and life of the people working in them, abiding in their territory, or in the region they are situated in.

From this point of view, the Methodology of planning and the Model of Business Continuity Management System of the critical infrastructure objects

are developed for the NPP "Kozloduy" System for the removing heat and its transforming into kinetic energy of the steam generator.

There are numerous approaches, methods, and means to create conditions of critical infrastructure objects continuous operations which reflect in different degree their specificity. Therefore, there are various security degrees and levels to guarantee their operation continuity.

The improvement of the theory and practice for continuous operation planning as well as the exchange of experience and good practices contribute to the increase of the security of the respective economical or organizational subjects but the unavailability of unified models for one-type objects results in the rise of uncertainty in relation to their viability degrees, that is, there is no objective criterion for comparison and assessment of the object resistance degree in different critical situations.

Considering also the fact that such objects are in the base of the critical infrastructure of all European Union member countries, it is of particular importance to create conditions for reliable assessment and achievement of the necessary security degree and level to guarantee their development.

All these impose the necessity of creating unified Methodology and Model of Business Continuity Management System of the critical infrastructure objects in the field of nuclear plants which will be also used in other critical infrastructure objects such as for instance gas depots or international airport terminals. The development and testing of the methods and models on real objects in Bulgaria (NPP "Kozloduy," UGD "Chiren," and "Sofia" airport) will contribute to the achievement of the following benefits for the critical infrastructure objects in power engineering and transport:

- providing conditions of carrying out reliable assessment of the critical activities and processes and improvement of their viability which guarantee acceptable operation of the objects under conditions of impact on their performance and characteristics;
- increase of the training efficiency of the officials in charge of the objects continuous operation;
- providing conditions to improve the continuous operation good practices;
- decrease of the expenditures for building Business Continuity Management Systems of critical infrastructures and objects; and
- multiplication of the above said results in the critical infrastructures of power engineering and transport of the EU member countries.

Objects of the research are the critical processes and activities in the three infrastructure objects, describing the correlations, assessing the probable effects of different factors influences and suggesting directions of good practices development. A complete set of tools is being developed for building a Business Continuity Management System of critical infrastructure in

power engineering and transport and a Model for Business Continuity Management to critical infrastructure is being tested in both areas.

The present article presents the parameters of unified Methodology of planning and Model of Business Continuity Management System of one of the basic nuclear plant systems with the prospect to be applied in gas depositories and international airports as objects of the critical infrastructure in power engineering and transport.

METHODOLOGY OF PLANNING THE INFRASTRUCTURE OBJECTS CONTINUOUS OPERATION

On the base of the study of critical processes and activities in the three infrastructure objects, the description of the interdependences and the assessment of the probable effects of the impacts of different factors, methodologies of planning the continuous operation of nuclear power plants, gas depots, and international airports will be suggested.

The methodologies will contain, but without being limited to, the following components:

- terminology standardization;
- identification of the major, minimum obligatory planning stages;
- determination of the approaches to create policy of continuous operation (Business Continuity policy) and strategy of its fulfillment;
- description of the obligatory preliminary analyses (such as for instance Business Impact Analysis (Business Continuity Management–Part 2, 2006), that should be performed in the stage of plan preparation with the purpose of determining the critical processes and the impact degree on them by the various kinds and types of threats;
- determination of alternative decisions 'and priorities to secure continuous operation as well as approaches to their realization;
- determination of the type of plans (Incident Response and Management Plan, Business Recovery and Resumption Plan, Communications & Media Plan [Business Continuity Management–Part 2, 2007], etc.), interconnections between them and their connections with the rest of the management system components. Elaboration of module plans depending on the kind and type of threat;
- determination and choice of different methods and manners to put the plans in operation with the purpose to obtain the best final results;
- determination of adequate methods, forms and approaches of personnel training;
- selection of approaches to create data bases and process automation; and
- development of mechanism for planning, monitoring, and realization of the activities for continuous operation maintenance.

MODEL OF CRITICAL INFRASTRUCTURE BUSINESS CONTINUITY MANAGEMENT SYSTEM

The Business Continuity Management is not only the preparation of plans. It is necessary, after the planning phase, to develop activities in support of the progress of the efforts in direction of permanent improvement of the planning and transformation of the accompanying processes in a part of the overall culture of the respective organization.

For that purpose a Business Continuity Management System of the NPP "Kozloduy" System for removing the heat, its transforming into kinetic energy of the steam generator of reactor WWER-PWR type will be developed (further down referred to as "System").

The development in advance Methodology of Business Continuity Planning will be used for providing documentary base of the system planning phase. In the frames of this phase the system scope will be defined which will obligatory include but will not limit to:

- policy of permanent technological/business development;
- sources and methods to provide the necessary resources;
- procedure of selecting critical materials and services suppliers;
- procedures of training the personnel and establishment of competency level traceability and maintaining the specialists competence;
- procedures for performing Business Impact Analysis, Risk Assessment, and Business Continuity Management Strategy of the System;
- structure for fulfillment of the activities for Business Continuity Management of the System;
- various plans of counteraction against the consequences of different kinds and types of threats;
- procedures of activating the plans;
- procedures of maintenance, inspection, and audit of the activities;
- procedures of preventive and corrective actions;
- procedures of management inspection and provision of proofs for permanent improvement; and
- production of Business Continuity Management Handbooks Set of the System, the nuclear power plant, respectively.

METHODOLOGY AND MODEL TESTING

The Methodology and Model of Business Continuity Management will be tested for fitness in NPP "Kozloduy," UGD "Chiren," and "Sofia" airport. For the purpose a software product will be made on which base the tests will be carried out and it will become the base of Integrated Control Information Center (ICIC). ICIC will be in the base of testing the methodology for providing security and protection of the power and transport critical infrastructure objects (including the Methodology of Business Continuity

Planning) and the model of improving the protection capacity system of such objects (including the Model of Business Continuity Management System). The software will cover all aspects of the critical structure objects protection and a separate module in it will be designed for continuous operation processes management. The Center will have all the functions of security and protection management of the critical infrastructure objects:

1. *Preparation and restraint*:
   a. planning of the mission;
   b. decrease of risk;
   c. training and simulations;
   d. management of resources;
   e. prevention through observation and quick action of specialized sensors (developed specially for the purpose in the IMSETHC-BAS);
   f. detection and signaling.
2. *Response:*
   a. development of general operative vision;
   b. management and circulation of instructions and information in real time;
   c. coordination, direction and communication.
3. *Recovery:*
   a. planning and monitoring of the recovery activities;
   b. review of the undertaken actions and creation of conditions for training and education on the basis of the acquired experience.

The advantages which will bring the elaboration of ICIC activity management software are the following, but not only:

- presentation of general operative picture in real time;
- creation of conditions for fast and accurate orientation under the circumstances presented;
- providing the maximum short reaction time;
- effective disposition and use of the necessary resources;
- creation of conditions for close and effective collaboration between the individually engaged bodies in the respective organization;
- precise and effective analysis after overcoming the crisis situation; and
- providing possibilities for reliable connections with external data bases and communications in the frames of multifunctional system.

Plans for tests carrying out will be developed and various scenarios of threats simulated; depending on the specificity of the latter. Different plans will be put in operation or only individual modules of them. Main focus will be placed on the means for putting the plans in operation, the capabilities of the computer techniques being massively used for data accumulation, processing, and circulation. There will be developed and used in practice at the maximum degree modern interfaces between the decision makers,

executives, and the execution units for the purposes of processes automation, speed of response, and improvement of the obtained results reliability.

In the run of testing the Methodology and Model internal audits will be made at definite interval of time as well as review of the management. On their base the results will be systematized which will outline the directions for improvement of good practices for continuous operation of the studied objects.

CONCLUSION

In the frames of a dynamically developing environment, Republic of Bulgaria turns into a key factor for building and maintaining in national, regional, and international planned strategic power and transport objects that increase to a significant degree the risks of terrorist acts. The increase of their quantity, diversification of their type, and extension of the territorial areas in which they are, in combination with the growing risks of terrorist acts, necessitate the undertaking of synchronized measures for their protection, not only in terms of use of adequate systems but also development of the relevant methodologies and models for increase of their safety capacity. By the described methodologies, models, and systems not only a systematized approach will be created for improvement of the security and protection of the critical infrastructure objects in Republic of Bulgaria but there will be provided also a considerable contribution to the stabilization of the European security in the field considered. So, the Institute of Metal Science, Equipment and Technologies "Acad. A. Balevski" with Hydroaerodynamics Center at the Bulgarian Academy of Sciences has contributed to the development of NATO defense capabilities, developing the high tech system of helicopter protection against rocket-propelled grenades, a project entrusted by NATO Defence against Terrorism Programme.

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