CUT THE COSTS AND ENHANCE EFFICIENCY IN NUCLEAR SAFETY AND SECURITY CULTURE SELF-ASSESSMENTS: CONSIDERATIONS THAT SHOULD BE TAKEN TO MERGE NUCLEAR SAFETY AND SECURITY CULTURE ASSESSMENTS

KÖLTSÉGCSÖKKENTÉS ÉS HATÉKONYSÁGNÖVELÉS A NUKLEÁRIS BIZTONSÁGI ÉS VÉDETTSÉGI KULTÚRA FELMÉRÉSEKBEN: MEGFONTOLÁSOK AMELYEKHEZ TARTANUNK KELL MAGUNKAT, HA ÖSSZEVONJUK A NUKLEÁRIS BIZTONSÁGI ÉS VÉDETTSÉGI KULTÚRA FELMÉRÉSEKET

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Abstract

About the peaceful applications of atomic energy, there can be no doubt, that safety accidents have the greatest effect on the public opinion. Besides safety - culture -, the security incident of the recent years highlighted the importance of security and the culture for security, but it is still not a principal issue.

The topic of nuclear safety culture, the human factor within safety issues has been recognized as an important component of nuclear safety performance since Chernobyl.

How to make nuclear security as relevant as safety, how does nuclear security culture relate to safety (culture) and what and how can security culture assessments can benefit from the lot of results that nuclear safety culture has reached? This paper answers a specific part of the above-mentioned topics and provides important considerations about the combination of nuclear safety & security culture assessment.

Keywords: *Nuclear safety culture, nuclear security culture, culture assessment and combination*

Absztrakt

Az atomenergia békés alkalmazásait tekintve kétség sem merülhet fel afelől, hogy a biztonsági balesetek befolyásolják legnagyobb mértékben a közvéleményt. Azonban a biztonsági - kultúra – mellett az utóbbi évek védettségi eseményei felhívták a figyelmet a védettség és a védettségi kultúra fontosságára, amely ennek ellenére továbbra sem tekinthető elsődleges feladatbak.

A biztonsági kultúra témája, a biztonsági eseményekkel kapcsolatos emberi tényezők szerepe Csernobil óta ismeretes.

Hogyan tegyük a védettséget ugyanolyan fontos üggyé, mint a biztonság? Hogyan kapcsolódik a biztonsági és védettségi kultúra? Valamint a biztonsági kultúra által elért eredményeket hogyan tudja a védettségi kultúra felmérés kamatoztatni?

A cikk a fent említett kérdésekre ad választ, valamint fontos megfontolásokat tartalmaz a biztonsági és védettségi kultúra felmérések összevonásával kapcsolatban.

Kulcsszavak: *Nukleáris biztonsági kultúra, Nukleáris védettségi kultúra, kultúra felmérés és összevonás*

INTRODUCTION

About the peaceful applications of atomic energy, there can be no doubt, that safety accidents have the greatest (negative!) effect on the public opinion. One of the main reasons behind this is most likely the fact that because of security consideration safety incidents have received and in the future, will receive much more publicity, than the security incident. [1] Accordingly, nuclear safety is one of the "flagships" and probably the most important missions of the nuclear industry and this is reflected in regulations, decisions makings, communication and unfortunately in allocation of resources. The topic of Nuclear Safety Culture, the human factor within safety issues has been recognized as an important component of nuclear safety performance since Chernobyl. [2] Although beside the importance of safety culture well-known security incidents of the recent years in Pelindaba [3] and in Belgium [4] highlighted the value of security and the culture for security, it is still not a principal issue. What can be done to make nuclear security as relevant as safety? How does nuclear security culture relate to safety (culture)? What and how can security culture assessments can benefit from the lot of results that nuclear safety culture has reached? This paper answers a specific part of the above-mentioned questions and provides considerations about the combination of nuclear safety & security culture assessment that can be useful not just in NPPs or in nuclear installations, but in other radioactive material associated facilities in Hungary. [5]

ABOUT THE CULTURE FOR NUCLEAR SAFETY

Weaknesses in safety culture have contributed to significant accidents at the Three Mile Island Unit 2 and Chernobyl, and significant incidents at Davis-Besse, Vandellos II, Paks and Forsmark, among others. [6] the self-assessment of the nuclear safety culture is a requirement in the nuclear industry for several years and during these years several assessments were already successfully conducted. From these self-assessments a much larger amount of valuable independent data and information were born - besides trend and side analysis. The efficient and effective use of these data, methods and processes are essential for the assessments in the future too. but few years ago a new player appeared on the scene, the need for nuclear security culture.

THE BACKGROUND OF THE CULTURE FOR NUCLEAR SECURITY

The necessity for separate nuclear security culture was rooted in the terrorist attack on the 11th of September 2001. The first reply to that was a report by the International Atomic Energy Agency (IAEA) on "Measures to Improve the Security of Nuclear Materials and Other Radioactive Materials". [7] Besides the IAEA, States and the World Institute for Nuclear Security are working together to strengthen nuclear security culture by publishing guides and hosting (international) workshops. [8]

The basis of all IAEA nuclear security culture documents is NSS 07 Implementing Guide, which was published in 2008 and provides a model for nuclear security culture, identifies roles and responsibilities of various nuclear security stakeholders. In 2014 the IAEA released NST 026, a detailed technical guidance about nuclear security culture self-assessment, that describes the method and the process of nuclear security culture assessment, and a provides the necessary instructions for either nuclear safety culture or nuclear security culture assessment. Probably as the most significant innovation, it determines characteristics and indicators of nuclear security culture assessment and illustrates them with practical examples. Since then NST 027 technical guidance came into state of the "Member state comments",

which provides examples and case studies about the progresses of nuclear security culture enhancement. [1]

ABOUT THE INTEGRATION BETWEEN NUCLEAR SAFETY CULTURE AND NUCLEAR SECURITY CULTURE SELF-ASSESSMENT

Both safety and security awareness (and performance) are part of the culture of an organisation. They share the same goal to protect the individuals, the public and the environment from the harmful effects of ionizing radiation.

The IAEA's concept of shared objectives between nuclear security culture and nuclear safety culture is manifested also by the agency's organizational structure, which places the responsibility for both disciplines within an integrated IAEA Department of Nuclear Safety and Security. [7]

Several documents were published regarding the interface between nuclear safety and security. The latest one is TECDOC-1801 [9], the "Management of the Interface between Nuclear Safety and Security in Research Reactors" which emphasizes that the integration between the two disciplines is relevant.

However, the functional categories of the safety and security management systems are very similar[1], there are some differences both in the management processes[2] as well as in the approach of the culture too. Security deals with deliberate acts and demands that the sharing of information typically be restricted only to authorized trusted personnel on a valid "need-to-know" basis, to prevent sensitive information related to security measures or safety/security weaknesses at the facility from falling into the hands of adversaries. On the other hand, safety culture pursues transparency. It shares feedback on experience, thereby preventing repetitive occurrences of incidents or accidents and to disseminate information to prevent such occurrences from being repeated. In some cases, however, it may be necessary to withhold safety information for security reasons, such as information that might reveal a vulnerability which could be exploited by a person or persons having malicious intent. Therefore, the management needs to clearly identify not only safety and security as distinct processes to be managed, but also the interface between them, so that the areas of common ground and the areas of potential conflict between the two disciplines can be properly managed [9]

THE COMBINATION OF NUCLEAR SAFETY AND SECURITY CULTURE SELF-ASSESSMENT

Per my theory with necessary and appropriate preparation the determination of the overall culture through an integrated nuclear security culture and nuclear safety culture self-assessment, is more efficient and effective than separate assessments. There can be no doubt about the cost-efficiency of a merged assessment. However, in the following all the considerations will be described step by step that must be taken to reach the desired efficiency and effectiveness with the contraction. [10] [6]

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[1] management responsibility, resource management, quality management, process implementation, performance assessment and improvement

[2] Typical processes for safety include the procedural management of safety analysis, fuel handling and core management, reactor operation, experiments, maintenance of systems and components important to safety and emergency preparedness. Typical security processes include personnel security, information security, computer security, access control, security training and exercises, system sustainability, security event reporting and management of the security organization and equipment.

The fundamental assumption is that self-assessment team needs to have a broad range of competencies and experience. At the first sight, the difference between integrated and separate assessments seems to be small… However, a separated team only has a delegate from the "other" team and the leading assumption is only either nuclear safety culture or nuclear security culture. On the other hand, an integrated team must have experts from both safety and security fields, and every member should have a comprehensive integrated approach from both nuclear safety culture and nuclear security culture, which makes an overall comprehensive approach of the assessment possible.

	Combined self-assessment	Separated self-assessments
Senior management workshop and commitment	With an integrated approach the management can cut the costs and enhance the efficiency.	During workshops and commitment, the integration is not part of the scope.
Self-assessment team composition	The Self-assessment team should contain experts from both safety and security fields and everyone must be aware of (culture for) safety and security as parts of the complete picture.	The fundamental role has either Nuclear Safety Culture or Nuclear Security Culture and according to that the scope is to assess and enhance only one of them.
Training on self-assessment	The training must handle culture as a whole.	The awareness of nuclear safety culture and nuclear security culture are separately handled.

Table 1. Prerequisite/general considerations: implementation of Action plan and Follow-up (made by the authors)

The preparation of the organisation in case of the assessment of the culture, is a very (if not the most) important activity. Without an appropriate establishment, it can go in a wrong direction, which is especially true if the organisation implements a combined self-assessment. It needs a comprehensive approach, and without it the campaign can do more harm than good. It may confuse the personnel without the possibility any reliably and valid result or enhancement. As it can be seen, there are several differences in the preparatory phase between merged and separated self-assessment.

	Combined self-assessment	Separated self-assessments
Allocation of the resources	To conduct one self-assessment is obviously the cost-efficient choice. But on the other hand the roles and responsibilities need to be harmonised.	Two separate self-assessments are more expensive, but the roles and responsibilities (safety or security divisions) are more clear.
Prepare the self-assessment team	The team put priority on safety and security approaches, but should handle the culture of the organisation as an integrated whole.	Prepare the team for a good organisational culture, but the focus is either on safety or security approach.
Prepare the Self-assessment plan	Integrated plan is needed to assess the complete whole of the culture and including nuclear security culture and nuclear safety culture and especially the interfaces between them.	A separate Self-assessment plan should contain all requirements (either safety or security (culture). *Simpler approach.*

	Integrated approach.	
Pre-launch	A harmonious and targeted campaign can reduce the costs, but without a strong communication and cooperation can do more harm than good.	There is no need for special integration. Two separate campaigns are more expensive, but it can clarify separate safety and security culture.

Table I. Preparatory Phase: Prepare the Organisation (made by the authors)

The main reason to conduct combined culture Self-assessment is that from technical aspects, that the prescribed recommendations of Nuclear Safety Culture and Nuclear Security Culture Self-assessment are very similar. In the conducting phase, there is no need for any special effort to pay attention on the interface. The processes and the methods [3] are appropriate to assess all and any type of culture, therefore by the combination of SAs the costs can be easily reduced.

Methods and Processes	All the methods and processes of Nuclear Safety Culture and Nuclear Security Culture Self-assessment can be merged without any difficulty.

Table II. Conduct Phase (made by the authors)

Several IAEA documents deal with the issue of the analysis of the assessments and the only difference between merged and separated ones is not the method, but the object of the analysis. During the analysis, attention must be paid to the overall culture of the organisation and/or as a part of it Nuclear Security Culture and Nuclear Safety Culture. The analysis method is very similar in every attitude assessment obviously, the variables and the connections to each other are different.

Communication of the results is similar from many aspects to the preparation campaign. With the help of an integrated communication the costs and redundancies will be reduced and a coherent enhancement of the organisational culture can be achieved.

	Combined self-assessment	Separated self-assessments
Analysis	The culture and the interface between Nuclear Safety Culture and Nuclear Security Culture must be analysed.	There is no need to pay special attention on the analysis of the interface between Nuclear Security Culture and Nuclear Safety Culture.
Prepare Assessment Report	The integrated Assessment Report handles the culture and as the leading segment the awareness of safety and security.	Prepare two separate Assessment Report. The focus is on the attitude of either safety or security. The integration does not play an important role.
Communication of the results	Like the pre-launch campaign, an integrated approach is essential.	Simpler messages in simpler campaigns, but separately for safety and security field.

Table III. Analysis & Communication Phase (made by the authors)

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[3] interview, focus-group, survey, document review and observation

The communication is not a one-way traffic… It is preferable to communicate the results and then receive feedback from the management, but the employees must be involved in developing and finalizing the action plan too. Their involvement results in more commitment to successful implementation compared with top-down direction.

	Combined self-assessment	Separated self-assessment
Feedbacks	Feedbacks are related to the overall culture of the organisation.	Feedbacks are related only either to nuclear safety culture or nuclear security culture.
Engagement of the management	Both managements (safety and security) must be engaged besides the overall culture of the organisation.	The action plan consists information about the engagement of either safety or security culture.

Table 5. Preparation of the action plan: based on the feedback of the management and employees (made by the authors)

While the combined action plan takes the culture as a whole (and as its important parts the safety and security awareness) into considerations, the separated action plans concentrate on the analysis and the enhancement of either safety or security culture. Improvements require a long term strategy and plan in addition to ongoing promotion of continuous improvements. The process should be repeated within 6-18 month.

	Combined self-assessment	Separated self-assessment
Implement the action plan	The implementation is done with a strong cooperation by safety and security divisions through a holistic approach.	The focus of the implementation is either on safety or security, no need for a special link between the divisions.
Conduct a follow up	The follow-up information does not concentrate on one division, strong cooperation is necessary between them.	The process is handled by either safety or security division.

Table 6IV. Implementation of action plan and Follow-up (made by the authors)

CONCLUSION

It was already emphasized, that the integration between nuclear safety and security is an important issue. Important, because the consolidation of all the regulations, roles, responsibilities, decision making and the allocation of the resources would possess practical difficulties. But the culture is something different…

If we take a closer look on the attitude of safety and security (by the IAEA), apart from the approach to sensitive information and transparency, there are no significant difference between them. An overall comprehensive approach of organizational culture would be prefect, and safety and security awareness is "just" a segment of it.

Beside cost-efficiency, because of reliability and validity considerations one attitude measurement is always better then two separate ones. Overall, however, the integration can do more harm than good, but with preparation these disadvantages can be prevented.

The first challenge that should be solved is to create the image of an ideal organisational culture and fill all the requirements of the ideal safety and security attitudes within. Communicate the message successfully– the preparation before the assessment and the results and action plan after it -. One single message about the right organisational culture with the necessary safety and security approaches can reach the target easier.

The second challenge is to create a perfect collaboration between the different divisions, rules and responsibilities. In ideal circumstances the energies that were spared with the single merged nuclear security culture & nuclear safety culture campaign and assessment do not exceed the costs of the collaboration between the different divisions and the alignment of the management.

The third and easiest challenge is, to conduct the self-assessment successfully, that it is described by the IAEA in the either in nuclear security culture or nuclear safety culture guidance [10] [6] and during the whole process special attention must be paid on both safety and security approaches.

Without the integrated message and collaboration, a contraction just confuses the personnel and the management too. The IAEA had already clearly shaped the concept of safety and security culture and with and ill-considered "innovation" the assessments will lose that. Furthermore, it will be no use of the more effective integrated campaign, if the message and the concept about the organisational culture is hardly "digestible" and not deliberated.

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