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ASPECTS OF HAZARD ANALYSIS AND CRITICAL CONTROL POINTS IMPLEMENTATION INTO UKRAINIAN INDUSTRY IN CONTEXT OF RATIONAL WATER RESOURCES USE

Abstract. The issues of the essence of water certification for its consuming at industrial enterprises, as well as food enterprises, have been investigated. Problematics of HACCP implementation in modern Ukrainian circumstances has been investigated, the necessity of system management of water resources (as an element of food products) quality and safety has been stated. The analysis of the existing conditions for developing and implementing such systems in Ukraine has been stated. The main approaches for the HACCP implementation have been investigated, the economical evaluation of the effectiveness of this system implementation to increase enterprises' competitiveness and to increase their financial indexes has been conducted.

We analyzed the degree of HACCP system implementation influence on the mechanism of rational water resources use. We determined the key problematics of industrial enterprises water use, concerning enterprises connected with food production and we also determined the ways of solving these problems by implementation of the mechanism of pre-conditional programs implementation. We suggested using of this methodic for following the direction of quality indexes of water improvement while this water is used in the food industry. We determined

the strategy of increasing concurrency of enterprises as a result of water quality improvement; and also improvement of financial indexes by decreasing ecological payments.

We proposed methodic for the critical control points determination and also determination of the according to these points decisions, which gives an opportunity to check put the controlling events to decrease or to annulate dangerous factors at some technological processes.

We also used the experience of HACCP implementation abroad in context of rational water resources use. We compared technical possibilities for the perfects system functioning at Ukrainian enterprises and enterprises abroad. The proposed mechanism for including HACCP to the system of rational water resources use of industrial enterprises is of a particular scientific and practical interest. We investigated structure of managing phases of implementation of this system to Ukrainian enterprises. The economical appropriateness of this system implementation has been ordered.

Keywords: water resources, industry, HACCP, certification, rational water resources use.

АСПЕКТИ ВРОВАДЖЕННЯ АНАЛІЗУ РИЗИКІВ ТА КРИТИЧНИХ КОНТРОЛЬНИХ ТОЧОК У ПРОМИСЛОВОСТІ УКРАЇНИ В КОНТЕКСТІ БЕЗПЕЧНОГО ВОДОКОРИСТУВАННЯ

Анотація. Розглянуто сутність системи сертифікації води для використання на промислових підприємствах, в тому числі підприємствах харчової галузі. Досліджено проблематику впровадження HACCP в сучасних умовах в Україні, обґрунтовано необхідність системного менеджменту якості та безпеки водних ресурсів як складової харчових продуктів, наведено аналіз існуючих умов для розробки і використання таких систем в Україні. Розглянуто основні підходи до впровадження HACCP, здійснено економічну оцінку ефективності впровадження даної системи для збільшення конкурентоспроможності підприємства і покращення його фінансових показників.

Проаналізовано ступінь впливу запровадження системи HACCP для функціонування механізму раціонального водокористування. Визначено ключову проблематику водокористування промислових підприємств, що мають стосунок до харчової галузі і визначені шляхи вирішення цих проблем через запровадження програм-передумов HACCP. Запропоновано використання методики HACCP з метою прямування до покращення якісних показників води, що використовується у харчовій галузі. Визначено стратегію підвищення конкурентоспроможності підприємств внаслідок покращення показників води, що використовується для виробництва напоїв; а також покращення фінансових показників підприємства внаслідок зменшення екологічних платежів.

Запропоновано методику визначення критичних точок контролю та відповідних до цих точок рішень щодо безпечності води, що дасть можливість

встановлювати заходи контролю для зменшення до прийнятного рівня або усунення небезпечних факторів на певних технологічних процесах.

Вивчено досвід запровадження системи НАССР у контексті раціонального водокористування за кордоном. Використано порівняння технічних можливостей якісного функціонування системи на закордонних та вітчизняних підприємствах. Науковий та практичний інтерес у роботі становить запропонований механізм включення НАССР до системи раціонального водокористання промислових підприємств. Досліджено структуру управління етапами впровадження даної системи на підприємствах України, проаналізовано законодавчу базу, систему розстановки кадрів для управління процесами раціонального водокористування у рамках НАССР на промислових підприємствах. Доведено економічну доцільність впровадження даної системи на підприємствах України.

Ключові слова: водні ресурси, промисловість, НАССР, сертифікація, раціональне водокористування.

Formulation of the problem. In recent years the problematics of water resources consuming seriously accents on the aspect of water safety for the communal water use. The outdated water providing networks in most of the regions of Ukraine cannot cope with the consumers' call for qualitative water and products which consist water. At the same time the responsibility for the quality of water resources for each economical sector lays on every branch of water consuming system.

This situation requires the maximum concentration of efforts of all branches of the water consuming system, the local self-governments and enterprises in the field of preserving water resources, developing a system for their adequate certification and including beside of the 'quality' the aspect of 'safety' of water-consisting production due to the modern requirements of foreign partners.

Analysis of recent research and publications. As HACCP certification is a new field for Ukraine in practical sense, the topic activates an interest of scientists working in the sphere of economics, food technologies, certification, products safety. Such Ukrainian scientists as V. Y. Plakhotin, I. S. Tiurikova, T. Y. Sutkovych devoted their investigations to the topic of HACCP implementation and the problematics facing Ukrainian enterprises.

The purpose of the paper is using analytical approach to solve the main difficulties in the model of HACCP implementation in Ukraine. We concentrate on the water resources use aspect as one of the points of products safety of the HACCP system so the purpose is to give suggestions on how to improve the system of water preservation, transporting and consuming on the food enterprises to get high marks of the products' safety level.

Presenting main material. The European integration direction dictates Ukraine new strategies for taking into account international norms and rules

of industrial sphere functioning, including also the factor of natural resources use safety. In fact, the precondition of certification changes is the export course of one ore another enterprise, which foresees taking into consideration ISO certification and also HACCP implementation to manage risks in the food production sphere. Strategically, implementation of such system shall give an opportunity to start client-oriented thinking at such enterprises, where the water resources safety might seriously increase the price for production [1]. Straight advantages are:

- Increasing of financial indexes by increasing possibilities to sell abroad;
- Increasing of the water consisting products safety and quality;
- Personnel motivation for the nature resources saving activities;
- Minimization of food risks;
- Lessening of water resources losses.

At the same time, implementation of HACCP forms charges for the developing of working plan; charges for buying an equipment for monitoring and researches and also an additional sanitary-technical equipment. Other charges include: personnel education and also tuning of a number of programs, in case their work is connected with a particular system. According to our legislation, preconditional programs of HACCP in context of water resources use (including water, ice, special materials to cope with food products processing, except water for extinguishing of fire and water for technical processes and except such processes which do not influence food safety) include number of organizational, technical and economical activities which at the same time include safe functioning of water supply systems and the accordance of water to the requirements to the food products. Legislation states that as: proper projecting and according to this a proper state of water supply systems at enterprises, their technical review, disinfection and cleaning [2]. At the same time drainage systems at enterprises should be constructed according to the concept of cross water pollution avoidance. This concerns water as well as other products and components and we should also take into consideration making cleaning at working places easier. Considering water, which might be a component of food products or such water which may contact them, the legislation states requirements for the enterprises so that they should evaluate risks themselves. They should also develop and introduce controlling events for avoiding pollution while water resources use. Such preconditional programs, according to HACCP, should provide determination of water sources and risks, connected with their work, determination of water conservation conditions; local water supply networks according to the industrial power; providing of water preparation; determination of the water use ways with avoidance of cross water pollution through the contact coverings [3].

It has been foreseen, that enterprises (as market operators) determine the risk points themselves so they introduce (if necessary) controlling events:

- Procedures of the incoming water control. We are fixing periods and methods of water collection, basing on the risk evaluations, which at the same time are based on the investigating

periods. Rejections of the investigation results prove the necessity of correcting events, negative results should cause the pollution avoiding events.

• While water preparation we evaluate risks which are connected with impropriate water preparation.

• Procedures concerning the proper functioning of water-supply systems which include water networks technical reviews, their disinfections and repair.

Implementation of the HACCP system, considering rational water resources use aspect, are directed to give enterprises more independence in choosing effective technologies, and at the same time to provide their responsibilities using an example of European countries which implemented HACCP earlier. The history of HACCP abroad is dated since 1980 years and its positive experience in USA, Canada, Europe, India, Australia, Latin America and Brasilia states its effectiveness, security and accessibility. As food products are of mass use and depict huge volumes of realization, most of existing methods of their quality management are basing on using the statistical controlling what means periodical investigation of some examples which are taken due to statistical control plans. These methods do not guarantee the safety of every product of some party and increasing of indexes quantity or strengthening of the control in the same manner also do not guarantee safety but increase the expenses. Otherwise the HACCP system is based on the control of weak points or the points concerning risks. This method is also cheaper and it is foreseen that enterprises follow the procedure themselves so they must take these expenses to the balance. In case of small food industries it becomes a new point of expenses, on the other side huge productions with a number of special controlling procedures might depict a strong economy on these processes. While the selective production control may just establish some danger, the HACCP system avoids the happening of dangerous factors or makes them less serious so it guarantees more safety to the production recipients. The qualified research of the technological process while making the HACCP plan may seriously shorten the quantity of indexes and the whole controlling procedure while using express methods of monitoring. The advantage of HACCP is full and objective documentation of this control. The most serious choices in this system include choosing the control points, monitoring methods and correctional activities. The protocols of HACCP may be used while creating contracts and in case of courts as a proof of providing all the necessary activities to avoid the danger. The HACCP system is rather clear for any audit and it coincides with other management systems at enterprises.

Preparation for the HACCP system implementation in Ukraine follows such preparation as [4]:

- Informational seminars and trainings due to safety systems implementation basing on the HACCP philosophy;
- Preparation of personnel with international education who can introduce the HACCP system;
- The annual International school on the principles of thermic food products treatment introduction;

- Introduction of International institute of products' safety and food products quality;
- A number of seminars for ministries' stuff where the international specialists introduce norms and rules about food products treatment abroad;
- Creating of network of consultative and certification centers on the HACCP implementation.

So these and other activities let an interest to HACCP increase. The important factors to increase this interest while the state initiative is absent are the international partners' demands. The pre-history for HACCP in Ukraine is ISO 22000:2005 standard which determines hygienical, trading and production practice. We are proposing to include water resources saving element to the system of HACCP support, so special seminars and educational courses should include a nature resources part. Economists and ecologists in the sphere of water management should introduce their recommendations for HACCP risk points determination. According to nowadays system of rational water resources use demand, these proposals should include such aspects of water use safety [5]:

- Water saving technologies for the drainage systems;
- Minimization of wasted;
- Minimization of polluted water flows to avoid high taxes;
- Using innovational potential;
- Increasing of personnel' ecological thinking;
- Asking of an investors' interest toward water-saving technologies;
- Including of innovational interest while changing the production directions at some enterprises.

These points should move to solving such problems as [6; 9]:

- Economical losses because of using water of bad quality;
- Increasing of payments for water cleaning;
- Quick abrasion of equipment which contacts water.

Solving of these problems by standing the key risk points needs first of all solving problems, connected with implementation of HACCP itself. Ukrainian enterprises are not ready to implement this system because of number of problems.

1. The main production funds seem to be old and outdated. The medium term of technological lines use are 12–15 years but at some enterprises it may be 25–30 years in fact. So the situation with controlling equipment is the same. Serious change of technologies and technological equipment because of its high price is conducted with the help of outer (foreign) capital but this concerns only huge enterprises which have a connection with international trade markets. Small enterprises are lacking such an opportunity, especially in crisis period.

2. Absence of economical stimulus for developing HACCP and its preconditions. So developing of certification seems to be an initiative of enterprises.

3. The legislation forms mechanism to control the HACCP implementation but using this system gives to enterprises no preferences among other enterprises. Later the companies might feel an economical affect but first they receive a baggage of hardly solving

procedures and problematics. In case of small enterprises, they need a quick economical satisfaction which shall increase their capital's growth.

4. The problem is also misunderstanding of the necessity of new procedures by the higher managers at enterprises. Managers consider this an extra bureaucratic work.

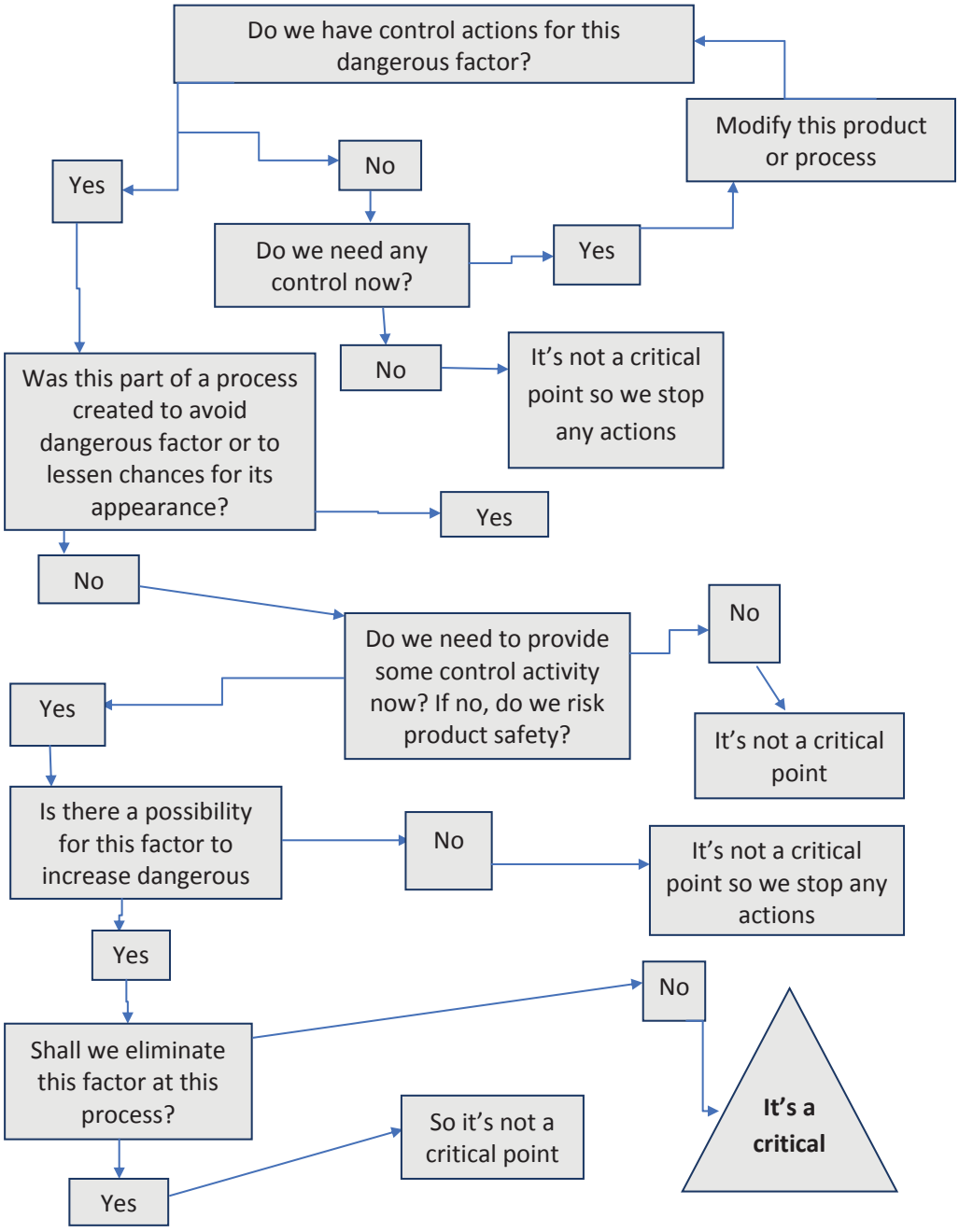
5. The personnel is not educated enough in the sphere of certification and products' safety procedures although they might have a serious experiences in their professional field.

6. This problem causes another aspect. The personnel is not motivated for the extra work about HACCP so the higher managers of small and medium enterprises should create motivational schemes for the personnel to stimulate the responsible people to get extra education to manage the HACCP projects [7; 10].

Procedure of determining critical points of control mean creating of a solutions tree which is based on number of questions and the variety of answers.

This scheme depicts the easiest way to check out critical points at some processes and the ways how the problem might be solved. This scheme can be used also for determining some critical points in the sphere of water resources safety. For example, we focus on the water resources quality. Water, used for some technological processes, may be taken from the networks of communal water services. If once we notice some kind of water pollution (we take polluted water from communal water systems), we come to some stated procedure of where we can get another water stock or how we can connect to another water source. If this helps us to solve the problem now, we follow the instructions but mark the critical point. The frequency of such points needs a particular solutions. According to HACCP, in this case we need to make some changes to the general documented procedures. It means that the more often we get polluted water, the more often we need to check it and to measure the level of pollution in the water for the technological processes concerning food products safety.

Conclusions. Implementation of HACCP may increase the water use safety especially at such processes which concern water use (same as ice etc.) while food production. In long perspective, this might increase the indexes of production and help the enterprises become more concurrent. At the same time, implementation of this system now needs serious investments, which is an acute point for small and medium enterprises. These investments include monitoring equipment buying but the most serious unaccounted and nor calculated point is personnel education and motivation. Due to the modern legislation, food enterprises should develop their HACCP systems and form special HACCP groups to convict extra work connected with this system's processes. At full loading this forms a need of hiring new specialists. Development of HACCP for the concrete enterprise means a full access to private concurrent production processes data so forms addictive risks to the enterprise's safety. Nevertheless, the described problematics, the HACCP system is a worldwide



The scheme based on [8].

working model which proofs as better way to achieve production safety. Using its working schemes in the aspect of water resources safety can solve the basic problems of industrial water resources use.

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