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ORGANIZATION OF PUBLIC PROTECTION IN THE EVENT OF ACCIDENTS AT CHEMICALLY HAZARDOUS FACILITIES

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Abstract. The article examines the specifics of measures taken to reduce the consequences of an accident at chemically hazardous facilities, as well as organizing the protection of the population in case of accidents.
Key words: highly toxic substances, chemically hazardous objects, detection and identification of chemical environment, operational reliability, warning systems, automation and mechanization of technological processes, evacuation of personnel and population, detection systems, isolation of liquid phase.

The Republic of Uzbekistan has large reserves of toxic substances chemical, pulp and paper, defense enterprises, oil refining and petrochemical industry, ferrous and non-ferrous metallurgy, industry of the Ministry of Energy. Significant quantities of them are concentrated in food and dairy industry facilities, in refrigerators, at trading bases, in housing and communal services. The Republic of Uzbekistan has a developed chemical industry, the enterprises of which contain significant reserves of highly toxic substances (hereinafter referred to as HTSS), which are its products or raw materials.

The unpredictability and suddenness of accidents at chemically hazardous facilities, the high speed of formation and spread of a cloud of polluted air require prompt measures to protect the population and the territory. Chemically hazardous accidents at economic and transport facilities can be classified as such situations.
The reality of such situations is evidenced by accidents and disasters at chemical industry facilities in some countries. For example, the accident that occurred in 1984 at a chemical plant in the city of Bhopal (India) resulted in the death of more than 3 thousand people as a result of poisoning.

In this regard, protection of the population from nuclear weapons is organized, if possible, in advance, and in the event of accidents, such protection is carried out in the shortest possible time and requires significant material costs .

An important and fundamental role in the strategy for reducing the consequences of an accident at chemically hazardous facilities belongs to the prevention of accidents and the reduction of damage from them.

The reduction of the consequences of an accident at chemically hazardous facilities (hereinafter referred to as CHF) is achieved through the organization of comprehensive measures carried out in the following main areas:

the use of a safe technological line, the implementation of organizational, technical, special and other measures that ensure high operational reliability of CHF, as well as limiting

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the spread of HTSS beyond the sanitary protection zone in the event of accidents and destruction;

the presence of systems for detecting and identifying the chemical situation on the territory of the facility and monitoring chemical pollution of the environment;

monitoring the chemical situation in areas where CHF are located and in areas of possible chemical contamination;

the presence of operational warning systems in the event of an accident at CHF, primarily local warning networks in the areas where the facility is located;

planning measures to protect the population, workers and employees, economic and social facilities;

providing the population living or located in hazardous areas with protective equipment;

carrying out works on diking storage facilities or containers with CHF;

preparation of stockpiles of materials for neutralizing CHF;

protection of water sources and food, sealing of warehouses, refrigerators and technological equipment in food industry enterprises;

training of workers at the facility and the population on the rules, methods of action in case of chemical contamination, as well as the use of means and methods of protection against HTSS [1].

Important role in preventing accidents at CHF is the increase in the level of automation and mechanization of technological processes, equipping them with high-speed technical means of protection, including automatic cut-off devices, explosion hazard warning systems, as well as accident prevention and localization systems, including improving the professional training of production personnel.

An effective way to reduce the consequences of accidents at CHF is to reduce the stocks of hazardous substances to the minimum quantities required by technology. This is especially important at the stages of loading and unloading operations in raw material and finished product storage facilities.

The stability of operation of facilities with chemical components must be ensured by high reliability of energy and water supply, and the introduction of a system for the safe shutdown of production in the event of sudden interruptions in the supply of electricity and water.

The possible scale of consequences of accidents at CHF is influenced by a number of factors, the main one being the rate of release of the HTSS into the atmosphere. Therefore, when eliminating the consequences of an accident, the priority is the work associated with limiting the spread of the liquid phase of the HTSS and reducing the rate of its evaporation.

To limit the release of the liquid phase of the HTSS from the tank, measures are taken to eliminate the leak or to pump the liquid from the emergency tank to the spare one.

The spread of HTSS on the ground in order to reduce the evaporation area is limited by engineering means (bulldozers, scrapers, excavators). It consists of creating obstacles in the form of ramparts of displaced or filled soil. It is also possible to direct the flows of the liquid phase of HTSS into natural depressions. When carrying out work, it is necessary first of all to prevent HTSS from entering rivers, lakes, underground communications, basements of buildings, structures, etc [3,4].

In some cases, the liquid phase can be collected in special containers for subsequent neutralization. The rate of evaporation of the HTSS can be reduced in several ways:

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absorption of the liquid phase of the HTSS by a layer of loose adsorption materials (soil, sand, slag, etc.);

isolation of the liquid phase of the HTSS with foams;

dilution of liquid HTSS with water or solutions of neutralizing substances.

To absorb the liquid phase of the HTSS with a layer of bulk adsorbents, the material is scattered (moved) onto the liquid phase. The adsorbent layer must be at least **10-15 s**m. Contaminated bulk materials and the upper soil layer (at the depth of absorption of the HTSS) are collected, if necessary, in special containers for subsequent removal to neutralization sites. In cases where environmental protection conditions allow neutralization of the HTSS on site, the contaminated adsorbent and soil are not collected or removed.

Isolation of the liquid phase of the HTSS with foams is carried out in order to reduce the release of vapors into the atmosphere. For this purpose, neutralizing additives can be introduced into the foam, which enter into chemical interactions with the HTSS, resulting in the formation of non-toxic or low-toxic substances.

The main and most accessible way to reduce the rate of evaporation of HTSS is to dilute the liquid phase with a stream of water or solutions of neutralizing substances. Water or solutions of neutralizing substances can be supplied to the accident site in a finely dispersed form or in compact streams. The finely dispersed fraction in the form of an "umbrella" ensures the neutralization of HTSS vapors. A compact stream is used to neutralize concentrated acids, oxidizers and other substances that react violently with water [3].

The main measures to protect workers, employees and the population in the event of an accident at a CHF are:

notification of chemically hazardous accidents;

temporary evacuation and shelter of people;

restriction of access and movement of the population in contaminated areas;

medical assistance to victims of chemically hazardous accidents;

use of personal protective equipment;

definition and observance of chemical protection regimes;

sanitary treatment of people, degassing of territories, buildings, transport, equipment and property.

Notification of an accident at CHF is assigned to the duty services of the facility and the Ministry of Emergency Situations of the Republic of Uzbekistan, as well as the responsible civil protection services.

The alert is transmitted to all enterprises and populated areas located within the area limited by a radius equal to the maximum possible depth of the spread of the HTSS, taking into account meteorological conditions. After receiving a signal about a chemical accident, personal and collective protective equipment is put into readiness for use, and in some cases, preparatory measures for the temporary evacuation of personnel and the population may also be carried out. Upon receiving the alert signal in all rooms, ventilation systems without filters are switched off and switched to the internal circulation mode, and with filters, they are switched to the filter-ventilation mode [2].

The warning system uses electric sirens and remote control and circulation call equipment. In addition, television and radio broadcasting, industrial loudspeaker equipment, telephone and mobile communication networks can be used for warning.

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Taking into account the possibility of receiving a large number of requests from various organizations and the population in the event of CHF and notifications about them, an information (reference) service is organized on the territory of the chemical hazardous facility, which, as the accident develops and during the elimination of its consequences, should disseminate information, especially on the rules of conduct for people in conditions of contamination with HTSS [3,4].

Temporary evacuation of personnel and the population involves their removal (withdrawal) from the area of chemical contamination (possible area of contamination) in order to eliminate or reduce the degree of damage. It should be noted that the evacuation of the population, given the rapidity of the accident, will have serious difficulties in its implementation, especially related to the possibility of panic among the population, and therefore is an extreme measure of protection and is carried out in exceptional cases. The most effective temporary evacuation of the population can be carried out before the approach of the primary cloud of HTSS [6].

An important role in maintaining public order in the accident area is played by **restricting access to it by people,** as well as organizing the regulation of the movements of units involved in the liquidation of the consequences of the accident in the contaminated area. To perform these important tasks, checkpoints are organized, the contaminated area is cordoned off, posts are set up and barriers are installed on the roads leading to the contaminated area, the streets of cities and settlements are patrolled, traffic is regulated on the evacuation routes of the population, warning signs (boards) are installed at the boundaries of the contaminated areas [5].

In the event of a rapidly developing situation, temporary sheltering of the population in shelters equipped with filters is envisaged. If there are no shelters, the population is advised to remain in residential and office premises for the period of passage of the primary cloud or until evacuation, having taken measures to seal them and wearing personal protective equipment. In the future, observing the chemical protection regime, it is necessary to act in accordance with the instructions of emergency response specialists [7].

Localization and then liquidation of chemically hazardous accidents are organized by emergency commissions. Special emergency rescue teams, regular and irregular teams, as well as territorial civil defense teams are used to liquidate chemically hazardous accidents.

Emergency rescue teams must have fire extinguishing equipment and large quantities of water delivery, bulldozers, trenching machines, equipment for clearing rubble, eliminating accidents on various energy networks, special means of protection against nuclear explosive devices, communications equipment, and stocks of standard degassing agents.

When staffing teams, special attention should be paid to the careful selection of a team to eliminate the consequences, as well as to the management of emergency forces. Personnel involved in the elimination of the consequences must have high volitional qualities, have special knowledge and experience in eliminating chemically hazardous accidents. They must also have good organizational skills [8].

The elimination of the consequences of a local accident at a CHF is carried out by special regular rescue teams and civil defense units of the facilities themselves. The management of the elimination of the consequences of a local accident at the enterprise is carried out by the headquarters for conducting emergency operations, headed by the chief of the headquarters for civil defense of the facility.

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In addition to the forces and resources of the enterprise, units and formations of the city (district, region) civil defense may be involved in the liquidation of the consequences of a local accident. The management of the liquidation of a local accident is carried out by the headquarters for conducting emergency recovery operations of the enterprise or the district (city) emergency commission [1,2].

In addition to the forces and resources of the enterprise and civil defense, military units and subdivisions may be involved in eliminating the consequences of a general accident if necessary.

Conclusions:

Important role in the prevention of accidents at chemically hazardous facilities is the increase in the level of automation and mechanization of technological processes, equipping them with high-speed technical means of protection, including automatic shut-off devices, explosion hazard warning systems, as well as the prevention and localization of the development of accidents and the improvement of the professional training of production personnel;

Significant factors in ensuring the safety of personnel and the population are: constant monitoring of the chemical situation in the areas where the facility is located and the possible spread of chemical contamination beyond the facility, stable operation of operational warning systems, in the event of an accident, primarily the uninterrupted operation of local warning networks in the areas where the facility is located, as well as planning measures to protect the population and personnel of the facility;

periodic implementation of protective measures to prevent the spread of HTSS, renewal, accumulation of neutralizing materials, as well as periodic training of facility personnel and the population on the rules and techniques of action in the event of chemical contamination, as well as on the use of means and methods of protection against HTSS.

Literature :

1. Resolution № 271 of the Cabinet of Ministers of the Republic of Uzbekistan, dated December 10, 2008, on Additional measures for the Implementation of the Law of the Republic of Uzbekistan “On industrial safety of Hazardous Production Facilities”.

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2. Resolution № 515 of the Cabinet of Ministers of the Republic of Uzbekistan, dated August 26, 2020, on Further Improvement of the State System for Preventing Emergencies and Responding to Such Situations in the Republic of Uzbekistan.

3. Zakharov L.N. Safety precautions in chemical laboratories. Leningrad "Chemistry". - 1991. (date of access - 12.01.2025).

4. “Science ,Protection, Safety ”. Scientific and Practical journal of the Civil Protection Institute, Ministry of Emergency Situations of the Republic of Uzbekistan. Issue 2(3) 2019. Ernazarov U.N. “The significance of special processing technology in ensuring public safety during chemical industry accidents resulting from natural disasters”. Pages 148-153.

5. The Republic of Uzbekistan Ministry of Emergency Situations, Civil Protection Institute, on the occasion of the “International Day for Disaster Risk Reduction”, published the collection of the materials from the Republic Scientific and Practical Conference titled “Issues of Preventing and Mitigating the Consequences of Emergencies Related to Climate charge in Uzbekistan”. Djumakulova K.A. “Training the Population for Proper Action in Emergencies”. Pages 79-84.

6. Encyclopedia of life safety. [Electronic resource]. - Access mode: http://bzhde.ru/chrezvychajnye-situacii-s-vybrosom-avarin i x-ximicheski-opasnyx-veshestv (date of access - 16.01.2025).

7 . Puzyakova A.A. The influence of the development of technology and engineering on people's lives. Young scientist. - 2015. No. 20-P.635-640.- URL : // htts : // moluch . ru / archive /100/22645/ (date of access - 1 5 . 01. 2025).

8. Public safety. [Electronic resource]. - Access mode: http://b ezopasnost .ru/chrezvychajnye-situacii-s-vybrosom-avarijnyx-ximicheski-opasnyx-veshhestv. (date of access - 11.01.2025).