The Order of the Federal Environmental,
Industrial and Nuclear Supervision Service
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«INSTRUCTION ON LOCALIZATION AND ELIMINATION OF CONSEQUENCES OF ACCIDENTS AT HAZARDOUS PRODUCTION FACILITIES IN MINING INDUSTRY»

(EXCERPTS)

2. This instruction is intended for employees of organizations operating hazardous production facilities (hereinafter - HPF) where mining operations are performed, contractors operating in/within the territory of hazardous production facilities, professional emergency response services or professional emergency response teams (hereinafter – PERS/PERT) operating HPF.

3. This instruction defines the order of the organization and measures on localization and elimination of consequences of accidents at HPF.

II. ORGANIZATION OF OPERATIONS ON LOCALIZATION AND ELIMINATION OF CONSEQUENCES OF ACCIDENTS

5. Emergency response operations are directed by the Chief of emergency response (CER) – a mine manager (chief engineer) of HPF.

Mine rescue operations are directed by a chief of mine rescue operations (hereinafter CMRO) – an officer from PERS/PERT that provide mine rescue services to HPF, appointed by an administrative document of the PERS/PERT head.

12. During localization and elimination of consequences of accidents at HPF, the CER must organize a command center (hereinafter – CC).

III. DRAWING UP OPERATIONAL PLANS ON LOCALIZATION AND ELIMINATION OF CONSEQUENCES OF ACCIDENTS

15. The CER and the CMRO must draw up an operational plan on localization and elimination of accident consequences (hereinafter - operational plan, OP) in following cases:

- if after carrying out all activities according to the emergency response plan (hereinafter – ERP), further mine-rescue activities are still required;
- major change of conditions in a mine working or in a network of mine workings (buildings, facilities, areas in the HPF territory) where an accident occurred (hereinafter - emergency area, EA) during activities according to the ERP.

The OP is being approved by the CER once agreed by CMRO.

V. MINE RESCUE PROCEDURES

23. Rescue operations in mine workings with irrespirable atmosphere are carried out in accordance with Appendix 8 to this Instruction.

The CMRO organizes a fresh air base (FAB, typically a part of mine working with respirable atmosphere where a mine rescue team (auxiliary mine rescue team) is located to provide communication with teams operating in mine workings with irrespirable atmosphere and a CC, as well as the necessary equipment) in the following cases:

mine rescue operation is carried out in mine workings with irrespirable atmosphere;

mine rescue operation is carried out to eliminate the consequences of water (brine)

breakthrough or water-pulp mix when diving activities are required.

The underground rescue base is located in close proximity to mine workings where mine rescue activities are being performed.

24. Confinement and extinguishing of a fire at HPF in mining industry are carried out in accordance with Appendix 10 to this Instruction

25. During localization and elimination of consequences of accidents at HPF in mining industry, the CER organizes mine ventilation in accordance with Appendix 12 to this Instruction.

27. Mine rescue operations are suspended and people involved in these activities are evacuated from the EA in the following cases:

mine atmosphere in the EA where a fire occurs is potentially explosive;

methane concentration at the place of firefighting in the intake or exhaust air is 2% and above;

the fire in a mine working or in a goaf area is accompanied by combustible gas outbreaks and (or) explosions;

sulfur dioxide concentration in the mine air is 0.5% and above;

hydrogen concentration in the battery charging chambers is 0.5% and above;

in case of change of mine ventilation status not according to the ERP or the active OP;

in case of a fire in a goaf area that is not sealed with explosion proof stoppings and (or) in mine workings used for isolated methane drainage in which explosive concentrations of combustible gases is possible;

in case of a fire in blasting areas or in explosive storages or on vehicles carrying explosives, when primary fire extinguishing failed;

mine atmosphere parameters exceed technical (functional) characteristics of available insulating suits, high-temperature personal protection equipment and (or) breathing apparatuses (hereinafter -BA);

in case of ambient temperature in a high temperature zone (air temperature equals or exceeds 27°C, hereinafter-HTZ) with irrespirable atmosphere, is increased by 3 °C or more within five minutes;

receiving information about the presence of other dangerous factors threatening the life and health of people performing mine rescue activities.

28. Search and rescue operations are not carried out or terminated in underground mine workings where there is an explosive atmosphere with fire seats or a risk of water (pulp) breakout, in the following cases:

mine atmosphere in the EA was irrespirable for a period of time equal to ten duration periods of available BA;

the ambient temperature in locations where people could be trapped was 100 °C or more for at least 24 hours;

mine workings where people could be trapped are flooded with water and there is no emergency exit from there;

people trapped in the EA are recognized as dead by court in accordance with legislation.

Appendix 8

MINE RESCUE OPERATIONS IN MINE WORKINGS WITH IRRESPIRABLE ATMOSPHERE

1. Mine rescue operations in underground mine workings with irrespirable atmosphere are carried out by PERS/PERT rescuers and VMRT (voluntary mine rescue teams) members (hereinafter – mine rescuers) with obligatory use of self-contained breathing apparatus (hereinafter - BA) with compressed oxygen (oxygen-nitrogen mixture) or chemically bonded oxygen with nominal duration of four hours or more.

2. The duration of stay of mine rescuers in irrespirable atmosphere is limited by the volume of breathing gas mixture which can be used in mine workings with irrespirable atmosphere (hereinafter- working volume).

The working volume should be taken as equal to:

75% of the volume of the breathing gas mixture in the cylinder prescribed by a manufacturer (for compressed oxygen (oxygen-nitrogen) BA);

the volume consumed for 75% of the duration time prescribed the manufacturer (for chemically bonded oxygen BA);

3. Consuming of working volume should be taken as following:

when moving upwards or along horizontal mine workings or downwards with an angle of inclination up to 10° - a half of the working volume should be used for moving forward and a half - for moving back;

when moving downwards along inclined mine workings with an angle of inclination of more than 10 ° - one third of the working volume should be used for moving forward and two thirds - for moving back.

At the same time, the maximum under oxygen time in irrespirable atmosphere should not exceed four hours.

4. Mine rescuers are monitoring the volume of breathing gas mixture in BA while staying in mine workings with irrespirable atmosphere.

The volume of breathing gas mixture necessary for emergency escape from mine workings with irrespirable atmosphere should be calculated taking into account that mine rescuers will walk along these mine workings.

5. Mine rescuers are performing their tasks in the mine workings with irrespirable atmosphere as a mine rescue teams.

Mine rescue team must be comprised of five persons or more when working in underground mine workings with irrespirable atmosphere.

6. When carrying out mine rescue operations in underground conditions with irrespirable atmosphere, a spare mine rescue team must be located at the FAB to ensure information transfer between the active team and a CC.

In the case of deploying a part of the team into irrespirable atmosphere, the rest of this team is staying at the FAB.

EXPLORATION OF UNDERGROUND MINE WORKINGS FILLED WITH IRRESPIRABLE ATMOSPHERE

7. Mine working exploration (hereinafter- exploration) is carried out in order to:

- locate and rescue people involved in emergencies;
- clarify the situation in the emergency area.

It is necessary to examine all mine workings located in the EA during exploration aimed at

detecting and rescuing people. It is necessary to examine mine workings of the emergency section first.

8. Prior to the beginning of exploration, it is necessary to calculate the maximum distance in the mine workings that a mine rescue team can go wearing breathing apparatuses, except the distances along the routes specified in the ERP.

9. It is necessary to establish communication between FAB and teams carrying out an exploration.

10. Mine rescue teams evacuate victims from mine workings with irrespirable atmosphere.

The CER may involve HPF workers who are not members of voluntary mine rescue teams for the evacuation of injuries from mine workings with normal atmosphere beyond the EA.

Mine rescue teams are not allowed to evacuate injuries from mine workings with normal atmosphere beyond the emergency area, if there are injuries who need help in the mine workings with irrespirable atmosphere.

MINE RESCUE OPERATIONS IN MINE WORKINGS WITH IRRESPIRABLE ATMOSPHERE AND HIGH TEMPERATURES

11. The maximum period (time) of a continuous stay for mine rescuers in HTZ with irrespirable atmosphere without heat protection is defined according to the Table 1 of this Appendix.

Table 1

Air temperature, °C	Maximum period (time) of a continuous stay in high temperatures areas with irrespirable atmosphere, minutes	
	When working or staying in one place	When moving along mine workings
27	210	158
28	180	135
29	150	113
30	120	90
31	90	68
32	60	45
33	50	38
34	40	30
35	34	26
36	30	23
37	26	20
38	22	17
39	20	15
40	18	14

The maximum period (time) of a continuous stay in HTZ with irrespirable atmosphere is determined by the maximum air temperature measured during mine rescue operations and is

counted from the moment of entering HTZ with irrespirable atmosphere.

12. When moving along mine workings the maximum period (time) of a continuous stay in high temperatures areas is distributed as follows: one third for the moving forward and two thirds for the moving back.

13. It is prohibited to carry out mine rescue operations not related to rescuing people in HTZ with irrespirable atmosphere without heat protection equipment at a temperature above 40 ° C.

Mine rescue operations in HTZ with irrespirable atmosphere are carried out at temperatures from 41° C to 50 ° provided that these works are associated with rescuing people and the period of staying in this atmosphere does not exceed ten minutes.

14. The maximum period (time) of continuous stay in HTZ with irrespirable atmosphere using heat protection equipment is determined by their technical characteristics.

15. It is prohibited to carry out mine rescue operations in HTZ with irrespirable atmosphere without communication between mine rescue teams and the CMRO or a mine rescue team located at FAB, provided that these operations are not related to rescuing people.

Appendix 10

LOCALIZATION AND FIRE-FIGHTING AT HAZARDOUS PRODUCTION FACILITIES IN MINING INDUSTRY

1. Underground fire is extinguished in following ways:

direct (active) firefighting;

sealing of mine workings in which fire exists (hereinafter - fire sealing);

combined method.

The combined method of fire extinguishing is mine workings sealing with further extinguishing by direct attacks.

DIRECT UNDERGROUND FIRE EXTINGUISHING

2. Underground fire is extinguished by direct attacks when there is a possibility to deliver fire-extinguishing agents directly to the fire seat;

Underground fire extinguishing by using direct attacks is carried out:

with the presence of rescuers in the fire area;

without the presence of rescuers in the fire area (remotely).

3. When underground fire is extinguished by direct attacks, people must stay on the side of the intake air flow.

The presence of people engaged in fire extinguishing using direct attacks in mine workings with exhaust air flow is allowed only in cases when the fire is located near the workings with fresh air. Extinguishing must be carried out in accordance with the chapter «Mine rescue operations in underground mines in HTZ with irrespirable atmosphere».

4. When extinguishing an underground fire, it is necessary to take measures to prevent rock fall (caving) and burning mass rash. Fallen, caved rocks and burning masses should be wetted down.

5. Extinguishing electric cables and equipment fires is carried out after the electric power is switched off. Electric cables and equipment under voltage are extinguished with dry chemical powder, sand or inert gases.

6. The following measures shall be implemented to prevent fire in mine workings along where combustion gases propagate:

removal of combustible materials from the combustion zone or the way of fire spreading;

water shield installation and (or) air flow reduction in ventilation streams mixing with combustion gases.

Water shields are installed in such a way to cover the entire cross section of a working and avoid fire spreading through goaf spaces.

7. It is forbidden to extinguish a fire with water when people are in mine workings with exhaust air from a fire seat.

8. Fire extinguishing is carried out in breathing apparatus (BA).

9. Measures are taken to reduce steam discharge while extinguishing a fire with water.

10. It is prohibited to extinguish a fire with water in underground workings of salt and potash mines.

FIRE-EXTINGUISHING IN DEAD-ENDS

11. Fire extinguishing in dead-ends using direct attacks from the face-side is carried out remotely.

13. If there is a need to evacuate people from the dead-end in case of fire spreading, the measures are taken to limit the possibility of fire propagation and contribute to fire localization.

FIRE EXTINGUISHING BY DIRECT ATTACKS IN GAS AND (OR) DUST HAZARDOUS PRODUCTION FACILITIES OF MINING INDUSTRY

23. When extinguishing a fire using direct attacks with the presence of people in the fire area on gas and (or) dust HPF, it is necessary:

to avoid accumulation of flammable concentrations of gases in the EA;

to carry out continuous gas inspection in the EA and control accumulations of flammable gases using combustible gas monitoring systems with audio and visual alarm.

24. A fire in a worked-out area must be extinguished with fire-fighting agents remotely, while people should stay at a distance from the EA, where hazardous factors of the accident cannot affect them (hereinafter - safe distance) or at the surface.

25. It is forbidden to extinguish a fire in unventilated dead-ends.

If during a fire in a dead-end the ventilation was disturbed because of stopping of a booster fan, it could be switched on under the following conditions:

the concentration of combustible gases in this working is not explosive;

switching on a booster fan will not result in an explosive concentration.

It is prohibited to carry out mine rescue operations in a dead-end, if there is no information about combustible gas content in it and there are no injuries in this working.

ELIMINATION OF CONSEQUENCES OF ROCKBURSTS, ROCKFALLS, LANDSLIDES

9. It is forbidden to carry out mine rescue operations in the area of possible rock falls (landslides) before taking measures to ensure the safety of mine rescuers.

Appendix 12

VENTILATION OF UNDERGROUND WORKINGS DURING LOCALIZATION AND ELIMINATION OF CONSEQUENCES OF ACCIDENTS

1. During localization and elimination of consequences of accidents, the ventilation of mine workings must be organized in the following modes, depending on the type of accident:

in case of gas explosion and (or) coal dust, coal (rock) and gas outburst, rock bump, accumulation of toxic substances in mine workings, water (pulp) inundation, mine working filling with water-clay mass, the normal mode of ventilation must be maintained;

in case of a fire in mine workings, depending on the location of its origin, one of the following ventilation modes must be set:

normal ventilation mode;

emergency ventilation mode.

2. In emergency ventilation mode the direction and rate of air movement in mine workings changes or the ventilation ceases.

Emergency ventilation mode in mine workings is achieved by:

changing a mode of one or several fans of the main ventilation system or auxiliary fans;

changing air-flow resistance of mine workings.

3. In normal and emergency ventilation modes in mine workings where fire extinguishing is carried out, it is necessary to supply the air flow which ensures effective extinguishing and combustible gas concentrations in the intake air don’t exceed permissible levels.

5. In methane gas and (or) dust explosion-hazardous mines it is necessary to set a ventilating mode that excludes formation of local or layering accumulations of methane and other combustible gases on an emergency site, prevents removal of air flow with dangerous levels of explosive gas or coal dust concentrations from worked-out areas or other workings to a fire seat.

When methane concentration increases during fire extinguishing in the intake air flow, the following measures should be taken:

increase ventilation flow in the mine working;

degassing of methane source;

changing the scheme of air supply to the emergency area.

6. Ventilation modes of mine workings in which fire-fighting operations are carried out should be stable, manageable, foster reducing of fire activity and ensure the safety of fire-fighting operations.

7. It is allowed to change ventilation modes after the evacuation of people from an area of fire-fighting operation.

8. It is prohibited to change a ventilation mode while exploring mine workings.