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by the Order of the Chief Engineer –
Director of the Department of
Technical Policy of the National
Company Kazakhstan Temir Zholy
JSC
dated 1 September 2023 No. 614

**IDENTIFICATION OF HAZARDS AND ENVIRONMENTAL ASPECTS,
ASSESSMENT AND MANAGEMENT OF RISKS IN THE FIELD OF
OCCUPATIONAL SAFETY AND ENVIRONMENTAL SAFETY IN THE
NATIONAL COMPANY KAZAKHSTAN TEMIR ZHOLY JSC AND ITS
SUBSIDIARIES**

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Introductory note

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2 APPROVED AND ENTERED INTO EFFECT by the Order of the Chief Engineer – Director of the Department of Technical Policy of the National Company Kazakhstan Temir Zholy JSC dated _____, 2023 No. _____

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COMPANY’S STANDARD

IDENTIFICATION OF HAZARDS AND ENVIRONMENTAL ASPECTS, ASSESSMENT AND MANAGEMENT OF RISKS IN THE FIELD OF OCCUPATIONAL SAFETY AND ENVIRONMENTAL SAFETY IN THE NATIONAL COMPANY KAZAKHSTAN TEMIR ZHOLY JSC AND ITS SUBSIDIARIES

Date: Order No. 614-CZ dated September 1, 2024

1 Applicable scope

1. This Standard “Identification of hazards and environmental aspects, assessment and management of risks in the field of occupational safety and environmental safety in the National Company Kazakhstan Temir Zholy JSC and its subsidiaries” (hereinafter referred to as the Standard) was developed in accordance with the Guidelines for the occupational health and safety management system in the National Company Kazakhstan Temir Zholy JSC and its subsidiaries,

Guidelines for the environmental management system in the National Company Kazakhstan Temir Zholy JSC and its subsidiaries, approved by the decision of the Management Board of the National Company Kazakhstan Temir Zholy JSC, in order to ensure a uniform procedure for identifying hazards, environmental aspects, assessing and managing risks in the field of occupational safety and environmental safety in NC KTZ JSC and subsidiaries.

2. The Standard applies to all structural divisions of the National Company Kazakhstan Temir Zholy JSC and its subsidiaries.

2 Terms, definitions, and abbreviations

3. This Standard uses the following basic definitions and abbreviations:

| | |
|--|--|
| NC KTZ JSC, Company | – National Company Kazakhstan Temir Zholy JSC |
| NC KTZ JSC group of companies subsidiaries | – National Company Kazakhstan Temir Zholy JSC and subsidiaries – subsidiary legal entities, 100% of shares (participatory interests) of which belong to NC KTZ JSC under the right of ownership or trust management |
| structural divisions | – departments, services, sections of the central office, branches, assigned staff of the Company/subsidiaries |
| Service | – structural divisions at all levels of management of the Company/subsidiaries, whose functions include ensuring the implementation of the Company’s policy in the field of occupational safety and environmental safety. |
| contractors | – a legal entity or individual who performs work, provides services or supplies goods and materials on the territory or in the interests of the Company and its subsidiaries in accordance with a contract (agreement) and which may influence the quality of provision, labor safety and environmental safety |
| management measures | - a set of preventive (warning) measures to eliminate adverse events that may arise as a result of activities, aimed at eliminating the possibility of an emergency or incident |
| hazard | - source, situation or action with the potential to cause harm to people, the environment, property or the reputation of the NC KTZ JSC group of companies |
| risk in the field of occupational safety and environmental safety | - the likelihood of an event occurring that could result in varying degrees of injury, property damage, or environmental damage |

- acceptable (tolerable) risk** - a risk reduced to an acceptable level, taking into account the requirements of legislation and internal documents of the Company/subsidiaries defining the policy in the field of occupational safety and environmental safety
- significant risk** - a risk that has a significant impact on people, property, the environment and requires appropriate measures to reduce them or maintain them at an optimal level where reduction is not possible
- residual risk** - a risk that remains after the risk owner takes action to change the probability or strength of influence of this risk
- risk assessment** - process of assessing the risk associated with a hazard that takes into account the completeness of all existing controls and allows a decision to be made as to whether the risk is acceptable or not
- environmental risk** the likelihood of adverse changes in the state of the environment and (or) natural objects due to the influence of certain factors
- environmental aspect** - an element formed during the activities of an organization, the production of its products or the provision of services that interacts with the environment
- Opportunities in the field of OH&S and EP** - a circumstance or set of circumstances that can lead to improved performance in the field of OH&S and EP
- OH&S** - occupational health and safety
- EP** - environmental protection
- Hazard Identification** - the process of detecting, identifying and recognizing hazardous and harmful production factors and establishing their quantitative, temporal, spatial and other characteristics necessary and sufficient for the development of preventive measures
- Identification of environmental aspects** - identification of environmental aspects, establishment of their impact on the environment
- Interested party** - a person or organization that can influence the activities carried out by the Company and its subsidiaries, and who are affected by these activities
- IS PB** - “Integrated system for industrial safety management” automated system (IS PB)
- Incident** - a negative event that occurred during storage, conservation, operation or liquidation of an object and related to a breakdown, accident, event, incident, accident, occupational disease, failure of a technical device, inflammation, fire, traffic accident, negative impact on the environment or violation when handling

hazardous sources

Concepts not provided for in this paragraph are used in the meanings provided for by the Company's local regulations.

3 General provisions

4. Identification of hazards and environmental aspects, risk assessment and management are an element of increasing the level of occupational safety and environmental safety and are aimed at identifying and preventing risks in the field of occupational safety and environmental safety.

5. The results of hazard identification and environmental aspects, risk assessment are:

1) initial information for planning achievable goals in the field of occupational safety and environmental safety and improving management in this area;

2) the basis for the development in the Company and its subsidiaries of measures to manage risks in the field of labor and environmental safety, allocation of the necessary resources (monies, human resources) for the implementation of measures to manage risks in the field of labor and environmental safety, as well as their monitoring and analysis;

3) the basis for the development of sections/requirements for labor protection and safety and environmental protection in regulatory technical documents for production processes.

4 Planning for identification of hazards and environmental aspects, assessment of risks, and opportunities in the field of OH&S, EP

6. The Company and its subsidiaries carry out planned and unscheduled identification of hazards, environmental aspects, and risk assessment in the field of occupational health and safety and environmental protection. At the same time, during the assessment process, the established (identified) opportunities in the field of occupational safety and environmental protection, the benefits of their implementation and the potential for improving performance in the field of occupational safety and environmental safety should be considered.

7. Planned identification of hazards and environmental aspects, risk assessment in the field of occupational safety and environmental safety are carried out in the Company and its subsidiaries annually no later than May 31.

8. Unscheduled identification of hazards, environmental aspects and risk assessment in the field of occupational safety and environmental safety is carried out in the following cases:

1) changes in legal and other requirements relating to identified hazards and risks and/or appropriate management measures;

2) changes in the management system in the field of occupational safety and environmental safety;

3) modernization, reconstruction, replacement and introduction of new equipment;

4) changes in working conditions and (or) the procedure for performing work;

5) the occurrence of an accident;

6) identifying inconsistencies based on the results of audits and inspections;

7) changes in production processes when planning any special (non-standard) work;

8) statements and/or opinions of interested parties;

9) changes in production processes based on the results of the analysis of questionnaires, checklists;

10) development and updating of regulatory technical documents for the production processes of the Company and its subsidiaries (technical maintenance, repairs, maintenance of infrastructure facilities, rolling stock, etc.).

9. To identify hazards and environmental aspects, assess risks in the field of occupational safety and environmental safety, working groups (consisting of at least 3 people) are created in the following order:

1) in the network level divisions of the Company/subsidiary, by order of the first head of the network level division under the leadership of the head of the network level division responsible for occupational safety and environmental safety;

2) in regional-level divisions of the Company/subsidiary, by order of the first head of a regional-level division under the leadership of the head of a regional-level division responsible for occupational safety and environmental safety;

3) in line-level divisions of the Company/subsidiary, by order of the first head of a regional-level division under the leadership of the head of a line-level division.

10. Workers included in the work group must have a thorough knowledge of the activity being assessed, its inherent hazards, risk assessment methods and control measures applied.

11. The working group develops a plan for identifying hazards and environmental aspects, indicating responsible executors and deadlines, defines workplaces and their boundaries.

5 Responsibility

12. The Inspectorate for Occupational Safety and Environmental Protection of the Company carries out general coordination and monitoring of work on identifying hazards and environmental aspects, assessing and managing risks in the field of occupational safety and environmental safety in the Company and its subsidiaries.

13. In the process of identifying hazards and environmental aspects, assessing and managing risks, the following are responsible:

| | |
|--|---|
| Employee of the Company and its subsidiary | <ul style="list-style-type: none"> • for providing working groups with reliable information about any existing or potential risks; • for conducting analysis when planning the implementation of new projects or changes in activities and ensuring that risk management measures are taken; • in the event of an increase in risks or the likelihood of new hazards, for taking risk management measures in the field of labor safety and environmental safety; |
| Service | <ul style="list-style-type: none"> • for ensuring a unified approach to risk management by managing risk in the field of occupational safety and environmental safety, including the elimination or minimization of any identified hazards and environmental aspects, ensuring the completeness of the required documentation and maintaining documentation of the risk management process, continuous monitoring of potential risks and risks control measures |
| Working group | <ul style="list-style-type: none"> • for identifying hazards and environmental aspects, assessing risks in the field of occupational safety and environmental safety; • for the formation of the Register of hazards, environmental aspects, and risks, the Register of significant risks and significant aspects; |
| Heads of divisions of the Company and subsidiaries | <ul style="list-style-type: none"> • for implementation and fulfillment of the requirements of this Standard within the framework of their powers; • for involving workers in the overall process of identifying hazards and environmental aspects, assessing them and managing risks, thereby reducing the likelihood of accidents when performing a functional task; • for informing and instructing employees and interested parties about identified hazards and environmental aspects; • for developing and ensuring approval of the risk management action plan; • for the development and updating of sections/requirements for labor protection and safety in regulatory technical documents for production processes, in order to ensure the prevention of adverse effects on workers of harmful and/or hazardous production factors. |

6 Process for identifying hazards and environmental aspects

15. Working groups identify hazards and environmental aspects in accordance with the Methodology for Hazard Identification, Assessment and Management of Occupational Safety and Health Risks, provided in Annex 1 hereto, and the Methodology for Environmental Aspects Identification and Risk

Assessment, provided in Annex 2 hereto.

16. Identification of hazards and environmental aspects is carried out for each permanent and non-permanent workplace and type of work, as well as workplaces that are used by stakeholders within the area of responsibility of the Company's structural division and subsidiaries.

17. One or two workplaces are selected from workplaces with the identical nature of the work and similar conditions.

18. When identifying hazards in the field of occupational safety and health and assessing them, the input data are:

- 1) standard and non-standard types of activities;
- 2) normal and emergency situations;
- 3) behavior of the employee, including personnel of contractors and subcontractors, visitors, and other persons with access to the facilities of the Company and its subsidiaries;
- 4) identified hazards that arise during the performance of work duties outside the workplace and that can negatively affect the health and safety of employees of the Company, its subsidiaries;
- 5) hazards arising in the immediate vicinity of the workplace, as a result of professional activities, under the control of the Company, its subsidiaries;
- 6) hazards arising in the immediate vicinity of the workplace as a result of professional activities not controlled by the Company or its subsidiaries;
- 7) infrastructure, equipment and materials at the workplace;
- 8) workplaces, technological processes, service passages;
- 9) sanitary conditions;
- 10) actual changes or expected changes in the health and safety management system;
- 11) design documentation, test results, tests of new objects, equipment, technological processes planned for implementation;
- 12) documentation in the field of labor safety and environmental safety;
- 13) regulatory technical documents for the production processes of the Company and its subsidiaries;
- 14) results of certification of production facilities for working conditions;
- 15) reports of previous external and internal inspections and audits on the state of labor safety and environmental safety;
- 16) materials of investigations of incidents that occurred in the field of occupational safety and environmental safety both within the Company and in other organizations of a similar profile;
- 17) list of works with increased hazard;
- 18) results of knowledge testing on training and briefing; emergency response plans, record of security drill results (if available), etc.;
- 19) results of the implementation of activities planned during the previous hazard identification and risk assessment;
- 20) results of assessment of legal requirements;

21) reports on the state of labor safety and environmental safety;

22) non-conformances identified and registered in the Behavioral Safety Dialogue module of the IS PB.

23) results of analysis of questionnaires, checklists.

24) results of monitoring the technological process, production environment, workplace, work of contractors, external factors.

25) complaints, statements received from employees and other interested parties, including via electronic and other means of communication.

19. Identification of environmental aspects includes:

1) analysis of documents on the activities of the structural division;

2) monitoring the activities of the structural division;

3) visual inspection of the site, survey and interview of employees of the structural division.

20. Input data for identifying environmental aspects are:

1) the main activity of the structural division (all technological processes occurring under standard (normal) conditions, during startup and shutdown of equipment, possible emergency situations, etc.);

2) auxiliary activities and activities carried out by contractors at the facilities of the NC KTZ JSC group of companies;

3) sources of impact on the environment during transportation, storage, loading, unloading of raw materials, materials, operation of transport and special equipment;

4) research activities (laboratory work, geophysical research, research of new reagents, etc.);

5) historical environmental impacts;

6) collection, storage, and disposal of production and consumption waste;

7) fulfillment of environmental protection requirements in accordance with the conditions specified in contracts for the purchase of goods, works and services concluded by NC KTZ JSC, subsidiaries with third-party organizations;

8) appeals, complaints from the general public and workers, publications and references in mass media related to the negative impact of environmental aspects on the environment and people, etc.;

9) compliance with the legislative requirements of the Republic of Kazakhstan and regulatory requirements in the field of environmental protection.

10) description of production, technological processes and schemes;

11) register of equipment used;

12) results of instrumental measurements;

13) analysis of consumption of fuel, energy and natural resources;

14) projects of maximum permissible emissions into the atmosphere, maximum permissible discharges of pollutants into water bodies, standards for the volume of waste removal and disposal;

15) permits for emissions into the environment.

7 Assessing risks and opportunities

21. The results of identifying hazards and environmental aspects are entered by members of the working group into the industrial safety information system by compiling a Register of hazards, environmental aspects and risks in accordance with Annex 3 hereto.

22. After compiling the Register of hazards, environmental aspects and risks, the risks are ranked based on the risk assessment. Risk assessment is carried out in accordance with the Methodology for Hazard Identification, Assessment and Management of Occupational Safety and Health Risks (Annex 1 hereto), the Methodology for Environmental Aspects Identification and Risk Assessment (Annex 2 hereto). In this case, the assessment of the impact of hazards is determined in accordance with Annex 4 hereto.

23. Significant risks and significant aspects in the occupational safety and environmental safety information system are documented in the Registers of significant risks and significant aspects in the form according to Annex 5 hereto.

24. Opportunities in the field of OH&S and Environmental Protection are also included in the Register of Hazards, Environmental Aspects and Risks, for which structural divisions and subsidiaries must maintain assessment processes in working order:

1) opportunities in the field of OH&S and Environmental Protection to improve performance in these areas, taking into account planned changes in the Company and subsidiaries, their policies, processes or activities, as well as:

possibilities for adapting work, work organization and production conditions in relation to employees;

opportunities to eliminate hazards and reduce risks in the field of OH&S;

2) other opportunities to improve the OH&S and Environmental Protection management system.

25. Measures to respond to risks and opportunities are included in the Registers of hazards, environmental aspects and risks using the IS PB.

26. If necessary, the Services of departments at all levels document the Register of significant risks and significant aspects by downloading from the IS PB.

27. Control over the timely implementation of unscheduled identification of hazards and environmental aspects in divisions at the linear and regional levels is carried out by divisions at the network level.

8 Risk management in the field of occupational safety and environmental protection

28. To manage risks in the field of occupational safety and environmental safety, the Company's divisions and subsidiaries take measures aimed at eliminating them, minimizing or replacing unacceptable risks with acceptable ones. In this case, the following hierarchy of management tools and methods are used:

1) eliminating the hazard;

2) replacing processes, operations, materials or equipment with less hazardous ones;

3) application of technical means and management methods and reorganization of work;

4) application of administrative means and management methods, including training of employees;

5) use of adequate personal protective equipment.

29. When significant risks and significant aspects are identified, in order to transfer them to a lower category or eliminate them, the structural divisions of the Company and subsidiaries develop risk management measures. These activities are included in the production activity plans of the divisions, developed in accordance with local regulations and regulatory technical documents of the Company and its subsidiaries. If necessary, additional action plans are drawn up for individual risks and aspects to eliminate or reduce them, taking into account the following requirements: the assigned tasks must be achievable, measurable, and limited in time.

30. Acceptable (tolerable) risks are considered manageable, no special management measures are taken for them; one can limit himself/herself to work within the framework of compliance with the legislation of the Republic of Kazakhstan, local acts of the Company and subsidiaries approved in the established order of technological processes.

31. If an unacceptable risk is identified, work activity or the work process must be immediately suspended in the prescribed manner until, with the help of appropriate management measures, the unacceptable risk is eliminated or transferred to a lower category, or reduced to the lowest level.

32. The priority of the formation and distribution of resources (material, financial) is carried out based on the results of risk assessment. First of all, activities aimed at reducing unacceptable risks are subject to financing.

33. The results of identification of hazards and environmental aspects, risk assessments are used as input information for analyzing the state of occupational safety and environmental safety, as well as when conducting briefings on occupational safety and health, and are taken into account when developing and revising local acts in the field of occupational safety and environmental safety, instructions on safety and labor protection for professions and types of work, regulatory technical documents, technological processes and other documents used in the divisions of the Company and its subsidiaries.

9 Risk assessment analysis and reporting

34. In order to monitor the effectiveness of the risk management system, the Company and its subsidiaries conduct a risk assessment analysis. The analysis is carried out on a regular basis at least once a year.

35. The analysis is carried out by the network level division after the planned identification of hazards and environmental aspects, assessment of risks in the field of occupational safety and environmental safety.

36. A report on the results of the analysis is submitted to the Inspectorate for Labor Safety and Environmental Protection no later than June 15.

Annex 1
(Mandatory)

Methodology
for Hazard Identification, Assessment and Management of Occupational
Safety and Health Risks

1. Purpose

1. The methodology is intended for identification of hazards, risk assessment, organization of control and development of risk management measures in the field of occupational safety and health and applies to all structural divisions of the National Company Kazakhstan Temir Zholy JSC and its subsidiaries. The methodology is based on the Rules of identification and assessment of risks of the National Company Kazakhstan Temir Zholy JSC, approved by the decision of the Management Board of NC KTZ JSC, as well as advanced experience and best practices of international companies that have achieved significant success in ensuring safe working conditions. For faster memorization, examples are provided in each section of the methodology.

2. Basic concepts and definitions

2. Identification of hazards in the process of production activities is the process of detecting, identifying, and recognizing dangerous and harmful production factors and establishing their quantitative, temporal, spatial and other characteristics necessary and sufficient for the development of preventive measures. A hazardous event occurs when a person interacts with a hazard that causes damage.

Example: There is an unevenness on the floor surface. This malfunction in itself does not have any consequences, however, if a person accidentally happens to it, there is a danger that he will be noticed, fall and be injured.

3. The totality of the probability of a hazardous event occurring and the consequences of such an event is a risk.
4. Probability is the degree of possibility that a hazardous event will occur. If the bump is located in a service aisle with heavy worker traffic, the chances of someone tripping are quite high.
5. If such a surface is present in a less busy area, someone will be less likely to trip and fall.
6. As a result of a hazardous event, if a worker trips over an uneven surface, the severity of the latter may vary:
 - he can restore his balance without any difficulty;
 - may drop the load it is moving;
 - may sprain a ligament in your leg or get a bruise or fracture.

As a rule, the consequences depend on certain conditions. In a busy area, in front of a building where the area is regularly cleaned, the consequences of a fall may not be as severe as in a backyard where various debris is present.

7. If the above is represented by the formula, we get

$$\text{Risk} = \text{Probability} \times \text{Consequences}$$

3. Hazard identification and risk assessment

8. A tool for identifying hazards and assessing risks is a way to effectively and economically ensure control of the most dangerous factors in the workplace (hereinafter referred to as OR). The OR is carried out at least once a year until May 31 and allows you to determine the sequence of steps in the work order and monitor their progress and implementation. OR is an effective tool for improving safety at work. OR is:

- the first important step in the development of safe work methods and occupational safety instructions;
- an important component of effective safety management;
- helps to understand what can go wrong;
- allows you to constantly improve the degree of safety of the methods and techniques used;
- a means of continuously improving safety standards and a way to move towards “zero injuries”.

OR - is a systematically conducted process where the magnitude of the risk is determined.

9. There are 5 stages of hazard identification, risk assessment and management:

- 1) identification of hazardous factors;
- 2) identification of the risk group and the nature of the risk;
- 3) assessing the risk and adequacy of existing control measures, or introducing additional control measures;
- 4) registration of significant results;
- 5) review of the risk assessment, updating it (if necessary).

10. Residual risk - a residual risk that can lead to injury or harm to health despite:

- full compliance with health and safety requirements;
- application of advanced technologies;
- use of advanced equipment.

11. To identify hazards and assess risks, a working group is formed from among employees of the department at the appropriate level, taking into account the competence to assess each specific area. The work group leader must have experience in the field of occupational safety and be trained in risk assessment. It is advisable to include in the risk assessment working group the head of the site or work (foreman, site manager, foreman) where there are inherent risks that need to be assessed.

12. The remaining members of the working group are selected by the head of the appropriate level of unit responsible for occupational safety issues, based on their

experience, technical or engineering competence and knowledge of relevant standards or requirements.

13. It should always be taken into account that insufficient risk control can lead to:

- potentially dangerous incidents;
- material damage;
- environmental damage;
- an accident resulting in injury;
- occupational disease.

Health risk factors are divided into 4 categories:

- chemical (solvents, exhaust gases);
- biological (bacteria, pathogens);
- physical (noise, vibration);
- psychological (stress).

14. There are two types of effects of occupational diseases on the body:

- acute, which occurs shortly after harmful effects and does not last long, but hospitalization is possible;
- chronic, during which harm to health develops over time. The disease can develop over a long period, the impact can be either mild (mild asthma) or serious (oncological diseases).

4. Identification of hazards

15. The first stage in risk assessment is to identify all the hazardous factors associated with the type of work in question. To do this, it is necessary to take into account such aspects as:

- location;
- people doing the work;
- materials and substances used in the work;
- equipment, mechanisms and tools used in the work;
- conditions and nature of the work performed.

16. Also, before starting a risk assessment, it is necessary to collect information about the technical means, processes and features of the unit's activities, including:

- maps of technological processes, movement plans (schemes of service passages, transport routes), diagrams of the production site;
- instructions for performing production work;
- places and conditions for storing hazardous materials (raw materials, chemicals, waste, products, components);
- technical descriptions and rules for operation and maintenance of equipment;
- technical requirements for products, documents describing the procedure for safe handling of materials, data on toxic materials and other information regarding occupational safety.

17. It is necessary to walk around the work site and observe what is happening there. Try to find anything that could reasonably be dangerous. Study the area, working conditions, equipment used and work performed. Particular attention should be paid to the manner in which the work is carried out and whether the workers carry out the operations correctly. Performing such a detour reduces the likelihood of not noticing any dangerous factor.

18. The actual location of objects and the work performed are considered.

Example: Do workers have enough space to freely complete tasks without exposing themselves to unnecessary risks? Do the work conditions allow the work to be performed properly?

19. It is also necessary to take into account common areas, such as corridors and staircases. They need to be included in the hazard identification to avoid cases where two different managers assume that the area is the responsibility of the other manager.

20. Each type of work is reviewed, before execution and during execution. Standard and non-standard operations are taken into account. At this stage, the working group needs to identify all possible dangers (even those whose likelihood at first glance may seem minimal).

21. The type of facility, equipment and materials and substances used are considered. Are they fit for purpose? Was the installation performed according to the manufacturer's instructions? Are they used for their intended purpose? What surrounds the object? Is the mount and pedestal secure?

5. Identification of the risk group and the nature of the risk

22. After compiling a list and clearly defining the stages of the upcoming work, you can begin to determine who may be harmed and how.

23. For each work task and hazard, a risk group must be determined. These could be (except for workers on site):

- maintenance workers, cleaners, persons working in close proximity to or passing through the work area;
- persons who do not work at the enterprise - agency employees, contractors, visitors and residents of populated areas.

24. Certain categories of workers may be at increased risk, for example, minors or inexperienced workers, pregnant and nursing mothers, night shift workers, and employees working alone. There is risk in almost every workplace.

Example: There is a hazard in the workplace - a moving conveyor belt or a rotating piece of equipment. We find out the possible reasons for the realization of danger into undesirable events, which are usually:

- lack of fencing, screens, blocking to prevent accidental and intentional contact of workers with the source of risk;
- inadequacy of safety and protective devices;
- insufficient response speed of protection mechanisms;
- inconvenient location and incorrect coloring of control buttons;

- *poor lighting;*
- *inappropriate microclimate;*
- *presence of harmful chemicals, aerosols and dust;*
- *high conveyor speed;*
- *location of equipment near other workplaces or the route of movement of workers;*
- *inappropriate personal protective equipment (PPE);*
- *insufficient training of employees, incompetence, negligence, individual characteristics of the employee;*
- *lack of practical training on the job before being allowed to work independently;*
- *lack of warning and signal signs;*
- *the employee is at work under the influence of alcohol, narcotic or psychotropic substances;*
- *lack of regular internal control;*
 - *lack of regular equipment maintenance.*

25. For identified hazards, the form of the Register of Hazards, Environmental Aspects and Risks specified in Appendix 3 to this Standard is used.

6. Risk assessment

26. This stage consists of two parts - the risk assessment itself and an assessment of the adequacy and relevance of existing control measures and barriers.

27. Once the hazards and possible risks have been identified, it is necessary to determine how high these risks are. To rank the risk, i.e. assessing the level of probability and extent of possible damage, it is necessary to consider:

- the adequacy and effectiveness of existing control measures;
- approximate level of risk (probability and severity of damage);
- actions that will be required to eliminate or mitigate the risk.

28. The purpose of risk assessment is to reduce the residual risk to a practically feasible level. In a fairly complex workplace, this can take a long time; in these cases, a gradation of risks is necessary - the higher the level of risk, the sooner it must be eliminated or controlled.

29. Listing existing controls is essential for a basic risk assessment, which records all previously applied or recommended controls to consolidate them all into one comprehensive list:

- engineering control measures for the source of danger (presence of protective fences, insulation, exhaust ventilation, etc.);
- administrative control measures (shift work schedule, safe work systems, personal protective equipment, etc.);

- behavioral controls (bulletins, instruction, training and supervision, as well as monitoring methods such as inspection).

30. Based on the results of risk identification and assessment, the working group should take the following steps:

- 1) determine the amount of information, training and instructions to be provided to the risk group;
- 2) determine the scope of measures necessary to ensure the reliability and relevance of such information;
- 3) Draw up a training plan for employees, both newly hired and transferred to a new job;
- 4) Establish a program for reviewing the risk assessment, which should include monitoring the level of exposure.

31. This information allows you to make a quantitative and qualitative risk assessment.

32. Quantitative-qualitative risk assessment contains coefficients that facilitate the classification of risks. Classifying risks according to the likelihood of their occurrence and causing damage, in turn, helps to prioritize corrective actions.

Example: A carriage washer uses a ladder to clean the exterior of a passenger carriage. What is the probability that the washer will fall? To determine the probability, a number of factors need to be considered:

- staircase stability;
- condition of the ladder rungs;
- type of shoes;
- lighting level.

After considering these factors, you can estimate the likelihood of a fall using a scale.

After calculating the probability of a fall, it is necessary to calculate the severity of the consequences.

If a washer falls down a ladder, what is the most likely consequence? In this case, it is necessary to consider factors such as:

- fall height;
- place of fall;
- what part of the body is affected by the impact force during a fall.

33. After all the above factors, the severity of the consequences of a fall can be assessed using the Hazard, Environmental and Risk Register specified in Annex 3 to this standard.

7. Quantitative risk assessment

34. The assessment of the maximum damage from certain types of risks, for example, the risks of liability for causing harm, cannot be calculated using any formulas, and therefore statistical data is used to quantify such risks. To assess such risks, scenarios for their occurrence and the parties that may be involved

(suffer damage), as well as the overall impact of such a risk, are usually assessed, and based on existing information (statistics) about the severity and cost of damage in the implementation of such scenarios, the maximum possible damage is determined.

35. Risk assessment is characterized by a risk indicator (R), which is assessed in points and calculated using the formula:

$$R = P \times S, \text{ where:}$$

P – probability of danger occurrence, score (Table 1);

S – hazard impact assessment, score (Appendix 4 to this standard).

Table 1. Estimation of the probability of occurrence of hazard P

| P (score) | Probability | Qualitative assessment (description) |
|---------------------|--------------------|---|
| 1 | Very rarely | The likelihood of a hazard occurring is remote. It is almost impossible to imagine that such a factor could arise |
| 2 | Rarely | The likelihood of a hazard occurring remains low. Conditions of this kind occur in isolated cases, but the chances of this happening are low. |
| 3 | Occasionally | The probability of danger occurring is at an average level. Conditions for this may actually and unexpectedly arise. |
| 4 | Often | The likelihood of a hazard occurring is high. Conditions for this occur quite regularly and/or over a certain period of time |
| 5 | Very often | The likelihood of a hazard occurring is very high. Conditions necessarily arise over a sufficiently long period of time |

36. Based on the “P” and “S” values, the risk category is determined according to the risk matrix given in Table 2.

Table 2. Risk matrix

| Probability of occurrence - P | Effects of consequences -S | | | | |
|--------------------------------------|-----------------------------------|------------------------|----------------------|---------------------|--------------------|
| | Critical (5) | Significant (4) | Essential (3) | Moderate (2) | Minimum (1) |
| Very often (5) | R (25) | R (20) | Y (15) | Y (10) | G (5) |
| Often (4) | R (20) | Y (16) | Y (12) | G (8) | G (4) |
| Occasionally (3) | Y (15) | Y (12) | Y (9) | G (6) | G (3) |
| Rarely (2) | Y (10) | G (8) | G (6) | G (4) | G (2) |
| Very rarely (1) | G (5) | G (4) | G (3) | G (2) | G (1) |

37. Risk categories are divided into:

G - green level – (acceptable) from 1 to 8;
Y - yellow level – (significant) from 9 to 16;
R - red level – (unacceptable) from 17 to 25.

38. Acceptable risks (from 1 to 8) include potential risks during daily work in the workplace. Risks with this level are considered acceptable if there are measures to manage them (labor safety training).

39. Significant risks (from 9 to 16) include risks in which there is a potential threat to the health of personnel and/or damage to the property of the enterprise. Risks with this level are considered acceptable if there are sufficient measures to manage them and require constant monitoring and analysis; if management measures are insufficient, they are considered unacceptable and appropriate measures will be taken.

40. Unacceptable risks (from 17 to 25) include risks in which there is a potential threat to the life and health of personnel and/or causing significant damage to the property of the enterprise. Risks with this level are considered unacceptable and require further mandatory management.

41. The results of the risk assessment must be used as input data when drawing up a work plan for occupational safety and health.

42. Hazards and risks located in the red zone of high risk require immediate management measures, including eliminating the risk by abandoning the type of activity associated with the risk. These high magnitude risks must be reduced to at least a medium to low magnitude risk by implementing control measures, or emergency safety measures must be taken.

8. Risk registration

43. After the risk assessment has been completed, if necessary, the results can be documented by downloading from the industrial safety information system.

44. It is mandatory to familiarize all employees of the group of companies of NK KTZ JSC with the results of the risk assessment reflected in the registers so that they understand what hazardous factors and risks are associated with the work they perform and can control the risk using the developed methods to ensure both your own safety and the safety of others.

9. Review of results

45. The grounds on which unscheduled hazard identification is carried out are defined in paragraph 9 8 of this Standard. For example, site conditions, the type of equipment and materials used, and the number of personnel involved may change. In addition, legal requirements and industry standards are subject to change. When such changes occur, the risks need to be reconsidered. In addition, when incidents occur, existing risk assessments must be reviewed. It is mandatory to assess risks that may create new hazards before taking action.

Example: New generation locomotive systems do not require the assistant driver to go out (at each stage) while the train is moving into the engine room to visually inspect its condition, as on old series locomotives. Accordingly, the

risks associated with slipping and falling, bruises, getting caught in rotating parts of mechanisms, electromagnetic radiation, inhalation of diesel fuel vapors and carbon dioxide are significantly reduced.

46. Regular review of the results of risk assessment as part of routine hazard identification in accordance with paragraph 7 of this Standard allows for more effective control of existing risks and the development of control measures for new risks resulting from changes in the work process.

10. Evaluation of control measures

47. When assessing the effectiveness of control measures or introducing a new control measure, the following hierarchy should be followed:

- elimination of danger;
- replacement (use of less hazardous materials, processes, operations or equipment);
- engineering control measures (introduction of small-scale mechanization, automation);
- signaling (warning signs, notices, markings, devices and administrative controls);
- individual protection means.

The above assessment sequence is based on the principle that engineering controls are more effective than human factors-based controls in eliminating and controlling risk.

48. Where there are a number of controls, it is necessary to assess the relative costs of each measure and the degree of control it provides in the short and long term.

Example: switching to maintenance-free batteries eliminates the risk of acid (alkali) getting on the human body, poisoning, explosion of the capacity during testing, and significantly reduces the risk of the battery itself falling on your feet. When estimating the cost of purchasing maintenance-free batteries: it is necessary to estimate, in addition to the cost of the battery, the reduction in costs to the company due to:

- *elimination of the need to maintain a battery shop (department);*
- *reduction of costs for purchasing consumables – alkalis, acids;*
- *reduction of costs for purchase and maintenance of equipment (extraction system, charger, areometer, etc.);*
- *reduction of water consumption and wastewater discharge;*
- *reduction of electricity consumption;*
- *reorientation of released battery fitters to more demanded jobs;*
- *reduction of payments for harmful and hazardous labor conditions.*

49. Physical barriers, such as equipment fencing, work areas and signs, must be maintained in good working order.

11. Hazard elimination

50. The most effective way to reduce risk is to eliminate the hazard and its associated risk. The following are examples of low-cost solutions to the problem.

Examples:

- *using long-handled brushes when washing railcar windows eliminates the need to work at heights;*
- *cleaning a well with a pump eliminates the need to work in confined spaces.*

This approach must be for each hazard to bring the level of risk to an acceptable level.

12. Substitution

51. Substitution refers to a change to safer materials or processes.

Examples:

- *use of water-based paints instead of solvent-based paints;*
- *replacing asbestos with safe materials;*
- *using an excavator instead of hand trenching.*

52. In some cases, the methodology of work can be changed to reduce risk.

Examples:

- *using mechanical devices for drainage cleaning, instead of using strong chemical reagents;*
- *using of mobile elevator instead of an extension ladder.*

53. In individual cases, the work order can be changed to facilitate the effort.

Examples:

- *arrangement of items and equipment in the workplace, taking into account whether the employee is right-handed or left-handed;*
- *alternation of work at the computer with physical labor – making copies, printing, carrying documents.*

These examples show elements of “lean manufacturing”, creating an optimal environment for the worker to work not only in a safe but also comfortable conditions.

13. Engineering controls

54. These measures include constructive safety as opposed to preventive actions by the employee. There are several ways to engineer controls:

a) risk control at source (use of more efficient filters or less noisy equipment);

b) exposure risk control:

- insulation of equipment by a shroud, enclosure or barrier;
- insulation of an electrical source or heat source;
- ventilation of hazardous vapors, gases.

14. Warning signs, inscriptions, devices, markings

55. All basic warning, prohibition, prescriptive signs shall contain graphic symbols of proper shape, color and appropriate symbol according to ISO 7010:2019 “Graphic symbols. Colors and safety signs. Safety signs used in workplaces”. It is customary to divide all major signs into these varieties:

| Type of sign | Assignment |
|--|---|
| Prohibiting | They inform about the prohibition of undesirable action or dangerous behavior and prevent emergency situations. For example, “No access allowed”, “No smoking”, etc. |
| Safety warning signs for occupational health and safety | They warn of a possible danger and inform about biological and hazards, fire hazards, poisons and more. |
| Fire safety signs | They indicate the location of fire extinguishing equipment: fire extinguishers, hydrant, crane, as well as the location of panic buttons. |
| Prescriptive safety signs for occupational health and safety | They prescribe mandatory actions necessary to prevent dangerous situations. For example, a sign prescribes working only with a helmet or face shield. |
| Evacuation signs | They show the evacuation direction in case of fire and other dangerous situations. Since it is difficult to navigate in a state of panic, an intuitive symbol showing the direction is necessary. |
| Medical signs | They indicate the location of the first aid kit, nurse’s station and other facilities important for first aid provision. |
| Index symbols | They show the location of the service aisle, smoking area and indicate the special purpose of other rooms. |

15. Administrative controls

56. Reducing the duration of exposure involves reducing the amount of time an employee is exposed to a hazardous factor, during the workday, either by providing rest periods or by transferring to another job. This measure is usually used to control health hazards such as noise, vibration, high or low temperatures, working with hazardous substances or radiation areas. Keep in mind that for many hazards there are short-term exposure limits and workplace exposure limits based on an 8 hour workday.

57. Isolation/separation. Controlling risk by isolating or separating people and hazards is an effective and widely used control measures.

Example: separation of pedestrian and transportation areas in the workshop, separate passageways for workers during repair work, provision of space for heating at workplaces, etc.

Storage of flammable substances should be organized on the principles of isolation, in open ventilated areas separate from other sources of danger.

58. Systems for safe production of works. It is based on the control of hazards identified as a result of risk identification and assessment. If there is a high or medium level risk, the safe work practices system should be written in hard copy and communicated to workers during training.

59. Details of the safe organization of low-risk work may be communicated verbally. Records must be kept of employees receiving training or instruction in safe work practices. In this way, the employee must confirm that he or she understands the requirements and is committed to complying with them.

60. Training. Training provides workers with skills and knowledge, health and safety competence relevant to the work they do, which can be accomplished in two ways:

- On-the-job training aimed at jobs where training is necessary due to the special nature of the job. As a rule, this is the work of the work manager (foreman, forewoman), who by virtue of his authority and daily contact with workers, must detail general safety issues to the daily procedures of safe work for each individual task, tool, piece of equipment, technological process.

- Planned training (general safety training, induction training, management training, refresher training planned for risk management).

61. Information. Anyone involved in the operation of a business needs safety information, including but not limited to regular employees, visitors, contractors and the public. Information provided:

- who might be affected and why;
- how to complete a specific task safely;
- correct operation of the equipment;
- procedures for reporting incidents;
- personal responsibility for safety.

These can be signs, posters, meetings, electronic reminders, training, instructions and prescribed procedures.

62. Sanitary conditions. Sanitary and domestic facilities must comply with requirements of regulatory technical documentation, among which are: general ventilation, lighting and heating, air ionization, provision of drinking water, latrines and showers, rooms for meals, etc.

Maintaining a workplace is the most economical and effective way to control risk. This includes keeping things tidy at all times and properly organizing the storage of hazardous materials. Risks primarily affected by workplace maintenance – fire. Slips, trips and falls.

63. Monitoring and oversight. The effectiveness of risk control measures, both engineering and behavioral is evaluated through monitoring and management oversight to ensure that such locations are adequately applied. Detailed information on incidents, illnesses and diseases allows the effectiveness of risk control measures to be assessed. During monitoring, all safety equipment, including assistance equipment, is checked to ensure that it is in good working order. It is important to observe the worker and make sure he or she understands

and complies. He may have suggestions for improving the equipment or method of work. Monitoring should also include workers who work in shifts.

Monitoring may cover evaluation of the effectiveness of the training or instruction received.

16. Personal protective equipment. (PPE)

64. PPE represents limited protection and is used as a last resort when other measures are found to be ineffective. The main disadvantages of PPE:

- 1) PPE provides protection only to the worker who uses it, without providing protection to others;
- 2) provides for the employee's use of a full time;
- 3) requires proper application;
- 4) requires replacement when the level of protection is reduced.

Advantages of PPE:

- provides immediate protection and allows you to continue working while implementing more effective engineering controls;
- in an emergency, may be the only defense in rescue operations;
- can be used to perform work in confined spaces where other methods are not available.

17. Conclusion

65. Ensure that the assessment is sufficient and objective. Ask the following questions:

- Does the working group have all the necessary information?
- Is the working group using appropriate methods?

Example: different sites may use very different equipment for the same job, which can affect the level of risk.

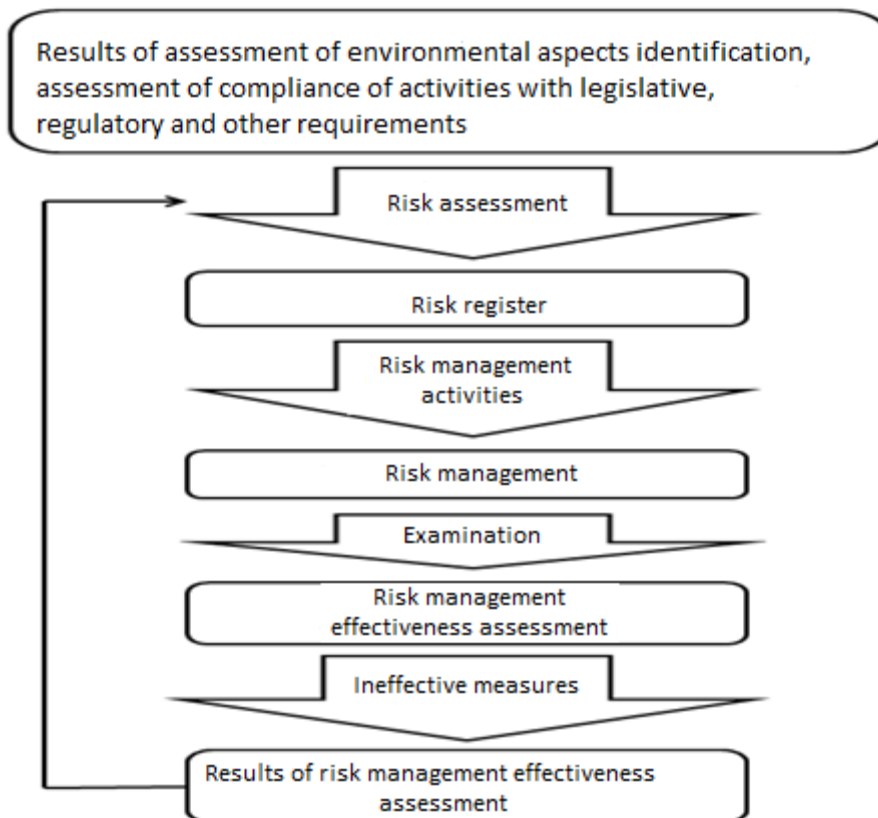
66. It is important to involve the workers whose activities are being assessed in the risk assessment, hazard description. Ensure that risk assessment all features of the workplace situation. A risk assessment done elsewhere for a similar type of work may not always be appropriate for the situation.

Annex 2
(Mandatory)

Methodology for Environmental Aspects Identification and Risk Assessment

This Methodology is intended to identify environmental aspects and assess risks and applies to all structural divisions of the National Company Kazakhstan Temir Zholy JSC and its subsidiaries.

The process of assessing environmental risks, managing risks, and assessing the effectiveness of risk management measures is shown in the diagram.



Identification of environmental aspects is carried out in accordance with clauses 19 and 20 ~~and 21~~ hereof.

Determination of the significance (assessment) of environmental aspects is carried out according to the criteria specified in Table 1.

Table 1. – Environmental aspects assessment criteria

| | |
|--|----------------------------|
| | Assessment criteria |
|--|----------------------------|

| Point | A | B | C | D | E |
|-------|--|--|---|----------------------|--|
| | scale of impact (within) | intensity (severity) of impact | degree and level of hazard | duration of exposure | public disclosure, importance for the image of NC KTZ JSC |
| 0 | within the boundaries of the SPZ, SG, RRW | within the norm, quota, limit, MPE, MPD, MPC | non-hazardous, green – index G | within 24 hours | no interference for unauthorized persons, not of interest to the media |
| 1 | goes beyond the boundaries of the SPZ, SG, RRW | exceeds norms, quota, limit, MPE, MPD, MPC | hazardous, amber – index A, red – index R | more than 24 hours | disturbs the population, interested by the media |

Notes:

SPZ is a sanitary protection zone, a territory separating special-purpose zones, as well as industrial organizations and other production, utility and storage facilities in a populated area from nearby residential areas, buildings and structures for housing and civil purposes in order to mitigate the impact of adverse factors on them;

SG is a sanitary gap, the minimum distance from the source of harmful effects to the border of a residential development, landscape-recreational zone, recreation area, resort, which has a sanitary protection zone regime, but does not require the development of a project to justify its organization;

The boundary of the SPZ is a line that limits the territory of the sanitary protection zone or the maximum of the planned projections of space, beyond which the impact factors do not exceed the established hygienic standards;

The boundary of the RRW is a railway right-of-way.

To assess environmental aspects, the working group specified in clause 10 hereof determines the impact of the environmental aspect.

The magnitude of the impact of the environmental aspect is determined by adding up the points for each criterion: A + B + C + D + E.

The degree of influence of the risk identified based on the results of the analysis of compliance with legal and stakeholders’ requirements, and other obligations is assessed by the method of expert assessments on a 5-point scale from “Minimal” to “Critical” according to Table 2.

Table 2. Risk influence degree (S)

| S | Influence | | | | |
|-------|-----------|----------|-------------|-------------|----------|
| | Minimum | Moderate | Substantial | Significant | Critical |
| Point | 1 | 2 | 3 | 4 | 5 |

The probability of risk occurrence is assessed by members of the working group on a 5-point scale from “Very rarely” to “Very often” according to Table 3.

Table 3. Probability of risks (P)

| P | Risk probability | | | | |
|-------|------------------|--------|--------------|-------|------------|
| | Very rarely | Rarely | Occasionally | Often | Very often |
| Point | 1 | 2 | 3 | 4 | 5 |

Based on the P and S values, the risk category is determined using the risk matrix given in Table 4.

Table 4. Risk matrix

| Probability of occurrence - P | Effects of consequences -S | | | | |
|-------------------------------|----------------------------|-----------------|-----------------|--------------|-------------|
| | Critical (5) | Significant (4) | Substantial (3) | Moderate (2) | Minimum (1) |
| Very often (5) | R (25) | R (20) | Y (15) | Y (10) | G (5) |
| Often (4) | R (20) | Y (16) | Y (12) | G (8) | G (4) |
| From time to time (3) | Y (15) | Y (12) | Y (9) | G (6) | G (3) |
| Rarely (2) | Y (10) | G (8) | G (6) | G (4) | G (2) |
| Very rarely (1) | G (5) | G (4) | G (3) | G (2) | G (1) |