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ҚАЗАҚТЕЛЕКОМ

Guidelines for monitoring, reporting and recultivation of land resources of Kazakhtelecom JSC

Astana

Preface

1 **DEVELOPED AND INTRODUCED** by the Corporate Governance Service of Kazakhtelecom JSC on the basis of the Action Plan of Kazakhtelecom JSC on environmental protection for 2022-2023, approved by the Order of the Chairman of the Management Board of Kazakhtelecom JSC No. 98 of May 12, 2022

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1 Introduction

Protection of lands shall include a system of organizational, economic, legal, engineering and other activities designed to protect lands from plundering, unjustified withdrawal from agricultural turnover, irrational use, harmful anthropogenic and natural impact in order to increase the efficiency of natural resources management and create a favourable environmental situation.

Protection of lands and their rational use shall be conducted on the basis of an integrated approach to lands as complex natural formations (ecosystems), taking into account their zonal and regional peculiarities.

The system of rational use of lands shall be of nature-protecting, resource-saving nature and shall provide for preservation of soils, limitation of impact on flora and fauna, rocks and other components of environment.

In the process of land protection, land monitoring shall be obligatory, which is a systematic observation of the state of the land fund for timely identification of dynamics and elimination of negative processes and trends and includes data on productivity of land resources, soil degradation and land pollution.

The very notion of monitoring covers a wide range of factors and phenomena studied in dynamics. This includes land transformation, changes in factors and phenomena affecting the productive capacity of soils (salinisation, erosion, etc.), environmental changes (radiation dynamics, pollution of soils, groundwater and water bodies with pesticides, etc.). The monitoring data shall be submitted to all state and public control bodies.

The system of information on the natural and economic status of lands of the Republic of Kazakhstan, location, target use, size and borders of land plots, their qualitative characteristics, on land use accounting and cadastral value of land plots constitutes the state land cadastre.

The Land Code of the Republic of Kazakhstan establishes fees based on the land cadastre and provides for strict state control over the use and preservation of land. If a land user fails to comply with the necessary requirements to preserve land and multiply its fertility, he or she is deprived of ownership rights under the law.

One of the most urgent problems of soil management and conservation is soil erosion control. Overcoming the effects of soil erosion is extremely difficult, sometimes impossible. Therefore, preventive, precautionary measures tailored to specific geographical conditions are of utmost importance in protecting soils from erosion.

The most effective measures to combat the consequences of erosion are creation of forest shelter belts, arrangement of various engineering structures for retention of surface runoff - dams, ponds in ravines, retention shafts and ditches. Systematic struggle against wind and water erosion of soils is an important state task.

Another cause of soil degradation is secondary salinization, which is caused by accumulation of salts in irrigated soils due to non-drainage irrigation and uncontrolled water supply. Prevention and control of salinization of irrigated soils is one of the main tasks for the protection of the stock of cultivated land and the pedosphere as a whole. To prevent negative consequences of irrigation it is necessary to control water-salt regime on irrigated lands permanently.

Degumification is also a cause of soil degradation. Humus is one of the main sources of plant nutrients and an important factor of soil fertility. Humus matter contributes to soil mass restructuring, creation of favourable air regime. But during tillage process dehumidification - reduction of humus content in arable layer occurs. This happens, firstly, due to mixing of the upper layer, rich in organic residues, with lower layers containing less humus and, secondly, as a result of destruction of humus content in virgin soils in the process of their exploitation. A decrease in humus content not only affects yields, but also causes destruction of soil structure and worsens water permeability, which leads to increased water erosion of soils and contributes to a further decrease in fertility in subsequent years.

An important problem of soil degradation is the accumulation of pesticides in the soil due to its widespread use in agriculture to preserve crops, and to control weeds and pests. However, pesticides have a detrimental effect on many living organisms, migrate through the trophic chains and, by entering the human body with food, can cause hazardous diseases. Pesticides are transported by wind and water over long distances, so they shall be used selectively, in limited areas. The most urgent problem of chemicalisation of agricultural production shall be creation of pesticides with high decomposition rate into non-toxic components.

In the course of its activities, Kazakhtelecom JSC violates land plots by laying underground utilities, installing equipment, matches, racks and structures. Any proposed activity of the Company in accordance with the applicable laws begins with the development of the working draft with the section "Environmental Impact Assessment" (hereinafter referred to as EIA).

EIA is a process that contributes to making an environmentally-oriented management decision on the implementation of planned economic and other activities by identifying possible adverse impacts, assessing the environmental consequences, taking into account public opinion, developing measures to reduce and prevent the impacts. The EIA not only determines the possible negative impacts, but also develops a set of measures to minimize them.

Development of the EIA draft is a mandatory procedure for the start of economic activity of the enterprise in order to reduce or completely neutralize the negative factors manifested as a result of the operation of the Company. In the process of developing the EIA draft, an in-depth and comprehensive analysis of water, air, flora, fauna and soil is conducted. The draft undergoes a mandatory expertise in the relevant authorized state bodies.

Assessment and monitoring of land resources will make it possible to establish the percentage of impact of the Company's activities on the soil and to develop measures to reduce the impact and preserve land resources in the region of operation.

2 Characteristic of the object

The Republic of Kazakhstan is located at the junction of two continents in the centre of the Eurasian continent and has an area of 272.5 million hectares. Part of the territory of the Republic is in Europe, the main part is in Asia. In terms of land area, Kazakhstan is among the ten largest countries in the world, and in terms of land availability per capita it ranks third in the world after Australia and Canada.

The length of the land border of the Republic of Kazakhstan with the

neighbouring countries is 13,383 km, including 7,548 km with the Russian Federation, 2,351 km with the Republic of Uzbekistan, 1,783 km with the People's Republic of China, 1,242 km with the Kyrgyz Republic and 459 km with the Republic of Turkmenistan.

One of the pressing problems in the country is the serious deterioration of natural resources and the environment in all the most important environmental indicators.

A large part of the country's territory is at high risk of environmental destabilisation. The problem of desertification is acute. In this regard, the creation and expansion of the areas of specially protected natural territories is the most effective way to provide the conservation of valuable natural complexes, biodiversity, restoration and improvement of the biopotential of the natural environment.

The lands of the specially protected natural territories shall include the lands of state natural reserves, state national natural parks, state natural reserves, state regional natural parks, state zoological and dendrology parks, state botanical gardens, as well as state natural monuments. Depending on the significance of the objects of the reserved fund they shall be referred to the category of republican or local significance.

The lands of the health-improving purpose include resorts which possess natural and therapeutic factors, as well as the land plots favourable for the organization of prevention and treatment.

The lands of historical and cultural purpose shall include land plots occupied by objects of historical and cultural heritage, including historical and cultural monuments.

According to land balance data, total area of this category is 7 705,7 thousand ha, including lands of specially protected nature territories - 7 521,6 thousand ha, lands of health-improving purpose - 35,7 thousand ha, lands of recreational and historical-cultural purpose - 148,4 thousand ha. Besides, other categories include lands of wildlife sanctuaries, protected areas and lands with natural complexes and objects of total area 1 269,3 thousand ha.

Different types of specially protected natural territories can be found practically in all natural zones of the republic.

The total area occupied by specially protected natural territories of republican significance is 24.6 million hectares. In 2020, the area of land in this category increased by 2.3 thousand hectares due to expansion of the territory of the Barsakelmes State Nature Reserve.

In the total area occupied by the objects of specially protected natural territories of the republican significance, the share of the state nature reserves is 6.6%, the state national nature parks - 10.9%, the state natural reserves - 12.7%. The main areas of specially protected natural territories are occupied by the state wilderness areas - 46.1 % and the state natural reserves - 23.8 %.

At the same time, according to article 122 of the Land Code of the Republic of Kazakhstan, land plots of state protected zones and state natural reserves are part of other categories of lands without their withdrawal from owners of land plots and land users.

The total area of specially protected natural territories of the republican significance occupies 9,0% of the total territory of the republic. Besides the objects of specially protected natural territories of the republican significance in the regions the objects of specially protected natural territories of local significance were created,

development of which is one of the urgent tasks of nature protection of the republican regions.

3 Area of application

These Guidelines establishes requirements for the assessment and monitoring of land resources in the process of construction and operation of telecommunications equipment and highways and other activities of Kazakhtelecom JSC (hereinafter referred to as the Company).

4 Regulatory references

The following referenced regulatory documents are required for the application of this Guideline For undated references apply the latest edition of the reference regulatory document (including all its changes).

GOST 7.32-2017 System of standards on information, library and publishing. Report on research work. Structure and design rules.

ISO 14001:2015 Environmental Management Systems - Requirements and Application Guidelines.

Note - When using this standard it is advisable to check the validity of reference standards and classifiers according to the annually published information catalog "Documents on Standardization" as of the current year and the corresponding periodically published information catalog published in the current year. If the reference document is replaced (changed), the use of this standard shall be guided by the replaced (changed) document. If a reference document is repealed without replacement, the regulation in which reference is made to it shall apply insofar as it does not affect that reference.

5 Terms, definitions and abbreviations

5.1 The following terms and definitions apply in this guidelines:

5.1.1 low usable rocks - rocks with physical and/or chemical properties unfavourable for plant growth;

5.1.2 overburden rocks - rocks that cover and host minerals to be excavated and moved as waste soil in open pit mining operations;

5.1.3 disturbed land - land which has lost its landscape primevalness and other value or which is a source of negative impact on the environment due to disturbance of soil cover, hydrological regime and terrain relief as a result of human industrial activities;

5.1.4 land reclamation - a complex of activities aimed at restoring disturbed lands for a certain designated use, including adjacent land plots which have fully or partially lost their value as a result of the negative impact of disturbed lands, as well as at improving environmental conditions;

5.1.5 land disturbance - the process taking place during extraction of minerals, including oil and oil products, geological exploration, prospecting and construction works resulting in disturbance of soil cover, hydrological regime, terrain relief and other negative changes in the condition of lands;

5.1.6 planning works - works for levelling the surface of disturbed lands, flattening the slopes, dumps and pit walls;

5.1.7 reclamation draft - a set of technical, economic, planning documents

including drawings, calculations and descriptions, graphic representation and justification;

5.1.8 reclamation layer - a layer of soil with plant-friendly properties that is artificially created during reclamation;

5.1.9 slope flattening - earthworks for the purpose of reducing the angles of slopes, dumps and sides of quarries or quarry openings, filling in subsidence and dips in the ground surface;

5.1.10 reclamation period - an interval of time during which the quality of reclaimed land is improved and its fertility restored;

5.1.11 potential-fertile soil layer - the lower part of the soil profile that has physical, chemical and limited-agrochemical properties favourable for plant growth;

5.1.12 fertile soil layer - the upper humusified part of the soil profile with physical, chemical and agrochemical properties favourable for plant growth.

5.1.13 land monitoring - a system of basic (baseline), operational, periodic observations of the qualitative and quantitative condition of the land fund, including the use of remote sensing data, conducted for the purpose of state control over the use and protection of land, timely identification of changes taking place, their assessment, forecasting of further development and development of recommendations for preventing and eliminating the consequences of negative processes.

5.1.14 ecological damage to land - pollution of land as a result of direct or indirect penetration of polluting substances, organisms or micro-organisms into the surface or composition of land or soil, which creates a significant risk of causing harm to public health.

5.1.15 land degradation - a set of processes, leading to changes in functions of land as an element of natural environment, quantitative and qualitative deterioration of its condition, reduction of its natural and economic significance.

5.1.16 key area - a typical plot of land, reflecting the composition and nature of vegetation and soils, their connection with natural conditions of a certain landscape with necessary reliability.

5.1.17 polygon - an area of different configuration characterizing certain types of landscapes (sands, foothill plains, mountains).

5.1.18 stationary site - a land plot which is organized for the purpose of permanent long-term (for more than 10 (ten) years) observation of the state of vegetation and soil cover in various natural and climatic zones, provinces, altitudinal belts.

5.1.19 lands for the needs of communication, radio broadcasting, television, informatics - land allotted for the placement of the facilities of the relevant infrastructure, cable, radio-relay and overhead communication lines, including underground, as well as their protection zones, land allotted for the construction of antenna-mast structures and (or) poles for cellular or satellite communications equipment. Protection zones of communication lines may be established for communication facilities on the basis of construction norms and rules, rules for protection of communication lines and other regulatory

technical documents approved in accordance with the established procedure.

6 General regulations

6.1 According to the Environmental Code [1], the Land Code [2], land resources (soil) are considered as objects of environmental monitoring. Monitoring of land resources is based on observations and measurements conducted by a specialized organization. This Guidelines establishes the content and procedure for observations, measurements, accounting, processing and analysis of data obtained in relation to land resources during anthropogenic activities of the Company, as well as during assessment of consequences of emergencies at potentially hazardous facilities of the Company. These Guidelines were developed taking into account the requirements and regulations of the Republican and international regulatory and legal documents: the Environmental Code of the Republic of Kazakhstan [1], the Land Code of the Republic of Kazakhstan [2], ISO 14001.

6.2 The purpose of land resources monitoring is to assess the impact of production processes and other activities of the Company on the state of land resources, to carry out measures to eliminate or minimize the negative impact (if any) on land resources.

6.3 The objects in the assessment of land resources are soil, vegetative and fertile layers of soil at telecommunication facilities, their condition and peculiarities of existence in the frameworks of specific environmental conditions.

6.4 Monitoring is conducted in accordance with the requirements of the Rules for monitoring of lands and use of its data in the Republic of Kazakhstan approved by Order of the Minister of National Economy of the Republic of Kazakhstan dated December 23, 2014 No. 159 [3] taking into account the specifics of the intended purpose of lands and is divided into subsystems, corresponding to categories of lands:

- monitoring of agricultural land;
- monitoring of lands of settlements (cities, towns and rural settlements);
- monitoring of lands for industrial, transport, communication, space activity, defense, national security and other non-agricultural purposes;
- monitoring of lands of special protected natural territories, lands of recreational, recreational and historical and cultural purpose;
- monitoring of lands of the forest fund;
- monitoring of lands of the water fund;
- monitoring of reserve lands.

7 Requirements for the organization of monitoring of the state of land resources

7.1 The Company plans to carry out a local type of monitoring, which covers land plots where telecommunication equipment is present.

7.2 Depending on the timing and frequency of land monitoring, the following groups of land observations are conducted:

- baseline (baseline capturing the state of the observable objects of observation at the time land monitoring was started);
- operational (recording current changes);
- periodic (after one year or more).

7.3 Land monitoring includes work on:

- carrying out systematic observation, surveys, surveys (re-surveys and adjustments);
- carrying out analysis and assessment of land conditions;
- development of recommendations on regulation of anthropogenic impact on land fertility;
- development of forecasts of the qualitative condition of lands for a certain period of time;
- organisation of a register of land data.

7.4 Assessment of the condition of lands shall be conducted by analyzing observations made (periodic, seasonal, daily), studying the direction and intensity of changes and comparing the obtained indicators with regulatory ones.

7.5 Based on the results of land condition assessment, a report with recommendations and scientific forecasts shall be prepared with thematic maps, charts, tables characterizing the dynamics, direction and intensity of changes, especially those of a negative nature.

7.6 Priority shall be given to monitoring of lands where the processes associated with them are manifested:

- changes in soil fertility (desertification, development of water and wind erosion, soil degumification, reduction of nutrition elements, salinization, waterlogging, overwatering and waterlogging);
- changes in the condition of the vegetation cover of natural lands.

7.7 Land monitoring shall be organized by the Company by concluding a agreement with a Company with an appropriate license and an accredited laboratory.

7.8 To carry out land monitoring a territorial-zonal network of observation stations for land conditions shall be established.

7.9 The territorial-zonal monitoring network includes stationary and semi-stationary observation stations for land conditions.

- Stationary observation sites are established to systematically obtain information on the state of the land with a given completeness and accuracy. These stations include fixed sites, key sites and polygons.
- Semi-stationary observation points (semi-stationary sites, profile) are organized depending on specific conditions and objectives of work. Observations are conducted periodically at intervals of 3, 5, 10 or more years.

7.10 The level of monitoring shall be determined by the program of ongoing observations of the state of lands at observation sites.

7.11 Land monitoring shall be conducted in compliance with the principle of compatibility of heterogeneous data based on application of unified classifiers, codes, system of units, standard data formats and regulatory and technical base, state system of coordinates and heights.

7.12 Sources of information for land monitoring shall be the results of systematic observations, ground surveys, surveys, inventories, materials of state control over land use and protection, archival data, remote sensing data, data received from state information systems and electronic information resources, as well as other information on qualitative condition of lands.

7.13 For land monitoring the Company plans to carry out ground observations, surveys, surveys, instrumental analysis of land for the content of harmful substances in the soil in places where telecommunication equipment is present using key sites, polygons and profiles.

7.14 The results of land monitoring shall be documented in the form of reports, tables, maps and cartograms, both in hard copy and in electronic media for collection, processing and storage systems.

7.15 Land monitoring documentation includes baseline and reporting documents. Baseline documents record the initial (baseline) condition of the land area. Baseline documents include initial thematic maps of land conditions, cartographic materials and collected information on the qualitative condition of land. Reporting documents are unified forms, tables reflecting the recorded changes in the condition of land.

7.16 Information contained on plans (drawings) of land plots classified as state secrets shall be used and stored in accordance with the Law of the Republic of Kazakhstan of 15 March 1999 "On State Secrets". [4].

7.17 When locating, designing and commissioning new and reconstructed buildings (structures, facilities) and other facilities, when introducing new equipment and technologies that adversely affect the condition of lands, measures for protection of lands shall be provided for and implemented, observance of environmental, sanitary, hygienic and other special requirements (norms, rules and regulations) shall be provided.

7.18 Assessment of the negative impact on the condition of lands and effectiveness of measures for their protection shall be conducted according to the results of state expertise, without positive conclusions of which the introduction of new equipment and technologies, implementation of measures for land reclamation, financing of construction (reconstruction) of buildings (structures, facilities) and other facilities shall be prohibited.

7.19 If land is disturbed in the course of the Company's activities, the owner of the land plot (the Company) shall, in accordance with the requirements of the Land Code of RK [2], carry out measures aimed at

1) protection of lands from depletion and desertification, water and wind erosion, mudflows, waterlogging, swamping, secondary salinization, desiccation, compaction, pollution with industrial and consumption wastes, chemical, biological, radioactive and other harmful substances and other processes of destruction;
2) protection of lands from contamination with quarantine objects, alien species and especially hazardous pests, their spread, overgrowing with weeds, shrubs and small forests, and from other types of deterioration of the state of lands
3) reclamation of disturbed lands, restoration of their fertility and other useful qualities of land and their timely involvement in economic turnover;

4) removal, preservation and use of topsoil during land disturbance works.

This type of work is conducted in accordance with the Disturbed Land Reclamation Draft, which is developed by a company with an appropriate licence and laboratory based on the Instruction on Development of Disturbed Land Reclamation Drafts, approved by the Order of the Acting Minister of National Economy of the Republic of Kazakhstan No. 346 of 17 April 2015 [5].

7.20 When developing reclamation drafts of disturbed lands , the following are taken into account:

- natural conditions of the area (climate, soil and vegetation cover, geological and hydrological conditions);
- prospects for development of the area;
- actual or predicted condition of disturbed (disturbed) lands by the time of reclamation (areas, landforms, degree of natural overgrowth, presence of fertile and potentially fertile layers of soil, waterlogging, erosion processes, pollution level);
- indicators of chemical and granulometric composition, agrochemical and agrophysical properties, engineering and geological characteristics of overburden and host rocks and their mixtures in dumps;
- economic and sanitary-epidemiological conditions of the disturbed land disposal area;
- environmental protection requirements.

7.21 The procedure for developing disturbed land reclamation drafts is as follows:

1) preparatory work (desk and fieldwork).

During the preparatory works cameral works consisting in selection of planning and cartographic materials, study of soil and soil-reclamation surveys, land inventory materials for conducting a field survey of the land plot subject to reclamation are conducted.

The field inspection of the land plots subject to reclamation is conducted by the draft developer with the participation of the Company representative and, if necessary, other specialists.

A field survey is conducted:

- clarification of the site location, actual boundaries of disturbed land, establishment of possible future use of the reclaimed area;
- establishment of availability of fertile and potentially fertile layers of soils in the dumps for recultivation of the disturbed lands;
- preliminary determination of the quality of fertile and potentially fertile layers of soils in the dumps, their mineralogical and mechanical composition, the presence of toxic salts in the rocks and the need for chemical reclamation, clarification of moisture conditions and natural overgrowth;
- determination of additional topographic, soil-reclamation, agro-forestry, geological and hydro-geological surveys to be conducted.

On contaminated lands the cause and source of contamination and the degree of hazard of soil contamination shall be additionally determined.

The results of the field inspection of land plots shall be documented in the act of inspection of disturbed (to be disturbed) lands (Annex A) subject to reclamation in the

form according to Annex 1 of the Instruction [5] and the drawing of the field inspection shall be made.

Based on the materials of the field inspection of land plots, a representative of the Company prepares a task for the development of the disturbed land reclamation draft (Annex B) in the form according to Annex 2 to the Instruction [5].

2) the production of surveys.

The following surveys are conducted based on the results of the field survey:

- topographic;
- soil-reclamation;
- agroforestry and land reclamation;
- geological and hydrogeological.

The topographical surveys are conducted at a scale of 1:1000-1:5000. If necessary, it may be conducted at a scale of 1:500. The soil and land reclamation survey materials provide:

- obtaining a full characterisation of the state of the fertile and potentially fertile soil layers on the land to be disturbed, and establishing the capacity and procedure for their removal, determining the conditions for storage and subsequent use;
- establishment of attributes and properties of soils and mixtures on disturbed land in order to draft technical or biological reclamation drafts;
- obtaining data on the attributes and properties of soils on low-productive lands, necessary for the development of design solutions to improve the productivity of these lands by applying an additional fertile layer of soil (trenching) to them

In explanatory note to materials of soil-reclamation surveys conclusion about quality of soils of surveyed object, recommendations on application of mineral fertilizers and list of grasses and grass mixtures, tree and shrub species, suitable for cultivation during reclamation period is given.

On low-productive lands provided for cultivation, soil surveys are conducted to obtain data on features and properties of soils necessary for making design decisions to increase productivity of these lands by applying an additional fertile layer on them.

Agroforestry and amelioration surveys are conducted to establish the possibility of producing forest plantations for various purposes on reclaimed areas.

Geological and hydrogeological surveys are conducted in combination with soil-reclamation surveys in order to obtain characteristics of underlying rocks, groundwater regime.

Sampling in the course of surveys is conducted taking into account the relief and degree of soil disturbance so that in each case the part of soil typical for genetic horizons or layers of the given soil type is represented.

3) developing a reclamation draft for disturbed land.

The reclamation draft is developed on the basis of the draft design assignment, the inspection report of the disturbed (to be disturbed) land to be reclaimed and survey materials.

The following works are conducted as part of the reclamation draft:

- developing the technology for reclamation of disturbed land depending on the reclamation area;
- determination of the scope of excavation works, special equipment and necessary materials

- necessary materials for technical and biological stages of disturbed land recultivation;
- organisation of works (recultivation schedule);
- drawing up cost estimates;
- preparation of working drawings for the production of works.

4) approval and issuance of the draft.

The draft of reclamation of disturbed lands shall be coordinated with the authorised body for land relations (structural subdivision of local executive bodies of the region, city of republican significance, capital, district, city of regional significance performing functions in the area of land relations) and shall be approved by the customer.

Approval of the draft of reclamation of disturbed lands located within the land plot provided (provided) by the executive body of the region (city of republican importance, capital) shall be conducted by the authorised body for land relations of the region (city of republican importance, capital), and in other cases - by the authorised body for land relations of the district (city) at the location of the disturbed lands.

In order to determine the environmental impact assessment, the disturbed land reclamation draft shall be submitted to the state environmental and sanitary and epidemiological expertise. The disturbed land reclamation draft is approved upon receipt of a positive conclusion of the state ecological and sanitary-and-epidemiologic expertise.

7.22 The assessment of land resources is conducted as part of a proactive assessment of the impact and management of the Company's land resources.

8 Requirements for Hygiene Regulations for the Safety of the Environment

8.1 In order to analyse the possible impact of the Company's activities on land resources and their condition, baseline (background) data on the qualitative and quantitative composition of soils in the areas where telecommunication equipment is located shall be available.

8.2 Data on the baseline condition of land resources shall be contained in the design and estimate documentation in the section of environmental impact assessment for telecommunications facilities. In case the necessary data are not available at the time of site preparation for operation, the background (natural) level of maximum permissible concentrations shall be established based on analysis of literature sources for the given or similar territory in the same geographical region.

8.3 The list of pollutants in the soil and the value of maximum allowable concentrations in the soil are determined by the requirements of Hygienic Standards for Safety of the environment, approved by Order of the Minister of Health of the Republic of Kazakhstan dated April 21, 2021 № MH of the RK - 32 [6] (Annex C)

8.4 Assessment of soil by sanitary-chemical and radiological indicators determines the degree of hazard, the degree of contamination, the frequency of exceeding MAC of chemical substances, and the index of contamination by radioactive

substances (Annex D).

8.5 Assessment of soil by microbiological and parasitological indicators determines the degree of hazard and contamination by coli titres, anaerobes titres, number of helminth eggs 1 kg. of soil, number of larvae and pupae of flies per 0.25 m2 plot, sanitary number Khlebnikov (Annex E)

8.6 Assessment of soil by physical degradation criteria and indicators of chemical and biological soil contamination determines the degree of radiological and chemical contamination (Annex F).

8.7 When surveying land subject to oil pollution, contours of land with increased content of oil products are identified, the depth of penetration of contamination is determined, and soil samples are taken to determine the content of oil products in them.

8.8 In case of soil contamination with oil products samples are taken to the depth of the lower boundary of the pollutant spreading. The methods for determining pollutants are performed in accordance with the State Standard "GOST 17.4.0.03-85 Nature Protection. Soils. General requirements for methods of determination of contaminants". [7].

8.9 Based on the results of soil-reclamation surveys, a soil-reclamation map of disturbed lands is prepared and, if necessary, soil-reclamation cartograms on the degree of land disturbance, rock toxicity, salinity, salinity, oil products content, heavy metals content, removal of fertile soil layer, use of overburden and host rocks in accordance with the State Standards "GOST17.5.1.03-86 Nature Protection. Soil. Classification of overburden and host rocks for biological land reclamation" [8] and "GOST17.5.3.06-85 Nature Conservation. Soil. Requirements for determination of norms of removal of fertile soil layer during excavations" [9].

8.10 Soil is one of the most important natural resources whose condition largely determines the ecological balance of the planet. The main characteristic of soil is its fertility, which is formed due to the vital activity of microorganisms. Economic activity leads to soil contamination, reduction of economic and potential fertility.

8.11 Pollution of soils with oil and petroleum products is currently an urgent problem for the Company. Products of fuel and lubricants are used for heating buildings and constructions, installations that provide uninterrupted power supply during emergency shutdowns, and for motor vehicles. Transportation and storage of petroleum products are hazardous processes that can lead to soil contamination. Chronic spills of oil and oil products are a serious threat to the environment and human health [10]. Soils and grounds are considered polluted when the concentration of oil products in them reaches the level that causes negative environmental changes in the soil ecosystem: the morphology, water and physical properties of soils change, there is a risk of pollution of groundwater and surface water due to leaching of oil products from soil or ground and their dissolution in water, soil animals die, productivity decreases or plants perish.

8.12 Mechanical, physical, thermal, physical-chemical, chemical and biological methods are used to clean up oil-contaminated soils. Application of one or

another method is determined by the nature, level and depth of contamination, type of polluted environment (soil, ground). Thus, in the soil environment contamination may be surface (depth of penetration of contamination 0-5 cm), subsurface (0-30 cm), deep (0-1 m), with penetration to groundwater level (from 1 to 5 m and more).

8.13 Mechanical methods are applied in case of high pollution degree, with hydrocarbon concentration exceeding 50 g/kg, depth of penetration of pollution into soils and grounds of 0.3-1 m, with layer thickness of oil products on water surfaces exceeding 0.03 m. With mechanical methods contaminated soils and grounds are extracted manually or with the help of excavation equipment and moved to remediation sites. The collected oil, oil products and oil-containing sludge are removed to ponds or sludge reservoirs

8.14 When eliminating fresh oil spills it is necessary to use bio-aggregation method ─ introduction of biopreparations containing microorganisms-oil-destructors to the polluted environment; in extreme conditions (in acidic environment, with deficit of moisture, deficit of nutrients in soil) yeasts and fungi are more effective as oil-destructors. As a result of mycelial growth, fungi penetrate between local nutrient sources, into soil-oil agglomerates and, due to their resistance to low moisture content and low pH, actively participate in the later stages of oil residue decomposition in the cleaned media.

8.15 The amount of biopreparation is determined based on the set cleaning time and level of contamination, and is 1 part of biopreparation per 100-10000 parts of oil hydrocarbons. Cleaning time increases when the dose of biopreparation and live cell titre decrease, contamination level increase, deviation of temperature, pH, humidity and other factors from the optimum values. Other things being equal, the largest amount of biopreparation is required for disposal of crude oil and fuel oil, the least ─ for disposal of liquid paraffin, light oil products. Before the application of the biopreparation, the soil is ploughed, ameliorants and structurizers are applied, and a starting dose of mineral fertilizer is applied. The mineral fertilizer solution is applied to the soil 2-3 days prior to treatment with the biopreparation.

8.16 At the end of the agro-reclamation work, a working suspension of the biopreparation is prepared. In preparations supplied as powders, the micro-organisms are dormant. In order to obtain active cells, they shall be gently brought out of their dormant state. When carrying out field treatment, a measured amount of biopreparation powder is diluted in water with added mineral salts (e.g. ammophoska or diammophoska) at a typical biopreparation to water ratio of 1:10 ─ 1:50 to convert the cells into an active state. The resulting basic suspension is stirred for 4-18 hours under air bubbling and a temperature of 20-30 ºC. The ─ suspension can be stored for a maximum of 5 days.

8.17 The prepared basic slurry of the activated biopreparation placed into the tank for working slurry preparation is diluted with technical water 100-1000 times (the dilution degree depends on the method of biopreparation application and technical means used); the estimated quantity of mineral fertilizers (50-200 kg of ammonium nitrate, ammophos or diammophos per 1 ha depending on the contamination level and biogenic elements content in soil) is added; the

contents is stirred repeatedly as contaminated objects are treated. Washing water is poured over the contaminated soil or water after using the working solution.

8.18 After preparatory measures the biopreparation is applied to the contaminated area at the rate of 6-10 l of suspension per 1 m3 of cleaned surface. Treatment of small areas with working slurry is conducted manually, and in case of significant surface contamination ─ with the help of sprinkler systems, irrigation and fire machines, pump (water cannon) to deliver the working solution to the surface [11].

8.19 Agricultural aviation can be used to treat vast contaminated areas. Biological treatment shall be conducted in the morning or evening hours or in cloudy weather. The biopreparation is buried in the ground because ambient temperatures above 40ºC and solar radiation inhibit the biopreparation's microorganisms [12].

8.20 The active biodegradation process takes 3-10 weeks, followed by a slow decline in oil hydrocarbons. In the initial stages the rate of biodegradation can be increased by repeated applications of the product (2-3 applications) at recommended or increased doses. Mineral fertilization by applying mineral fertilizer solution (50-200 kg of ammonium nitrate, ammophos or diammophos per 1 ha) to the soil is applied 3-4 weeks after the first application of the biopreparation. The rates of biopreparation and mineral fertilizers application are adjusted in the process of facilities cleaning, based on the results of control determinations of oil products, nitrogen and phosphorus content in the soil [13].

8.21 Biostimulation methods and the use of biopreparations can remove up to 90-98% of the oil contamination in the soil environment. The remaining hydrocarbons, tars, asphaltenes, bitumens and other high molecular weight compounds are resistant to biodegradation, but are inert and of little environmental concern.

8.22 Living organisms are also actively involved in self-purification of oil-contaminated environments. Bioremediation with the use of oil remediators is an efficient means of eliminating oil and oil products pollution of soil [14].

8.23 Bringing (purification) of natural environments to the level of maximum permissible concentrations of oil products is taken as the criteria for purification of natural environments. The maximum permissible level of oil products content in soils in the Republic of Kazakhstan is not established and is not fixed in regulatory documents. Due to the complex composition of oil products as biodegradable pollutants and extremely high diversity of bioclimatic, landscape-geochemical and other, not less important for splitting, new formation, migration and accumulation of oil products natural conditions, as it was mentioned above, in principle, it is impossible to accept a single level of maximum concentration for the Republic of Kazakhstan.

8.24 Determining maximum permissible concentrations of petroleum products in soils, unlike rationing of many inorganic pollutants, requires an ecological and geographical approach that takes into account the diversity of the natural potential of a given territory.

9 Contents of the land resources monitoring report

9.1 The Land Resources Monitoring Report shall be a scientific and technical document that contains systematic factual data describing the condition of land resources and changes occurring in them from the effects of the Company's activities.

9.2 The Land Resources Assessment Report shall be prepared at least annually by the authorised unit (s) of the Company in accordance with ISO 14001 on the basis of the actual data (Annex A-F)

9.3 The report shall contain:

1) a brief description of the land plot, cadastral number and date of entry of this cadastral number into the state cadastre, description of the location of the land plot borders, area of the land plot (land allotment).
2) the results of soil monitoring in the form of a report and its approval by an authorised representative of the Company. The report shall contain assessment of the monitoring results (types of measurements, place and date of measurements, analysis of the environmental situation, recommended measures).
3) baseline data, laboratory analysis of periodically taken samples and issuance of results. All laboratory analysis shall be performed by an accredited analytical laboratory, in accordance with the legislation of the Republic of Kazakhstan.
4) results of soil measurements documented in accordance with the requirements of the Ministry of Environmental Protection of the Republic of Kazakhstan.
5) soil analyses with maximum recommended retention period of samples according to GOST.
6) a certificate of approval of the type of measuring instruments, metrological certification, certificate of verification, verification methodology, passport and operating guidelines for all instruments, including the automated monitoring system, shall be provided.
7) additional report with analysis of soil samples taken in case of accidents at the facility with emission/discharge of pollutants into the environment during the monitored period.
8) baseline indicators of the quality of the land plot;
9) assessment of the impact of external factors and production processes of the Company on land resources (land plots);
10) general conclusions on the condition of the land plot;
11) recommendations for preservation and protection of the Company's land resources.

10 List of mandatory annexes to the land monitoring report

10.1 state act for the land plot;

10.2 the disturbed land reclamation draft with an environmental protection section to the disturbed land reclamation draft.

10.3 conclusions of sanitary-epidemiological and state ecological expertise;

10.4 results of soil measurements (protocols) executed in accordance with the requirements of the Ministry of Environmental Protection of the Republic of

Kazakhstan.

10.5 certificate of type approval of measuring instruments, metrological certification, certificate of verification, verification methods, passport and operating guidelines for all instruments, including the automated monitoring system.

10.6 Annex A, C, D, E, F, G;

Annex A
(mandatory)

Inspection report on disturbed land (to be disturbed) subject to reclamation dated "__" _

(Surname, first name, patronymic, job title) _____
_____
_____

conducted a survey of the land plot disturbed or to be disturbed _____
_____

(the name of the organisation developing the fields and carrying out the construction work).

The survey found that:
1. An area of disturbed land with an area of _____
(the location of the site, and the consistency of the actual use with the land acquisition documents)

2. Land adjacent to the area of disturbed land shall be used
_____
(indicates the actual use as well as possible future use of the land according to schemes, drafts and other materials)

3. Description of the disturbed land _____
(type of disturbance, area characteristics)

4. Advice from the land user or landowner _____
_____
(the land user or landowner's recommendations, with reasons and justifications)
_____

As a result of the land survey, it is recommended that the draft:
1. Areas of reclamation: _____
_____
(the type of land or other economic use of the land)
2. Types of work in the technical phase of reclamation: _____
3. Use potentially fertile rock and topsoil from the plots for reclamation:_____
4. The need for a biological phase of reclamation
_____
Use available topographic plans of disturbed land at the scale of

_____, as well as available soil survey materials at the scale of _____

Supplement the existing material with topographical surveys at a scale of _____,
soil-reclamation surveys on a scale of _____
other research _____
Annexes:

Characteristics of disturbed land (contour list);

Extract from the land use plan;

Scheme of the disturbed lands.

Signatures of representatives of the authorized body for land relations of the district (city) at the location of the land plot, the client and other specialists:

1. _____
2. _____
3. _____

Note: In specific circumstances, the content of the issues to be dealt with in the act may vary if necessary.

Annex B
(mandatory)

Terms of reference for the development of a reclamation draft for disturbed land

№	List	Indicators
1	2	3
1	Basis for the design (act of survey of disturbed (to be disturbed) land to be rehabilitated)	
2	developer of the draft	
3	design stage	
	technical stage	
	biological stage	
4	name of the object (site)	
5	site location (administrative district)	
6	characteristics of the recultivation object	
	total area, hectare	
	of which it is supposed to be used for (preliminary)	
	arable land	
	hayfields	
	pastures	
	perennial plantations	
	forest plantations, including forest strips	
	afforestation	
	Industrial and nonindustrial construction	
7	availability of stockpiled (or removable) fertile topsoil, thousand cubic metres	
8	availability of stockpiled (or peeled) potentially fertile soil layer, thousand cubic metres	
9	land area set aside for temporary dumps, hectares	
10	technical problems	
	the extent of salinity and secondary toxicity of the rocks	
	level of contamination	
	depth of penetration of contamination	
	the extent to which the site is waterlogged and the need for drainage	
	the extent of water and wind erosion and other geodynamic	

	processes	
	degree of stoned vegetation	
	degree of overgrowth with tree and shrub vegetation	
11	the types and extent of surveys to be conducted	
12	tentative dates for the start and end of work: the technical phase of recultivation, the biological phase of recultivation	
13	deadline for completion of the recultivation draft	
14	special conditions	

Annex C
(informational)

Maximum allowable concentrations (hereinafter MAC) of chemical substances in soil

№	Name of substance	MAC value μ/kg soil including background (clark)	Limit value
1	2	3	4
mobile form			
1	cobalt* (1)	5	universal
2	fluorine* (2)	2,8	translocation
3	chromium* (3)	6	general-sanitary
water-soluble form			
4	fluorine	10	translocation
5	benz(a)pyrene	0,02	universal
6	xylenes (ortho-, metha-, vapour)	0,3	translocation
7	arsenic	2	translocation
8	CFCS* (4)	3000	aquatic and general
9	mercury	2,1	translocation
10	lead	32	sanitary
11	lead + mercury	20,0 + 1,0	translocation
	elemental sulfur	160	universal
	hydrogen sulphide	0,4	air
12	sulphuric acid	160	general-sanitary
13	styrene	0,1	aerial
14	formaldehyde	7	-"-
15	potassium chloride	560	aquatic

Annex D
(informational)

Soil assessment for sanitary-chemical and radiological indicators

№	Degree of hazard	Degree of contamination	The frequency of exceeding the MAC of chemicals	Indicator of radioactive contamination
1	2	3	4	5
1	Safe	Clean	<1	Natural level
2	Hazardous	Highly contaminated	01-10	Natural level exceeded by a factor of 1.5
3	Extremely hazardous		10-25	Natural level exceeded by a factor of 2
4	Environmental disaster		>25	Natural level exceeded by a factor of 3

Annex E
(informational)

Soil assessment for microbiological and parasitological indicators

№	Degree of hazard	Degree of contamination	Microbiological and parasitological indicators					Self-cleaning index of soil thermophiles
			If the titer	Anaerobes titer (Cl.perfringers)	Number of helminth eggs 1 kg of soil	Number of fly larvae and pupae in an area of 0.25 m2	Khlebnikov's sanitary number	
1	2	3	4	5	6	7	8	9
1	Safe	Clean	>1,0	.>0,1	0	0	0,98-1,0	0,01-0,0002
2	Relatively safe	Lightly soiled	1,0-0,01	0,1-0,001	01.oct	up to 10	0,85-0,98	0,01-0,00002
3	Hazardous	Moderately soiled	0,01-0,001	0,001-0,0001	11-100	10-100	0,7-0,85	0,00002-0,00001
4	Extremely hazardous	Heavy soiled	<0,001	<0,0001	>100	>100	<0,7	0,00001

Annex F
(informational)

Physical degradation criteria and indicators of chemical and biological soil contamination

№	Indicators (concentrations in mg/dm3)	Parameters		Relatively satisfactory situation
		environmental disaster	environmental emergency	
1	2	3	4	5
Key indicators				
1	radioactive contamination, Cs/km2:			
	cesium-137	over 40	40-15	up to 15
	strontium-90	over 3	3-1	up to 1
	plutonium (sum of isotopes)	over 0,1	0,1-0,05	up to 0.05
2	exceeding of MACs of chemical substances:			
	Hazard Class 1 (including benz(a)pyrene, dioxins)	over 3	3-2	up to 2
	Hazard class 2	over 10	10-5	up to 5
	Hazard Class 3 (including oil and oil products)	more than 25	25-10	up to 10

Annex G
(*informational*)

Certificate of Acceptance of Disturbed Land after Reclamation

«____» _____ _____ .

Commission composed of:

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____
5. _____ _____
6. _____ _____
7. ….

Inspected plots of land with a total area of _____ha, submitted for temporary compensatory land use on the basis of

_____
_____
_____
_____
_____
_____
_____

(a document issued by an authorised state land use authority, a lease agreement, an easement agreement) for

_____
_____

The Commission has drawn up this act as follows:

1. The Temporary User (Owner) of the land plot has conducted land reclamation work on the land plots in order to return the land to the primary land users as part of the former agricultural land.
2. The following documents have been submitted to the Commission:
   - state certificates of temporary compensatory land use rights;
   - acts of completed land reclamation works;
   - draft reclamation of disturbed land with EIA section with positive sanitary and epidemiological and environmental conclusions.

№	Cadastral number	Area, ha

3. No deviations from the norms have been noted in the land reclamation process.

4. Opinion of the commission:

Reclamation work on temporarily occupied land for

_____

_____

_____,

performed in accordance with regulatory, legal norms and rules.

The Commission believes that the reclaimed land plots are suitable for further agricultural use as part of the former land.

The recultivated land plots for further use shall be transferred to the former land users.

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____
5. _____ _____
6. _____ _____
7. ….

Note: In specific circumstances, the content of the issues to be dealt with in the act may vary if necessary.

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