

## 1. Background and Goal of the present work

NAC Kazatomprom JSC (the Company), has a public status since 2018, thereby undertaking to organize production activities in accordance with the ESG principles of sustainable development and international standards for ensuring environmental and social sustainability of the International Finance Corporation (IFC) and the Global Reporting Initiative (GRI). In this regard, the Company initiated the Roadmap of the Environmental and Social Action Plan (ESAP), which, starting from 2019, is being implemented in the areas where the Company's Uranium mining enterprises (UME) are located. Within the framework of ESAP, comprehensive environmental studies are carried out to assess the impact of the production activities of the UME on environmental objects.

Adhering to the SDGs (United Nations) in the field of ecology, the recommendations of the UN Economic Commission for Europe and the IAEA, as well as based on the experience of implementing ESAP for the period (2019-2022), the Company identified the main principles and approaches in the implementation of environmental monitoring of the territories where the UME is located.

## 2. General principles for environmental research

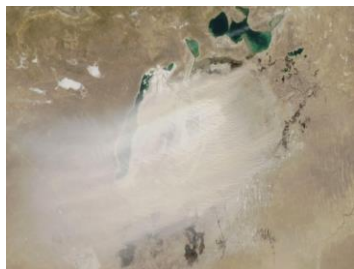
### 2.1 Territories for ecological research

According to the recommendations of international standards and the legislative requirements of the Republic of Kazakhstan, a comprehensive assessment of the impact of production activities should be carried out in the following territories:

- 1) **territory of influence** - the territory of subsoil use, where the enterprise carries out production activities (mining allotment);
- 2) **territory of possible impact** - the territory adjacent to the mining allotment (within a radius of 10 km from the boundaries of the mining allotment of the mine);
- 3) **background territories** - territories beyond the border of possible impact, more than 10 km from the boundaries of the mining allotment. In the background areas, reference areas are laid for studying the natural background in the study area;
- 4) **the nearest settlements** - are settlements located in the territory of possible impact.

### 2.2. Natural and climatic features and accounting for other anthropogenic activities in the study area

The UME are located in the territories affected by the Aral Sea problem, the largest environmental disaster on the planet. Part of the subsoil use areas are referred to the zone of ecological crisis. In addition, these territories are also under pressure from the economic activities of the local population. In this regard, when assessing the impact of UME on the environment, it is necessary to take into account the climatic conditions of the region, and as a result, it is necessary to separate the impact factors of the UME production activity from the general negative factors of the natural background and other anthropogenic activities.



Salty dust storms coming from the Aralkum desert



Economic activity of the local population

### 2.3. Objects and channels of technogenic impact

In order to develop measures to reduce the level of technogenic impact on environmental objects (EO), all types of emissions, including radioactive, arising in the course of the production activities of the UME, should be analyzed, on the basis of which factors, potential channels (paths) and markers of impact on EO are determined: atmospheric air, surface and ground water, soil, biodiversity.

## 3. Conclusions

➤ In order to transfer the management of environmental protection, health and industrial safety issues in accordance with the requirements of international standards and IAEA recommendations, environmental studies should be carried out throughout the entire life cycle, which will make it possible to organize the activities of socially responsible enterprises in accordance with a risk-based approach, which will reduce impact on the environment in the course of production activities and form a plan for eliminating the consequences of subsoil use in such a way that, upon completion of production activities, the territories will correspond to the possibility of conducting other economic activities agreed with local authorities and all stakeholders.



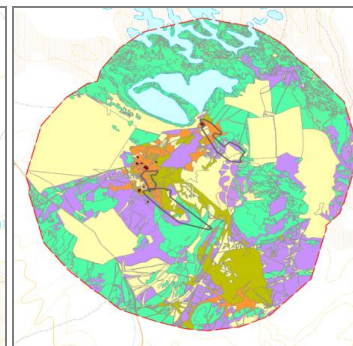
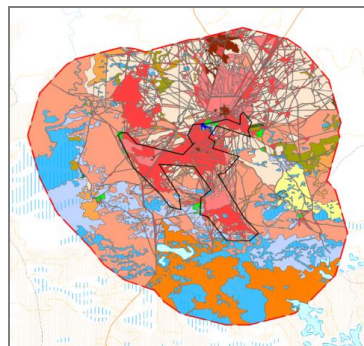
Research of natural water bodies and soils



Research of rare species of flora and

### 2.4. Visualization of results

For the convenience of processing and managing large volumes of environmental research data, a geographic information system (GIS) should be created that will allow: to visualize information for the convenience of decision-making; organize and store large amounts of data, create reports on research and visual presentations for stakeholders. The information on the state of environment constantly accumulated in the GIS database for different years of research will make it possible to understand the dynamics of changes in the state of environment, assess the degree and predict the impact of production activities on the environment. Earth remote sensing data should be used as an actual source of data.



Examples of cartograms of the state of the soil and vegetation cover

### 2.5. Normative base

Environmental studies, including sampling of environmental objects, laboratory analysis of samples, assessment of pollution of environmental objects are regulated by regulatory documents in the field of environmental protection approved in the Republic of Kazakhstan. Within of the ESAP, taking into account the recommendations of international standards (IFC, GRI), developed internal corporate standards for organizing monitoring of the impact of underground well leaching of uranium on ground and groundwater (ST NAC 17.4-2021), assessing the state of biodiversity in uranium deposits (ST NAC 17.6-2022).