REPORT

Mirny (Kazakhstan) 1GW Wind Farm Project

ESIA Report Chapter 11 - Unplanned Events

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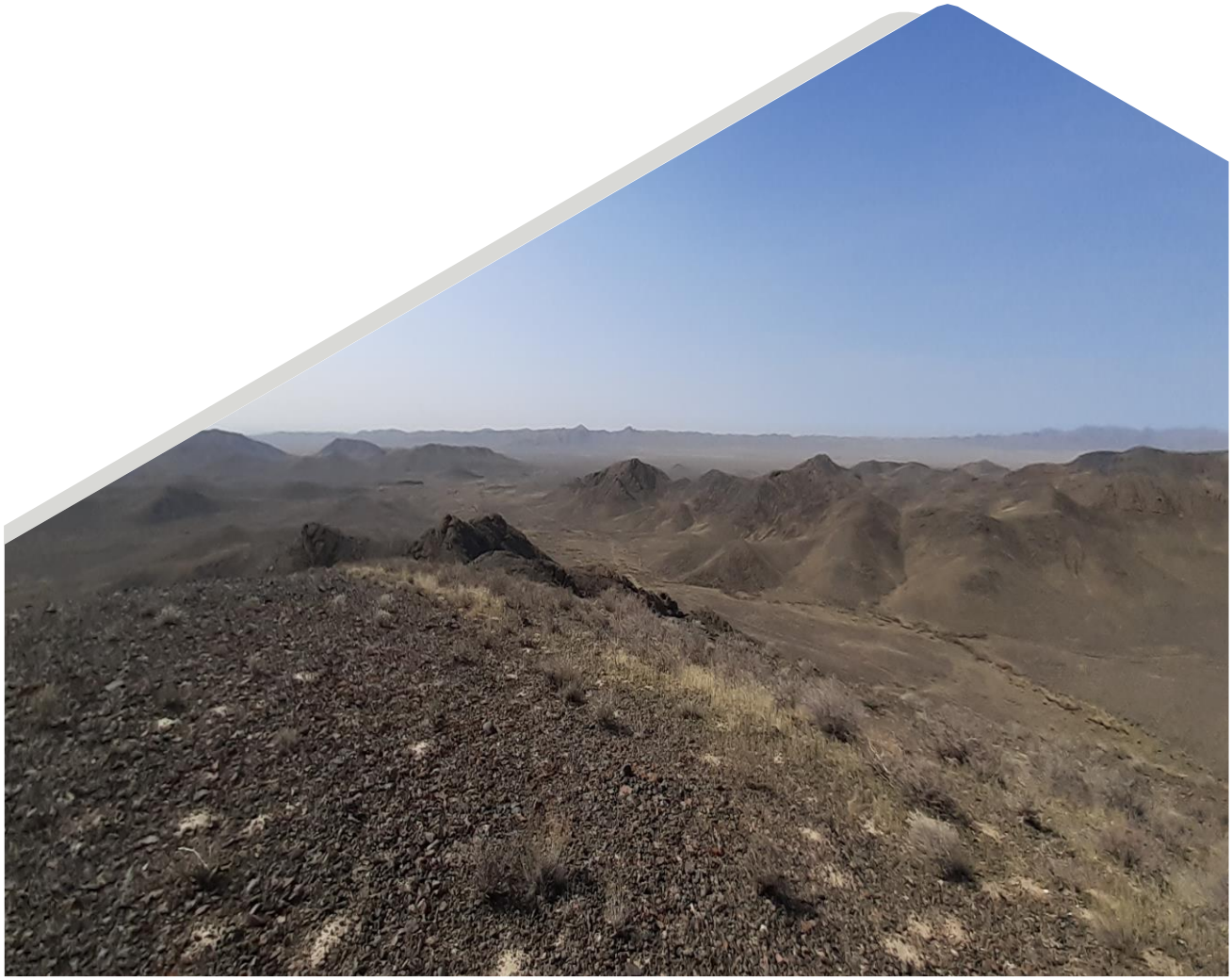

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11.0 UNPLANNED EVENTS

11.1 Unplanned Events

This section describes the unplanned events that may occur during the construction and operations of the Project and the effects they may generate.

Unplanned events are not expected to occur during the Project's normal construction and operational phase activities but are considered possible, although unlikely; therefore, their consequences, impacts and effects need to be identified and managed.

The Project is being designed based on the principle of preventing unplanned events to occur and will take into consideration lessons learnt from other projects. The Client will develop adequate engineering design solutions and operational procedures to avoid and minimise the level of risk and magnitude of impacts in case of the unlikely occurrence of unplanned events.

This section provides an overview of the potential consequences related to a number of scenarios and non-routine operations during construction and operation, including those due to natural hazards and identify measures to be taken for their avoidance and, if this will not be possible, to mitigate the risks they may pose and their impacts.

11.2 Construction Phase

Based on WSP's initial screening of available Project information, unplanned events that may occur in the construction phase are:

- Worksite Accidents.
- Traffic accidents.
- Spills and leaks of fuel, oils or other hazardous materials.
- Fires and explosions.
- Damage to third-party assets.
- Spread of infectious diseases.
- Security-related risks such as thefts.
- Natural Hazards.

These events represent a potential risk during construction although they may occur also during Project's operations. The likelihood of these events is considered to be low or very low; an exact determination of the likelihood of each unplanned event considered in the assessment is not deemed relevant, as response measures are defined to provide a full response to these events regardless of their likelihood.

Some unplanned events have been scoped out from the assessment, specifically:

- **Earthquakes**: Seismicity of the Jambyl Region and likelihood and intensity of earthquakes has been presented in Baseline Chapter 4. Earthquakes have been scoped out as the design of turbines and other Project facilities that may be possibly affected has taken into consideration the local seismicity and, in the very unlikely event of an earthquake, this will have intensity and consequences that do not to pose any risks to the Project overall; as a consequence, there are no risks for workers during construction. Similarly there will be no risks during Project operations, as structures will be able to withstand earthquakes and, anyway, the absence of communities or other receptors in the vicinity of turbines and other Project facilities avoids any adverse effects on human receptors to occur; individual herders will not be affected as well, as they will

be instructed to keep a distance from turbines and other facilities as a mitigation to effects of other impact factors such as noise.

- **Electrocution** on birds and bats due to the OHTL: The OHTL is designed to maintain a minimum distance of 1.5m between energized elements (such as cables) and grounded elements (such as pilons) in line with WBG EHS Guidelines on electric lines. As a consequence there is no potential for electrocution on birds and bats.
- **Collision with planes**: There are no international, national or regional airports in the vicinity of the turbines, the only Project elements that due to their height may theoretically pose a risk to aviation. In case any plane will fly over the site, this will occur at a significant height, so there is no potential for any collision or accidents.

11.2.1 Worksite accidents

Construction workers can face a variety of risks, especially when safety protocols aren't followed. Many of the risks can lead to serious injuries and even fatalities. The most common construction work-related injuries may be due to fall from height, manual handling of materials, falling objects, improper lifting operations, improper handling of energized tools causing electrocution and electrical shock, loads overturning, excavation walls and trenches collapse, inhalation of chemicals' fumes, gases and dust, poor housekeeping and more..

To prevent and minimize the potential risks which they are exposed to, the workers undergo proper training, have access to and use appropriate collective and personal protective equipment and follow safety regulations and best practices. Moreover, general and task-specific Job hazard analysis and risk assessments will be implemented to identify potential hazards, evaluate the risks and implement control measures. Effective site management and supervision will also play a key role in preventing accidents. These measures will be included in an Occupational Health and Safety Plan that will significantly reduce the occurrence of these events and mitigate their consequences, however a certain degree of likelihood remains. The Emergency Preparedness and response plan will include a description of measures for responding to worksite accidents involving workers, including on-site and off-site assistance (through site medical clinic with qualified doctors and nurses served by an ambulance) and site evacuation procedures.

11.2.2 Traffic accidents

Accidents involving vehicles are among the most frequent causes of injury, often fatal, during the projects' construction phase.

The consequences of traffic accidents may affect both Project's workers when occurring at the construction site (also including drivers drivers) or offsite (drivers and commuters), and communities living along the roads used by vehicles to access the Project site. The following are considered the possible effects of road accidents during construction:

- Injury or mortality of communities' members
- Injury or mortality of Project workers.
- Injury or mortality of livestock and impact on livelihoods.
- Damage to structure and assets at the Project site.
- Damage to structure and assets along transport routes and in community centres.
- Environmental damage such as contamination of soil, of water or of other environmental components in case of lack of maintenance of moving vehicles or of accidents with release of hazardous products.

The main causes of traffic accidents are:

- Drivers fatigue.
- Drivers behaviours and behaviours of other road users.
- Inappropriate level of driving experience for the type of vehicles.
- Roads conditions.
- Weather conditions.
- Poor vehicle maintenance.
- Traffic conditions.

When the Project design will be finalized it will be possible to determine the likely locations and traffic accident scenarios; for the time being, these may be broadly identified as follows:

- Delivery of equipment and machinery, construction materials and products and wind power plant components (e.g., turbines) imported distributed to the Project's site using public roads (onsite and offsite);
- Site workers commuting to their workplace using public roads (offsite); and
- Additional services requiring the use of vehicles such as occasional maintenance and control operations on machinery and equipment, cleaning services, waste.

Road safety will be a key concern of the Company that will be committed to adopt and implement the highest standards in terms of road safety. The Impact Assessment section includes an assessment of impacts associated to traffic and identify relevant mitigations during normal operations. These potential impacts will be managed through a Traffic Management Plan which will be included in the set of ESMPs package for the Project. The plan will include measures on vehicle speed, restrictions to the routes used, training requirements for drivers including rules for the avoidance of drugs and alcohol and any other substance that may limit the ability to safe driving. The plan will include measures and safety initiatives to be shared with the local communities as part of the stakeholder engagement process to inform on traffic risks and safety aspects. The plan will also provide for specific studies to identify specific traffic risks due to local road conditions and interference with other road users. The findings will be used to develop additional site-specific mitigations prior to the commencement of construction.

In case these measures will not be sufficient to prevent traffic accidents, these will be managed through the EPRP, that will include specific measures to prepare and respond to their consequences.

11.2.3 Spills and leaks of fuel, oils or other hazardous materials

The Project's construction phase will require the use of mobile equipment, power generation equipment and numerous vehicles. Hazardous products such as oil, lubricants and fuels will be necessary. The exact Project's needs in terms of construction vehicles will be defined during the detailed design and a full inventory of products has yet to be defined. Minor spills and leaks may occur during vehicles refuelling, equipment and machinery maintenance and control, products transportation and other construction activities. Potential larger spills may occur in case of liquids-containing tanks and containers breakage, human errors or roads accidents during products transfer activities. Impacts of spills on the environment have been described in the Project ESIA.

Spills are considered unlikely as a consequence of the mitigation and preventive measures included in the ESMP, that in summary consist of:

- Installation of paved and roofed hazardous products storages, provided with waterproofed flooring or secondary containment systems.

- Use of specific fuel transportation and distribution vehicles.
- Provision of automatic shut-off systems to all pumps.
- Provision of tanks equipped with overfill protection devices or double chambers.
- Avoidance of using underground storage systems.
- Provision of emergency spill kits to all areas where hazardous products are handled.

Specific mitigations will be included in the Hazardous Material Management Plan that will specify storage requirements for hazardous materials, define refuelling procedures, and actions to be taken in the event of accidental release of dangerous products. In the unlikely occurrence of spills, suitable emergency response procedures will be included in the EPRP.

11.2.4 Fires and explosions

There are multiple possible causes of fire at the Project construction site:

- Accidental ignition of dry vegetation or flammable materials during specific activities and operations involving hot works (e.g., welding, grinding and cutting).
- Inappropriate human behaviour (e.g., smoking cigarettes or abusive actions).
- Poor management of the compressed gases cylinders and containers.
- Failure of electrical equipment and circuits.
- Lightning strikes.

Despite the risks of severe fires is considered limited, fires can spread across the construction site and cause impacts on workers and assets and on the environment.

The Project will be developed in a greenfield area where grassland is predominant with tree cover and vegetation that could be affected by fire. Fires can also impact local communities and their livelihood such as properties and local infrastructure, although these effects are considered unlikely due to the Project distance from the nearest communities.

Fire risk associated with Project activities will be minimised through the definition and enforcement of strict control measures, including the adoption of a “permit to work” system for hot works, described in the OHS Management Plan. Fire extinguishers and other fire protection systems will be disseminated across the different working areas and workers will be trained on first emergency. Smoking will be strictly controlled by providing designated smoking areas to be used. Other ignition sources (such as welding and cutting systems) will only be used by specifically trained personnel under controlled conditions. Electrical equipment will be periodically checked to prevent issues.

In general, for the construction activities foreseen and the nature of site, fires occurring during construction are considered to be unlikely, and their impacts on the environment and communities very limited due to the distance of the Project from the nearest community receptors, while workers may be more affected due to their proximity to potential ignition sources.

The EPRP will include a section defining fire response measures, procedures and roles and responsibilities for their implementation.

11.2.5 Damage to third-party assets

During the construction phase, the materials and equipment transportation and the use of mobile construction machinery, such as excavators, dozers, and construction vehicles, may cause damage to third-party property.

Even though machinery and equipment will mostly operate within the boundaries of the Project site, there will be a lot of material delivered by road. Also, the construction of linear infrastructure such as roads and OHTL will extend the working areas for tens of kilometres.

Third-party assets that may be adversely impacted by construction activities will be identified through pre-construction surveys included in the Traffic Management Plan to be prepared as part of the ESMP package and delineated through temporary fencing, to prevent accidental collisions or interactions. When heavy equipment and machinery will be transported to the site (e.g., construction vehicles and power plant components) and will cross communities or public roads outside the Project fence, pre-construction surveys will identify potential risks and measures to be further implemented through the Traffic Management Plan. Example of mitigations include the use of convoys or escort vehicles, awareness campaigns at the communities interested, proper schedule of construction activities to limit disturbance of third-party assets.

With appropriate control measures and monitoring in place, the likelihood of damages to third party assets is considered very low. Relevant specific response measures to emergency situations due damage to third party assets will be included in the EPRP.

11.2.6 Spread of infectious diseases

Construction sites can be breeding grounds for infectious diseases, if not properly managed.

The most common infectious diseases potentially spreading at construction sites are respiratory infections, gastrointestinal infections (e.g., norovirus and food poisoning quickly spread through contaminated food, water, or surfaces), skin infections and vector-borne diseases (e.g., tick-borne pathogens).

Measures shall be adopted and included in the OHS Management Plan to prevent disease spread, such as avoid close contacts, periodically sanitize tools and equipment, adequate handwash and undergo regular health screenings.

The EPRP will describe measures to be adopted for responding to emergency resulting from diseases affecting individuals or groups of workers.

11.2.7 Security-related risks

The Project construction site can be vulnerable to security-related risks such as theft, vandalism, and unauthorized access.

Thieves may target heavy machinery, construction materials (especially copper wiring and steel), tools and equipment while vandals can cause significant delays due to damages to machinery, equipment and property. Moreover, unauthorized access may generate risks not only to the security of the site but also to the safety of individuals. Unauthorized people accessing the Project site may cause accidents, steal information or disrupt work. Nevertheless, such security risks are considered extremely unlikely, given the distance from the nearest community or from other locations where threats to the Project security can originate from.

Preventive measures such as proper fencing, surveillance, and security personnel can help mitigate such risks and will be described in the Community Health and Safety Management Plan. The EPRP will include a section describing procedures to respond to emergency scenarios that may originate from security risks.

11.2.8 Natural hazards

During the winter season (from December to February), the Project area is impacted by severe snowstorms and blizzards, with strong winds frequently generating deep snowdrifts. These adverse weather conditions may cause the shutdown of the construction activities.

From March to May, during spring snowmelt, meltwater collects at the Project area, flowing down from the mountain creeks via streams into the lowland areas both to the west and east. The topography of the site makes the risk of flooding unlikely, however, in lowland areas, such as the Sarysu and Shu districts, nearby the southern OHTL corridor, intense rainfall and snow melting can lead to flooding, which can lead to a general instability of the soil and affect the construction activities and structure stability. Other natural hazards such as earthquakes, have been scoped out.

These issues will be addressed by careful construction planning and execution, and design in consideration of the season and the site-specific meteorological forecasts and conditions.

The detailed assessment related to the risks generated by natural hazards has been considered in the Climate Change Risk Assessment (CCRA), under Chapter 09 of this ESIA report, which includes a list of mitigation measures for each hazard identified. The EPRP will describe procedures that will be adopted at the Project site to prepare and respond to the effects of natural hazards along the OHTL and at the wind farm site.

11.3 Operation Phase

While most unplanned events identified and discussed for the construction phase are also applicable to the operation phase, some of them are specific to Project operations and are discussed in this section.

The EPRP will list and refer to applicable international safety procedures mandatory for the wind sector that will be developed by the Client as part of the requirement to comply with national and international standards and regulations. The following include a list of unplanned events that will have to be considered in the EPRP:

- Blade throw, and turbine collapse.
- Fires and explosions.
- Spillage of fuel, oils or other hazardous materials.
- Cyberattacks.
- Natural hazards.
- Transmission line snapping, and transmission tower/pylon collapse.

11.3.1 Blade throw, and turbine collapse

A failure of the rotor blade could result in the “throwing” of a rotor blade, which might affect workers and public safety. Moreover, a WTG can collapse in case the foundations are improperly built.

These kinds of accidents are extremely unlikely, as well as their consequences given the scarcity of receptors such as operation workers and herders. These accidents will be prevented by ensuring the compliance with the design requirements and with planned maintenance and control operations on machinery and equipment and by properly conducting, as necessary, exceptional maintenance.

The EPRP will include detailed measures to prepare and respond to the effects of such unplanned events.

11.3.2 Fires and explosions

WTGs are made of flammable materials. Damaging the WTGs and their auxiliary components may result in fires and explosions.

Moreover, fires and explosions might be generated by lightning strikes on transmission lines, electrical arcs or flashovers and malfunctioning tools and equipment.

Also, fires and explosions may occur at operating BESS. Bess fires can be caused by temperature, cell defects, damage during installation, operational issues and lack of maintenance. Battery fire and/or explosion may be caused by thermal runaway, or the rapid uncontrolled release of energy from a battery cell. Thermal runaway can be caused by an internal short circuit, which can be caused by mechanical, thermal or electrical damage to the battery before, during or after installation. For this reason, thermal runaways require a significant amount of water to cool and control. Potentially hazardous chemicals released during the fire can pollute the environment, while hazardous fumes can pose at risk to the first responders.

In general, the likelihood of fires occurring during operation phase is expected to be very low and, in case of occurrence, impacts on the environment and communities will be very limited due to the distance of the Project from the nearest community receptors. The EPRP will include a section defining fire response measures, procedures and roles and responsibilities for their implementation.

11.3.3 Spills and leaks of fuel, oils or other hazardous materials

During the maintenance and control services on site, lubricants and fuels will be used. The use of such products may result in spills that would in any case be limited in volume. Also, WTGs and transformers contain lubricants as these are essential for allowing efficient rotation and operations of turbine components, for enhancing insulation in transformers, ensure efficiency and minimize maintenance.

Over time, WTGs and transformers can undergo damage such as cracking, pitting, and seal breakages. Such damages may lead to oil leaks. Industry good practice to prevent spills and leaks or minimise their consequences will be incorporated into the design, specifically:

- Installation of paved and roofed hazardous products storages, provided with waterproofed flooring or secondary containment systems.
- Use of specific fuel transportation and distribution vehicles.
- Provision of automatic shut off systems to all pumps.
- Provision of tanks equipped with overfill protection devices or double chambers.
- Avoidance of using underground storage systems.
- Provision of emergency spill kits to all areas where hazardous products are handled.

Specific mitigations will be included in the operational Hazardous Material Management Plan that will specify storage requirements for hazardous materials, define refuelling procedures, and actions to be taken in the event of accidental release of dangerous products. The operation EPRP will describe potential scenarios and relevant emergency procedures to respond to spills and reduce their effects on the environment.

11.3.4 Cyberattacks

The geographic distribution of the WTGs, connected to centralized control centers, exposes the Project to cybersecurity breaches.

In case the WPP will be targeted, the national grid could be significantly compromised, impacting various villages. This makes the WPP an attractive target for cyberattacks.

Cyberattacks can render the system unusable. Potential effects range from operators being unable to monitor and control WPP operations, to the system shutting down completely, which would cut off the Project from the electricity grid. Sudden changes to the WTGs operation can also damage hardware, adding to unexpected

maintenance needs and delaying how quickly they can get back online. Such risks are mitigated through cybersafety preventive measures embedded in the design. In case these will reveal insufficient to prevent cyberattacks, the operation EPRP will include measures to respond to cyberattacks.

11.3.5 Natural hazards

During the winter season (from December to February), the Project area is impacted by severe snowstorms and blizzards, with strong winds frequently generating deep snowdrifts. These conditions may lead to infrastructures damage. Moreover, strong winds often blow on the Project area, which can cause significant risks to infrastructures.

From March to May, during spring snowmelt, meltwater collects at the Project area, flowing down from the mountain creeks via streams into the lowland areas both to the west and east. The topography of the site rends the risk of flooding unlikely, however, in lowland areas, such as the Sarysu and Shu districts, nearby the southern OHTL track, intense rainfall and snow melting can lead to flooding, which can lead to a general instability of the soil and affect the stability of the infrastructure.

Some measures adopted to prevent the effects of natural hazards during the operation phase are included in the CCRA, while suitable emergency response measures will be included in the EPRP for operations.

11.3.6 Transmission line snapping, and transmission tower/pylon collapse

Lines or transmission towers/parts may snap/sway because of the tower failing. This may result in major injuries and/or fatalities. Additionally, any intentional or unintentional contact with the exposed snapped transmission line can result in electrocution.

This may be due to various issues such as poor foundation quality, improper parts welding, tower parts damage and materials corrosion. Also, it may be due improper maintenance and control measures implementation (e.g., keeping the base plate in good condition, ensuring the lack of corrosion between the base plate and foundation, strictly following up the manuals and guidelines provided by the equipment manufacturer).

These events are considered extremely unlikely, as the Project has been designed and construction materials specification defined to reduce the likelihood of structure collapse to a minimum, as well that of electrocution, that is considered likely only for humans in case anyone will intentionally access energized elements that are in all cases made uneasily accessible and insulated. Also, herders will be engaged to inform them on Project safety aspects.

The Operational EPRP will in any case include measures for responding to the effects of structural failures and electrocution on workers and, to a more limited (and unlikely) extend on community individuals.

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