Non-technical resume
Of investment projects on environment impact assessment of "PAVLODARENERGO" JSC

"SEVKAZENERGO" JSC has long-term investment program, directed towards the modernization of power complex, the aim of which is the increase of park resource of equipment, increase of available and installed capacities of electric and heat power, and decrease of emissions of polluting substances into environment, as well as power saving. Implementation of the investment program on power sources is executed by the mean of annual signing of bilateral agreement on investment liabilities with the Ministry of industry and new technologies of the Republic of Kazakhstan in order set by the legislation. The Company undertakes the investment liabilities with the purpose of technological park modernization, within the frames of Regulation of the Government of the Republic of Kazakhstan "On approval of cap rates" # 392 dated 25.03.09.

I. Acting practice on EIA investment projects

Environment policy of "SEVKAZENERGO" JSC identifies the principles, aims, objectives and main directions of the Company's activity in the field of environment protection and providing environmental safety. Basic liabilities of the management policy of "PAVLODARENERGO" JSC on the issues of decrease of negative impact of the enterprise to the environment are the following: execution of corresponding legislative and regulatory requirements related to the ecological aspects, improvement of technological power generation processes, as well as openness and availability of information for all interested parties.

Within the process of technical projects development, implementation of which may directly affect the environment and health of the citizens, the Company mandatorily develops section "Environment Impact Assessment" (EIA). Within the frames of conducted EIAs of the project decisions in compliance with "Instruction for conducting EIA of the projected economic or other activity within development of preplanned, pre-project and project documentation" (Astana, the Ministry of Environmental Protection of the Republic of Kazakhstan, 2007), the Company conducts impact assessment on atmosphere air, surface and subterranean waters, soil and subsoil, plant and animal life, physical impact on environment as well as mandatorily on socio-economic sphere. After project development, with the purpose of compliance with the requirements of Art.57 of Environmental Code of the Republic of Kazakhstan in the field of compliance with the transparency principle of state environmental expertise and public access to decision making, the Company with the help of mass media informs about conducting public consultations. For obtaining open and true information on forthcoming works and impact, which the enterprise may occur to the environment, the consultations are conducted with participation of all interested parties: representatives of local authorities (Akimat), authorized bodies in the field of environment protection, mass media, interested public, population. The results of actions are minuted, placed in mass media, and further the projects are submitted for state environmental expertise.

According to the approved additional investment program for reconstruction and technical reequipping for long-term period of 2010-2015 "PAVLODARENERGO" JSC developed "Environment Impact Assessment" (EIA) and obtained conclusions of the state environmental expertise for the following investment projects:

- Conclusion of the state environmental expertise # 16-0849/13 dated 18.11.2013 for the project "Ekibastuz CHP. Reconstruction of boiler BKZ-75-39ф St. # 6 with increase of productivity to 90 t/h for "PAVLODARENERGO" JSC;

- Conclusion of the state environmental expertise # KZ12VCY00002196 dated 23.12.2013 for the project "Reconstruction of ash collector facility of boiler BKZ-160-100 (M) St. # 1 of CHP-2 with installation of battery emulsifiers of the II generation";
- Conclusion of the state environmental expertise # 12/1-15/ЮЛ-П-320 dated 04.06.2013 for the project "Industrial development of clay materials at sites of Kuat and Zhili su, located in the North industrial area of Pavlodar city for the needs of "PAVLODARENERGO" JSC.

For implemented investment projects:

- Conclusion of the state environmental expertise # 16-0849/13 dated 18.11.2013 for the project "Reconstruction of boiler St. # 6 (to 90 t/h) of ECHP";
- Project "Reconstruction of boiler unit BKZ-420-140 St.4 of CHP-3" (conclusion of the Environment Department for capital repair is not necessary);
- Conclusion of the state environmental expertise # 3-2-12/3332 dated 26.11.2012 for the project "Reconstruction of ash collector facility of boiler BKZ-160-100Ф (M) St. # 1 of Pavlodar CHP-2 of "PAVLODARENEGO" JSC with installation of battery emulsifier of the II generation";

The following investment projects are at the phase of implementation:

- Project "Reconstruction of ash-pump house # 1, 2 at CHP-3 of "PAVLODARENERGO" JSC" (submitted to the Environment Department for obtaining conclusion of the state environmental expertise);
- Project "Reconstruction of boiler unit BKZ-420-140 St. # 3 of CHP-3 of "PAVLODARENERGO" JSC" (at the phase of submitting to the Environment Department).

II. Description of implemented investment projects and projects transferred to the next period

The aim of the project "Remediation of the 1st stage of ash dump of CHP-3" is prevention of dusting of the surface of cumuli ash and slag of worked-out section; it is foreseen to execute technical remediation, which includes setting matting from clay sand. The project implies the complex of actions for decrease of environmental impact caused by remediation works of ash dump of CHP-3: usage of developed land resources, watering of the territory and roads, canvas covering of the body of dump-trucks during the transportation of bulky and dusty materials. For this project the Company obtained expertise conclusion of "GN Energy" LLP # 09/14 dated 07.03.2014, on the fact that this project complies with imposed requirements of industrial safety and acting regulatory technical documentation at the territory of the Republic of Kazakhstan.

Implementation of the project "Construction of cooling tower St. 5 of CHP-3" (irrigated area 1600m^2) will provide an opportunity for decrease of impact on atmosphere air of the region of CHP-3 location, firstly by the mean of decrease of volume of drop entrainment (does not exceed 0,005% from the expenses of water on cooling tower), and secondly by using polymer materials, recommended for installation at cooling towers. Existing water catchers, used at the cooling tower decrease droplet entrainment almost for 100%. Usage of polymer materials in water distribution system and irrigators, which are tolerant to the temperature of 60 C, having high resistibility to alkali, acids, fats, lubricants, UV radiation will provide an opportunity for reduction of impact on atmosphere air of the region of CHP-3 location. For reduction of noise level during the process of cooling tower operation, the Company intends

to install the gills (for reduction of air seepage during winter), which reduce the level of sound by 2-3 dBA. Usage of polymer irrigators will alleviate framings of exoskeleton for irrigator taking into account the weight of polymer irrigators. The technical decisions made within the working project comply with the best available technologies, existing in the European and Kazakhstani practice.

The Company completed implementation of investment project "Reconstruction of boiler unit BKZ-420-140 St. # 4 of CHP-3 with the purpose of efficiency increase and wear resistance increase of air heater". Reconstruction of air heaters with replacement of boilers provided an opportunity for improvement of fuel combustion, and thereby for decrease of chemical and mechanical unburned carbon, which helps to reduce the emissions of ash dust and unburned fuel into the environment, and cools combustion gases for providing sanitary norms and environmental requirements.

As the result of replacement of oil-switches with SF6 circuit breakers within the implementation of projects "Reconstruction of closed switchgear (ZRU-35 kV)" and "Reconstruction of outdoor switchgear (ORU-110 kV)" there is a decreased possibility of ORU site soil and subsoil waters' pollution by oil products. The level of electromagnetic impact at the border of sanitary-protective zone of CHP-3 after the reconstruction of ZRU-35 kV will not exceed the maximum permissible level – 1kV/m.

In 2013 the Company continued implementation of investment action on reconstruction of boiler unit BKZ-420-140 St. # 3 of CHP-3 with the purpose of reduction of NOx emissions, and efficiency increase, as well as increase of stability with installation of Automatized management system of technological processes. Together with products of fuel combustion there are various hazardous substances emitted into the environment, including NOx. Due to the reconstruction of combustor plants of the boiler, the emissions of NOx into the environment will be minimized.

The Company started implementation of project on reconstruction of ash-pump houses at CHP-3, which is related to the perspective expansion of the plant and its reconstruction with the purpose of increase of stability of operation of the CHP. Within the frames of the project implementation, 8 pumps will be assembled.
The aim of the project implementation:
- increase of installed productivity of ash pumps;
- increase of stability of operation of boiler equipment of CHP-3.

The working project provides for the range of actions on safety of atmosphere air, noise protection, and prevention of impact on subsoil and surface waters during the reconstruction. Timely reconstruction will provide an opportunity for improvement of operation of dust extraction plants, which thereby will reduce the emissions into the environment.

The Company implemented project "Reconstruction of dust extraction plant with installation of battery emulsifier of boiler St. # 1". Existing system of combustion gases cleaning – gas scrubber with pipes Ventury, had efficiency coefficient of ash collecting 97%. Battery emulsifiers to be installed have efficiency coefficient of ash collecting 99,5% and 15% efficiency coefficient of sulfur collecting, which will reduce emissions of ash and Sox into the environment.

The Company completed reconstruction of boiler unit St. # 6 (to 90 t/h) of Ekibastuz CHP, which implied gas-proof furnace. The Company has top blast for fuel combustion and under blast for burnout of NOx, which reduces the emissions of NOx into the environment, and

executed reconstruction of dust extraction plant with installation of battery emulsifiers of the II generation. system of combustion gases cleaning, which existed prior to the reconstruction – scrubber with pipes Ventury, had efficiency coefficient of ash collecting 97%. Battery emulsifiers to be installed have efficiency coefficient of ash collecting 99,5% and 15% efficiency coefficient of sulfur collecting, which will reduce emissions of ash and Sox into the environment.

III. Environment Impact Assessment

Implementation of the projects has significant socio-economic importance, defined by scale and contribution of electric and heat power generation in Pavlodar generation system. The technical decisions made within the replacement of dust extraction plants at boiler units of CHP-2, CHP-3 and ECHP of "PAVLODARENERGO" JSC and within the exploitation of deposits of clay materials (materials for construction of new ash dumps of CHP-2 and CHP-3) at the sites "Kuat" and "Zhili su" provide an opportunity to make the following conclusions.

1. Atmosphere air

At installed dust extraction plants the Company applied modern technology of ash collecting, based on the usage of battery emulsifiers of the II generation, which let to reach the level of ash collecting to 99,5% and which approved its sufficiency at the range of thermal stations of Russia and Kazakhstan.

Other benefits of the battery emulsifiers of the II generation are the following:
- possible collecting of Sox without appending special reagents;
- stability, reached due to the usage of titanium alloys for internal nodes;
- reliable facility of circular demisters, providing an opportunity to fully exclude drop entrainment at various loads;
- simplicity of operation (installation does not require a permanent control and special operations);
- absence of special blast nozzles, requiring configuration and regulation;
- low requirements to the content of solid impurities in irrigating water (satisfactory work at lightened water from ash dump).

Gross emissions of non-organic dust into the environment, containing 20-70% of SiO2 – dust of ash of Kazakhstani coal from boilers after replacement of dust extraction plants are reduced to 82%. Reduction of gross emissions of non-organic dust into the environment provides for the maximum ground level concentration at the border of sanitary-protective zone at the level of standard concentration, which is indicative for the efficiency of replacement of dust extraction plants. Testing for efficiency of installed emulsifiers of the II generation demonstrate that efficiency coefficient of dust extraction plants composes 99,40-99,61%. Directly dust extraction plants do not have impact on atmosphere air.

Exploitation of the sites "Kuat" and "Zhili su" is accompanied by the emissions of polluting substances into the atmosphere air from stripping and mining works.
Analysis of the results of accountings of dissipation demonstrated that maximum ground level concentrations, produced by the emissions from the sites "Kuat" and "Zhili su" at the border of sanitary-protective zone, do not exceed maximum permissible concentration for any of polluting emissions.

2. Surface and subterranean waters

Due to the saving of volume of water consumption for irrigation and absence of additional engineer decisions on water supply and water disposal, special actions on safety of surface and subsoil waters within the replacement of dust extraction plants of boilers of CHP-2, CHP-3 and ECHP of "PAVLODARENERGO" JSC were not provided.

At installed dust extraction plants safety of surface and subsoil waters is provided by earlier measures:

- usage of lightened water from ash dump as irrigating water;
- proper operation of water-carrying utility networks;
- storing of ash pulp in equipped ash dump.

Thereby, replacement of dust extraction plants and their further operation do not have a significant impact on surface and subsoil waters. Prevention of pollution of surface waters and surface discharge during execution of mining works at the sites "Kuat" and "Zhili su" is executed in compliance with the following measures:

- organization of waste disposal in areas which comply with the sanitary standards and rules, its timely disposal for authorized allocation and utilization;
- fueling of transport and mechanisms by oil and lubricants applying the measures to exclude leakage of oil products.

For monitoring of subsoil waters the Company provided the following actions: creation of performance network of observation wells, execution of supervision of subsoil waters condition.

3. Soils

Land sites, occupied for dust extraction plants, are located at earlier utilized production sites of CHP-2, CHP-3 and ECHP of "PAVLODARENERGO" JSC.
Within the operation of reconstructed dust extraction plants, coal ash is collected, and it acts like production and consumption wastes, which are transferred to the ash dumps. There are no any other additional wastes of production and consumption, related to the work and operation of dust extraction plants of boilers.
Thereby, replacement of dust extraction plants and its further operation do not have limit-exceeding impact on soils.

Exploitation of deposit "Kuat" is executed within the borders of mine allotment with area of 64,51 ha, "Zhili su" – within the borders of mine allotment with area of 15,49 ha. With the purpose of reducing negative impact of wastes on environment, the Company carefully organizes collection, storage, and disposal of wastes to the sites of its disposal. For prevention of pollution by production and consumption wastes, the Company provided the following actions:

- arrangement of the site with containers;
- collection of communal and production wastes is executed into different containers, and wastes are disposed regularly;
- repair of vehicles is executed only in a specialized territory, which prevents pollution of soil by the wastes and oil products.

4. Sub-soils

Due to the location of installed dust extraction plants at existing production objects of CHP-2, CHP-3 and ECHP, the Company did not execute land withdrawal, which excluded:
- building on areas of commercial mineral occurrence;
- violation of rare geological outcrops, mineral buildups and subsoil sites, proclaimed as reservation parks, natural, history, and culture monuments.

Technology of execution of mining works adopted by the project at the sites "Kuat" and "Zhili su" provides an opportunity for execution of the maximum possible fullness of mineral mining. For providing balanced usage and safety of sub-soils, the Company has a set of organizational and technical measures:
- control of fullness of mineral mining;
- register of mining;
- execution of works in strict compliance with the project of technical work-out.

At the end of mining works, the Company will execute remediation works at the sites "Kuat" and "Zhili su".

5. Plant and animal life

Analysis of flora and fauna of the territories, which were in operation for a long period of time, demonstrates that due to the long-term man-made burden, the structures of plant and animal life simplify, which is firstly related to the factor of displacement. Due to this fact, replacement of dust extraction plants of boilers and usage of emulsifiers will not lead to the violation of existing structures of techno-landscape, plant and animal life.

The condition of plant cover within the zone of the sites "Kuat" and "Zhili su" is characterized by the absence of plant complex and poor variability of floristic composition. There are no rare plants and plants from the Red Book in the region of the sites "Kuat" and "Zhili su". There are no places of inhabitation of rare animals and animals from the Red Book in the region of the sites "Kuat" and "Zhili su".

6. Physical impact on environment

Operation of battery emulsifiers installed at boilers of CHP-2, CHP-3 and ECHP does not have any kind of physical impact (thermal, electromagnetic, etc.) on environment.
Works, executed during the replacement of dust extraction plants within the frames of scheduled boiler repair works, did not change the character of activity of the stations and did not have any kind of physical impact on environment.

The source of noise during the operation of mining at the sites "Kuat" and "Zhili su" is the process of equipment work, but taking into account the fact of significantly isolated location from residential estate, there is no negative noise impact. There are no sources of thermal and electromagnetic radiation at the sites "Kuat" and "Zhili su".

7. Socio-economic sphere

Replacement of dust extraction plants of boilers of CHP-2, CHP-3 and ECHP of "PAVLODARENERGO" JSC directly does not have any kind of impact on socio-economic conditions of local inhabitants' life, and does not cause any changes of the characteristics of its activity. Implementation of investment projects on replacement of dust extraction plants at boilers of CHP-2, CHP-3 and ECHP of "PAVLODARENERGO" JSC will improve sanitary

and epidemiological condition of the territories of the stations due to the reduction of gross emissions of non-organic dust into the atmosphere.