GKP KOKTEM

AKTAU WASTE MANAGEMENT PROJECT

NON-TECHNICAL SUMMARY

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1 Introduction

The City of Aktau is the centre of the Mangistau Oblast (Region) in the West Kazakhstan. It is situated close to the Caspian seashore. The location map is presented in Figure 1.

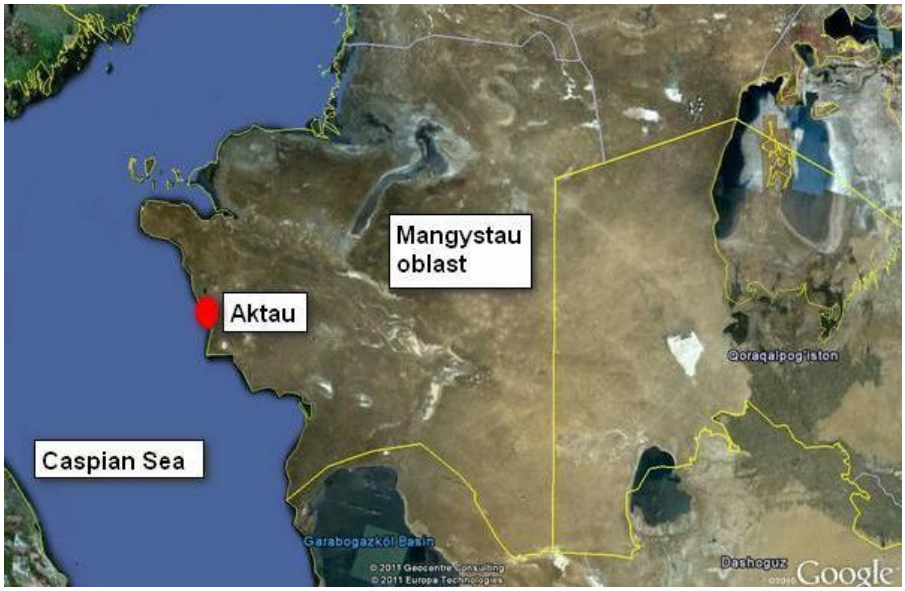

Figure 1. Location map

Authorities of the Oblast intend to establish a modern waste management facility in Aktau. In order to assess possible technical scenarios of the Project, in 2009 the Oblast mobilised a Consultant funded by the European Commission. The Consultant recommended establishing an integrated waste management facility which will combine waste separation and recycling with generation of green energy (the "Facilities"). Best Available Techniques (BAT) will be used and the Facilities will fully process the waste with least or near-zero residuals. When established, the Facilities would allow Aktau to depart from the current ineffective and costly practices that have resulted in the accumulation of waste in environmentally unsafe dumpsites. Additionally, the Facilities will help to decrease CO_2 and methane emissions and preserve renewable and non-renewable resources. The Facilities in Aktau shall include waste separation, recycling, anaerobic digestion and generation of electricity. The Aktau Waste Management Project will be a pilot project of the kind in Kazakhstan.

The project is partly financed by the European Bank for Reconstruction and Development (EBRD). Hence the project design and due diligence is to be carried out not only in accordance with the Kazakh regulatory requirements but also EBRD's Performance Requirements.

2 Current situation

An increase in the amount of generated waste can be anticipated in Aktau in the following years due to the forecasted increase of the population of Aktau and welfare of the population.

Today there are no containers for recyclable waste collection in Aktau city. Recycling is practiced only by the informal sector "waste pickers" or by the solid waste management staff themselves for extra income. Recyclables are separated by way of sorting in the Aktau landfill. Such work is done in a very labour-intensive and unsafe way, and for very low incomes. Safety risks while performing this function include moving vehicles, unstable slopes, sanitary risks due to contact to waste. Moreover, this activity is illegal since all types of MSW processing should take place before wastes enter the landfill gate.

Figure 2. The existing dumpsite (Source: Lada newspaper on internet)

Also a number of problems were identified in the waste handling system, including:

- A lot of animal corpses are disposed at the landfill in breach of safety and sanitary norms of Kazakhstan;
- Due to violations of safety norms related to landfilling and due to the aridity of the climate, fires occur at the landfill. Additional hazard is posed by the presence of third persons without any H&S training at the landfill;
- Reportedly there are issues of unsafe waste collection in the cases of broken truck presses when waste is pressed manually, which should not be done;

- Small containers do not allow for any optimization of waste collection traffic routes;
- Containers without covers are mainly used; this creates problems as strong winds spread light fractions around the containers;
- Lack of container covers also results in the penetration of rain water into the container decreasing the quality of paper and cardboard (which may be recycled), boosting bio-degradation of the organic fraction and leachate formation;
- The latter two processes result in odour and sanitary risks for population;
- Low awareness of the waste generators resulting in dumping of hazardous wastes (batteries, animal corpses, etc.) in MSW containers.

Although SWM system at the moment provides services meeting the needs in waste removal and maintenance of proper sanitary conditions in the city, the existing situation holds a lot of risks and a big room for improvement, especially considering the anticipated increase in the amount of waste generation. To solve these problems the priority investment program was developed.

3 Description of the proposed Project

The proposed project mainly aims at the improvement of environmental situation and living conditions in the city of Aktau. Proposed mixed solid waste (MSW) management system's development includes the following components:

- Collection system upgrade;
- Waste management system improvement;
- Institutional development;
- Construction of a waste sorting facilities together with energy recovery facility (anaerobic digestion);
- Construction of a new landfill.

Waste sorting facility and energy recovery facility (anaerobic digestion) together are addressed as mechanical-biological treatment (MBT) Facility.

3.1 Waste collection system upgrade

For optimization of the existing waste collection system, the MSW system development includes the replacement of 0.75m^3 containers with 1.1m^3 containers equipped with tight lids. The overall demand in the city of Aktau will be 2 500 containers. Regarding the waste collection trucks, it is planned to replace the existing low efficiency trucks with the new vehicles with capacity 18-20m^3.

3.2 Waste sorting facility

It is planned to establish a waste sorting facility with manual and automatic sorting and with the equipment to prepare the organic fraction for further anaerobic digestion. The sorting facility will allow the segregation of organic wastes, plastic films and bottles, ferrous and non-ferrous metals, glass bottles, cardboard, wood, and their recovery.

Figures 3, 4. Waste sorting facility examples

3.3 Anaerobic Digestion and Biogas CHP Plant

Anaerobic digestion is a series of processes in which microorganisms break down biodegradable material in the absence of oxygen. It is used as part of the process to treat biodegradable waste. As part of an integrated waste management system, anaerobic digestion reduces the emission of landfill gas into the atmosphere. The conceptual scheme of the proposed facility is presented at the figure 3 below.

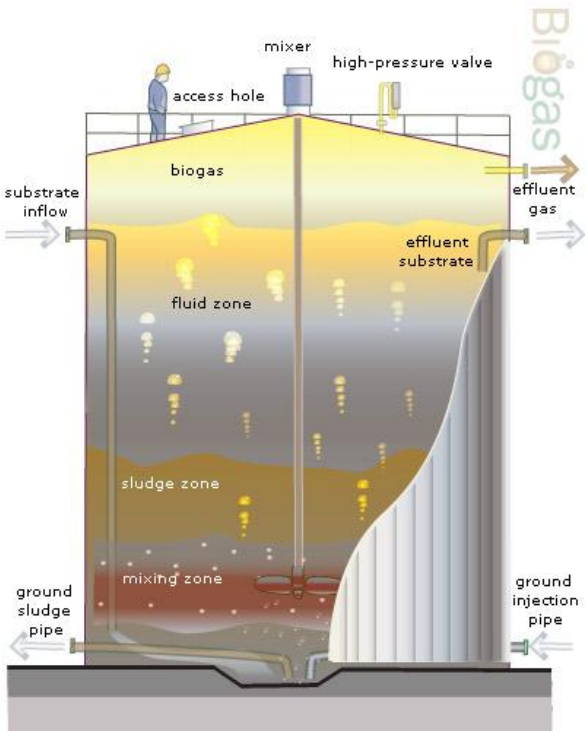

Figure 5. Anaerobic Digestion process

3.4 Composting

The by-product of anaerobic digestion process described above is so called “digestate”, i.e. solid organic residue after anaerobic digestion process. This digestate has to be processed into compost. Composting area is designed to compost 15 000 tons of solid digestate per year.

Preliminary treatment of organic fraction will remove virtually all contaminants from digestate which will easy the further composting process. Such pre-treated digestate will be mixed with another organic matter (e.g. garden waste, wood chips or bark) to obtain the compost with high oxygen content. Windrow method will be used at composting area.

3.5 Landfill

The decision was made to apply the “industrial symbiosis” approach and locate the MBT facility, the Waste Water Treatment plant and the new modern landfill at the same production site to achieve the most efficient use of land, biogas, and to improve logistics.

The landfill will be designed and operated in accordance with the national and EU requirements and standards. If the detailed design indicates potential for substantial landfill gas production, the systems will be introduced to register and collect the generated landfill gas. Leachate will also be monitored, collected and treated.

4 Environmental and Social Assessment of the Project

An Environmental and Social Impact Assessment (ESIA) has been carried out for the project by international and local specialists in parallel with the Feasibility Study in 2011-2012.

Together with this NTS, the ESIA document will be disclosed to the public for 120 days, so that the relevant comments and recommendations of the stakeholders may be taken into consideration during the finalisation of the ESIA and preparation and implementation of the proposed Project.

4.1 Analysis of alternatives

The procedure of ESIA involves a systematic comparison of feasible alternatives of the Project in terms of location, technology or design carried out for comparison of potential environmental and social impacts.

4.1.1 Alternative technologies

Considering the needs and features of the Aktau city as well as national and local legislation, the following SWM system scenarios were assessed.

Table 1. Scenarios of the SWM system development in Aktau for the coming 15-20 years

№	Scenario name and description	Pros and Cons
1	Business-as-usual scenario Situation as it is currently, all waste is collected in 0.75 m^3 containers and disposed at the dumpsite complying with minimum national requirements. After construction of the new landfill the waste stream will be switched to the Bayandy landfill.	No capital investments needed. Low operation and maintenance costs. Not in compliance with the national environmental and energy policy. No changes in operation cost, staff, no need for additional training.
2	Collection system upgrade, waste disposal at the new landfill	Low capital investments needed. Low operation and maintenance costs. Not in compliance with the national environmental and energy policy. No changes in operation cost, staff, no need for additional training.

№	Scenario name and description	Pros and Cons
		Time for introduction - < 1 year
3	Collection system upgrade, sorting facility, processing facilities for valuable fractions (processing facilities on-site), tails disposal at the landfill	High capital investments needed. Needs of qualified staff, additional training Higher operation and maintenance cost In compliance with the national environmental policy, not in compliance with energy policy. Time for introduction – 2-3 years
4	«Maximum scenario» Source separation introduction, re-use (bottles, paper) and recycling (including processing of PET and other plastic, green energy, composting), very small amount of tails sent to the landfill	Average to high capital investments needed. Needs of qualified staff, additional training Higher operation and maintenance cost In compliance with the national environmental policy and energy policy. Time for introduction – about 10 to 20 years (to achieve commercially viable parameters and sorting rate) which is outside the planning time for this project
5	**“Gradual improvement scenario”** **Pilot areas with source separation, collection system upgrade, MBT involving sorting, baling of recovered valuable fractions, digestion of organic wastes and WWTP sludge, CHP facility, landfill**	Average capital investments needed. Needs of qualified staff, additional training Higher operation and maintenance cost will be reduced by selling green energy In compliance with the national environmental policy and energy policy. Time for introduction – about 2-3 years Opportunities to reach the “maximum scenario” in 10-15 years due to high flexibility of the system.

As can be seen from the table above, maximum environmental benefits result from implementation of the “Maximum scenario”. However introduction of the full-scale source separation system with commercially viable separation rate and recyclables quality would not be possible within a timeframe of less than 10 years. The concept chosen is designed to gradually move forward the waste management system but to get positive social, environmental and economic results significantly earlier.

The scenario chosen is a “medium” option with significant decrease in the amount of the wastes disposed in landfills, creating conditions for recycling and reuse of valuable fractions, and enabling energy recovery. This is also in complete compliance with the national strategies for environmental management and energy saving because it provides effective diversion of the biodegradable wastes from the landfill, while allowing biogas recovery and use and energy production from waste. The issue of WWTP sludge management is also solved. One of the main features of the system proposed is the high degree of flexibility including options for technology adjustment to waste volume and composition which is vitally important due to growing population, changing living conditions and lack of comprehensive baseline data.

4.1.2 MBT and landfill locations

Two site alternatives for the mentioned facilities were considered. According to the previous plans of the City Administration, the new landfill was to be located in the Munaylinsky region (see fig.6).

Figure 6. Location alternatives

However there was an alternative site close to the future WWTP-2 which is suitable for this purpose. The second option provides significant opportunities for industrial symbiosis, including common digestion of solid waste and WWTP sludge with higher energy output. Analysis of advantages and disadvantages of the alternative locations of MSW facilities has shown that preferable option is location of both MBT and landfill adjacent to WWTP-2. This option leads to minimizing of air emissions, decreased water consumption and improved wastewater management. It also minimizes the negative impact on soil, groundwater and wildlife. Finally, it

improves waste management practices, leads to increase of green energy production and ensures the most efficient land use.

4.2 Main benefits and impacts from the Project implementation

The ESIA process involves an assessment and comparison of potential major impacts which may occur during some of the Project phases and the identification of adequate measures for mitigation of negative impacts, as well as for enhancement of possible positive impacts.

4.2.1 Environmental impacts

Increased efficiency of the use of resources

Introduction of MBT Facility into the solid waste management system will allow recovery of valuable fractions from the municipal solid waste stream which was previously sent to landfill.

Reduction of waste volume sent to the landfill

Volume of waste sent for final disposal will decrease by 50 – 55%. This is in line with the national legislation (Environmental code).

Marked decrease of biodegradable waste volumes disposal at landfill

The segregated biodegradable waste fraction will be sent to anaerobic digestion, which will in its turn result in a number of secondary benefits, including:

- Decreased risks of leachate formation at the landfill meaning significantly lower risks for soil and underground water pollution;
- Better sanitary situation at the landfill and improved working conditions;
- Significantly lower risk of fires at the landfill which means improved safety for workers, mitigation of nuisance for population and mitigation of excessive air emissions risks; and
- In general the waste disposed at the landfill will be of a more inert nature than previously. Stabilisation and therefore the aftercare period will be reduced by pre-treatment.

Green energy

One of the essential environmental benefits is energy recovery from the organic waste stream and generation of green electricity and heat energy from biogas. This energy will be used for technological processes at the MBT Facility and WWTP. The system will therefore be close to self-sufficient system with minimum energy need from outside. Collection and utilization of

biogas will also result in reduction of uncontrolled air emissions of the so-called “landfill gas” (mixture of carbon dioxide and methane) by 90 – 95 %.

Air quality

Overall the effects of the proposed development on air quality are considered to be negligible and no cumulative impacts have been identified.

Due to the encapsulated type of waste and WWTP sludge treatment, the predicted long-term impact from the proposed MBT and the new landfill will be the reduction of emissions compared to the existing situation.

Provided that good operational practices are implemented, the potential increase in dust, litter, odours and bio-aerosols during construction will be minimal.

Landscape and visual impact

The area for the proposed facilities is considered as “disturbed” and has a very low visual and environmental value. No long-term cumulative impact is anticipated, although the existing landfill to the south of the Project Area has some visual impact already.

All buildings will be constructed in the same area as the landfill. From a distance, this area will look like a part of an industrial suburb with low buildings. They will not significantly affect the landscape. Besides, there are no receptors in the Project Area which could be negatively affected.

Noise

All the process lines and equipment of the proposed project will be designed and built according to national and EU noise standards for operators inside the plant and for neighbours. The noise levels from the on-site noise sources will be reduced by using appropriate noise reduction measures as defined in the ESIA.

Geology Hydrology and Hydrogeology

It is considered that there will be no additional ground water impacts as a result of the proposed development. All potential related issues are mitigated through the measures defined in the ESIA. As for surface water, the proposed design of the surface water attenuation provides adequate capacity for both landfill and MBT Facility. With due implementation of the mitigation measures defined in the ESIA the residual impacts will be insignificant.

Cultural Heritage

There will be no direct impacts on cultural heritage since there are no nearby buildings of historic interest in the area.

Greenhouse gases and Climate Change

The review of alternative technologies demonstrates that the MBT technology is the one of the most beneficial waste management methods in terms of reduction of GHG emissions. The proposed MBT plant with an anaerobic digestion facility would therefore be beneficial in providing a permanent source of energy recovery which would reduce the dependence on fossil fuels. If the landfill is to be located in the same production site, landfill gas produced by the disposed waste will also be collected and used in CHP for energy production to prevent emission of the pollutants in the air. GHG emissions from the WWTP sludge will also be eliminated. Calculation of the GHG emission reduction indicated that GHG emissions will be significantly reduced as a result of the Project implementation.

Improved monitoring system

The extensive monitoring of waste management activities and related environmental and social impacts are recommended in the ESMP, which will be an integral part of the project implementation and future Facilities operation.

4.2.2 Socio-economic impacts

Improvement of working conditions of staff involved in collection of waste and landfilling

Purchase of new waste containers and vehicles will improve the sanitary situation for workers by minimising their direct contact with waste. Moreover, with the purchase of new machinery, the current manual operations will become automated, minimising and making the physical work easier. .

Improved living conditions in the city

Overall improvement of the living conditions in the City of Aktau will be mainly attributed to the improvement of the waste collection system. This includes prevention of the city area littering, lower emissions from waste trucks, timely collection of waste, and improved awareness of the general public on waste disposal rules.

Improved public awareness

Public awareness is among the main prerequisites for the introduction of a source separation system as well as for the due use of any waste collection facilities. The Project involves wide-scale public consultations starting from the earliest stages. NGOs, representatives of smaller and medium businesses, authorities involved in SWM, numerous mass media as well as the general public will be informed on the main ideas and best technical solutions for Aktau. The purpose of the public awareness programme is to achieve common understanding of the new waste management system setup and its rules, prepare waste holders and authorities for the forthcoming changes, explain the ways and milestones of services improvement, explain future tariffs and importance of payments for sanitary situation and living conditions in Aktau, mitigations of risks

to the operators of the collection system and to the population. To the large extent this activity will be guided by the Stakeholder Engagement Plan (SEP) developed for this Project.

New workplaces for different social groups

Although the proposed development will result in loss of income for a number of waste-pickers due to closure of previously used facilities upon the Project completion, the new SWM system will provide about 57 new workplaces at the MBT facility for workers of different educational level, for both men and women. This includes employment opportunities for marginal population groups including those of the Baskudyk settlement who already have obtained some experience in waste sorting at the landfill which is under closure now. This will include additional provision of information to them about the formal employment opportunities (see ESAP). These new jobs will be safe, regularly paid and will provide all guarantees in accordance with national labour legislation. All new workers will be employed in accordance with all requirements set forth by the Kazakhstan law, without gender or age discrimination. Employment procedure will comply with the applicable legal requirements. New jobs will be properly announced. Additional measures will be taken to inform the dwellers from the vicinity of the former landfill about these opportunities to ensure they have an opportunity to fill at least 50% of the relevant vacancies if they do apply. Competitive selection of the applicants could be arranged if required. The other benefit of the Project is the potential for investment opportunities to the local economy/

Demonstration effect of the pilot project

This Project is the pilot one in the sphere of this kind of waste sorting and green energy recovery in Kazakhstan. It is therefore expected to have significant educational effect for the future improvement of waste management practices all over Kazakhstan. Due monitoring and registration of milestones is therefore an integral part of the Project implementation.

It is obvious, that the MSW development will have a positive environmental impact in terms of optimal use of resources, energy, higher efficiency of solid wastes collection, occupational health and safety. However due implementation of the Project will require careful planning, environmental assessment and preventive measures as well as an extensive dialogue with the stakeholders. This includes elaboration of permitting procedures which are an essential part of the environmentally and socially important projects. If mismanaged, it may imply potential risks.

Special attention should be given to the design and implementation stages of the Project in order to adequately foresee/assess and mitigate certain adverse impacts and risks which may arise from the construction works.

4.3 Mitigation measures

The ESIA document provides detailed description of potential environmental and social impacts together with mitigation measures, i.e. the measures to achieve best results, minimise or eliminate

potential impacts and to achieve overall compliance with the relevant national regulations, EBRD requirements and introduce the BAT related to SWM sector modernisation.

This section provides an overview of principal mitigation measures for all components of the Project, i.e. upgrade of waste collection system, waste sorting facility, anaerobic digestion and biogas CHP plant, Composting facility, and Landfill. It should be also noted that due to different nature of potential impacts in short term (during construction phase, where applicable) and long term (during operation phase) two sets of relevant mitigation measures are proposed.

Construction Contractors will be responsible for the implementation of mitigation measures during the construction and installation works. Contracts will include EHS requirements and penalty schemes in case of poor performance of the contractual obligations. The authorized Employer‘s representative will supervise the implementation of EHS measures and arrange for the timely reporting to the EBRD.

4.3.1 Upgrade of Waste Collection System

Upgrade of waste collection system will result in mainly positive impacts by improving the well-being of the population and the sanitary situation in the City. To ensure the best possible effect of the component it is necessary to clearly specify technical and other requirements to the equipment to be purchased and to include those requirements in the technical specifications of Tender Documents.

Measures on safe utilization/disposal of the replaced containers and vehicles should also be planned by developing a disposal programme and finding options for re-use of the replaced equipment, for example, in other regions of Kazakhstan.

A public awareness programme (including individuals and condominiums) will be implemented to ensure the due usage of the new system (including separate collection containers) and a proper understanding of the relation between the service quality and the tariff rate. Training courses should be arranged for the staff collecting the waste covering measures on safe and efficient operation of the vehicles, possible emergencies and repairs. It is recommended to introduce a system for identification of occupational risks.

The above mentioned measures are to be implemented in an institutional setup with a possible outsourcing of some waste management functions to the competitive environment.

4.3.2 Air Quality

Measures related to short-term impacts

Standard measures will be used to mitigate the impact at the construction stage, including:

- Planning of works and scheduling of equipment operation including accounting for meteorological situation;
- Idle operation will be prohibited;
- Only modern vehicles and certified equipment will be used;
- Open fire will be prohibited, including burning of waste oils and construction wastes.

In order to prevent dust from the storage grounds of excavated soil those storage places will be equipped with covers to preserve soil, prevent dust pollution and improve working conditions on the construction site.

Measures related to long-term impacts

The main measure to mitigate impact from the equipment is to install proper air treatment units, e.g. in the exhaust ducts of the ventilation system. For composting unit mitigation measures include installation of scrubbers and bio-filters.

CHP unit will meet various EU emission standards. Mitigation measures related to pollutant emission by combustion units will include measures aiming at the optimisation of the combustion process. Regular maintenance of equipment will be applied. Specific requirements will be applied to stack design since they determine pollutants dissipation patterns.

For the landfill additional installations of landfill gas collection system and gas combustion at CHP facility will result in complete elimination of greenhouse gases emissions. To eliminate wind impact (increasing dust and particles content in air) perimeter planting, landscaping, or fences to reduce wind are to be provided.

While choosing vehicles for the operations the preference will be given to electric vehicles where possible. It is also recommended to purchase vehicles compliant with the EURO 3 and 4 requirements and to check regularly the composition of exhaust gases from vehicles.

In dry weather the production site and the transport moving routes will be watered. In case of adverse weather conditions additional measures and limitations will be applied.

4.3.3 Surface Water Bodies and Soil Cover

Since there are no surface water bodies in the Project Area only mitigation measures related to soil cover will be dealt with.

Measures related to short-term impacts

Standard mitigation measures are to be employed in any civil construction of localized facilities as prescribed by regulatory documentation. Household wastewater is to be collected and disposed to the municipal wastewater collection system. No additional pollution of storm water is anticipated if properly functioning machinery is used and lubricants are handled according to the established rules.

Arrangement of storage places for hazardous materials, fuel, solvents, etc. will prevent spillages or deflations, preferably on solid basement.

Only certified vehicles which underwent technical check-up will be allowed to the site and to works; regular visual checks of the fuel system functioning and leaks detection will be performed by operators. Vehicles parking will be arranged on the designated plot with a solid cover. Repairs of machinery and vehicles during construction will be arranged in the specially designated workshops (equipped with permanent solid cover and surface runoff collection system) outside the site.

Risk of the littering of soil with construction waste will be mitigated by proper implementation of waste management procedures. Landscaping of the production site, planting of greenery will be a part of the detailed design and an inherent part of the Contractor's works.

Measures related to long-term impacts

The key measures on soil and groundwater protection at the production site including production and administrative areas are:

- Construction and treatment system for the storm runoff;
- Arrangement of the site landscape, rain water collection system, especially in the areas of active machinery operation;
- Collection of household wastewater in a septic tank with further removal to WWTP or local wastewater collection system;
- Scheduled checks of the wastewater (industrial, household and storm) removal systems and timely maintenance;
- Washing of vehicle wheels at the exit to the facility and treatment of the generated wastewater at local treatment facilities of the block type;
- Designed leachate management system which consists of an infrastructure and monitoring systems to collect, monitor, control, and treat leachate prior to being discharged into the surrounding environment.
- Monitoring as per the separate Environmental and Social Monitoring Plan.

4.3.4 Construction and Household Waste Management

The construction and household waste generated during construction will be separately collected, separated, and safely stored until collection by authorized companies on contract basis.

Waste management adequacy will be subject to periodic internal inspections by the responsible person within the EHS Department of the Company. It is also subject to control by the local supervisory authorities.

Where wastes are to be temporarily stored at the construction site, storage grounds are to be arranged as prescribed by relevant Sanitary norms; i.e. sites for temporary waste storage should have a solid surface, be equipped with properly marked containers, and have access for waste pick-up. Removal of wastes should be carried out in parallel with main construction works. Burning of waste will be prohibited.

During the facilities operation, the main stream of waste will come from the process line. These wastes (their types and volumes) are to be accounted for in the waste generation assessment and relevant permits from environmental authorities as well as environmental charges paid by the company.

Other specific issues relate to waste stored at the landfill. Considering the local climate, specific concern is related to possible littering of the production site and surrounding area due to strong winds. In order to prevent this impact the following measures are to be employed:

- Provide perimeter planting, landscaping, or fences to reduce wind;
- Pin waste by dozers and landfill compactors immediately after discharge from the vehicles delivering the waste;
- Use soil or artificial cover materials so that deposited waste is held in place. More frequent application of cover may be required during high winds or in exposed areas;
- Install strategically placed mobile catch fences in extreme weather conditions;
- Temporarily close the facility to specific or all waste or vehicle types when weather conditions are particularly adverse.

4.3.5 Wildlife

The new facilities do not make any significant contribution to the biodiversity on the level of species or landscapes. Specific measures on wildlife protection are not required.

Additional measures include:

- Landscaping and greenery planting at the facility production site;
- Arrangement of grass covers;
- Greenery care during operation.

Details on the landscaping activities are to be included in the detailed design.

4.3.6 Social Conditions

Measures related to short-term impacts

Some inconveniences may be caused by the increased traffic to the citizens during the construction period. Noise and vibration levels outside the fenced areas of production sites are not expected to be disturbing for dwellers, due to the fact that the construction site is well outside the residential areas. Therefore, no nuisance to the public will be caused by the works. However some risk of unauthorized access to the construction sites is anticipated. In order to prevent accidental access by dwellers to the construction sites, the sites will be fenced and properly lighted. Information boards are to be installed with the dates of commencement and completion of works, name of the Contractor and general data on the Project. Information about the works locations and durations will be disclosed to the population at least two weeks prior to their commencement. Warning signs are to be installed at the approaches to the construction site.

Measures related to long-term impacts

Specific assumptions are to be made due to the planned construction of a new city district, the so-called “Aktau City”, at the seashore at the approximate distance of 1-2 km from the planned MBT Facility. Nevertheless, a 1 km wide Sanitary Protection Zone will be established to prevent any adverse impacts.

4.3.7 Main OHS aspects and Mitigation Measures

OHS measures during construction

The issues related to occupational health and safety (OHS) management during the construction will be included in the detail design (Works arrangement plan). The Project Engineer will ensure that the OHS issues are addressed not only in the documents, but in the actual operations of contractors and operators. The OHS arrangements will include the management of noise, dust, smoke, odour, light, hindrances on floors, cables and installations, insulation of hot surfaces, temperature contrast, ventilation, hard physical work, availability of manuals, signboards, fire safety, construction waste handling. Safety instructions are to be provided and necessary trainings for workers are to be arranged prior to the works commencement.

Appropriate amenities should be provided, including a laundry room with a washing machine for dirty clothes, a room for de-dusting of working clothes with cabinets for outerwear and footwear.

Cloak-rooms should be provided with individual cabinets for clothes and private things of the workers, the rooms for meals must have sanitary areas for dish washing and cooking.

Measures related to long-term impacts

The measures to ensure comfortable working conditions are to be included into the design, including light, insulation of hot surfaces, temperature contrast, ventilation, control devices, availability of manuals, signboards, fire safety, safety during maintenance works, personal and group protection equipment identification and purchase. A full HS management system as specified in the tender documents will be developed by the Facility operator.

All employees working at the sorting line will receive introductory training on the proper handling of the new equipment before it is put into operation. This training should be performed by representatives of the equipment suppliers. Besides, general trainings on fire safety, loading and unloading operations, working with hazardous materials, use of the PPE, etc. will be arranged for relevant workers according to the training schedule. Workers involved in the activities involving specific risks, will undergo periodic trainings in the accredited educational centres issuing individual certificates. Grievance procedure is to be established for workers in compliance with the national legislation and the SEP provisions.

Noise

The preliminary assessment results indicated that the noise level is significantly below the maximum allowed levels. Therefore additional measures on noise monitoring and control are not required. However this conclusion is to be confirmed while detailed design development after the detailed list of equipment is defined.

Emergencies

Emergency response and containment plans will be developed and approved before the facility starts its operation.

Inflammation of waste is the most common emergency at landfills. Removal of biodegradable waste from the waste stream sent to the landfill, and methane collection system are the main measures which are expected to significantly reduce this risk. However, some additional measures are recommended, e.g. gate control, regular compaction of wastes and temporary coverage with soil, gas drainage installation, watering of waste in dry hot periods, and prevention of unauthorized access to the production site.

5 Conclusions

The existing landfill located to the Southwest from the planed Aktau MBT Facility will be operated until the new landfill is commissioned. The major change for the existing and surrounding developments, as a result of the proposed development, would be the permanent addition of an MBT facility and a new landfill site. Other resulting changes would be the treatment at the MBT Facility of the wastewater sludge generated in the WWTP, which would be beneficial and sustainable on a cumulative level. The integration of the MBT Facility with the WWTP-2 allows the elimination of environmental impacts and risks associated with the WWTP sludge which is one of the main impact sources in the wastewater treatment process, including soil contamination, odour, bacterial contamination, non-productive use of land. 40 000 tonnes per year of sludge will be isolated from environment through the transfer to the bioreactor. The sludge energy potential will be utilised for green electricity.

The construction work will be located at the production site of the new facility, which is well remote from the residential areas and places of public presence. The construction will be short-term and of localised nature. Most of the construction impacts will be similar to the short-term negative impacts typical of any kind of civil construction and earth works, including minor traffic disturbances, pollution of air with dust and emissions from vehicles, soil run-off and sedimentation, noise, odour and light nuisance, additional waste generation. Due precautions to ensure safety of workers shall be taken as well as the measures to prevent unauthorized access to the construction site.

In the operation stage only minor impacts are expected: the new Facility will need electricity (less than the CHP will generate), will produce some air emissions and wastewater. If compared to the baseline scenario, those impacts will be well offset by the environmental benefits. In order to achieve the positive effect, the physical components of the Project shall be designed, installed, operated and maintained in strict conformity with relevant health and safety laws and regulations (national, EBRD and FIDIC as well as those outlined by the current FS in the technical and E&S parts) to ensure the expected results of the facility operation.

In terms of social impact, the closure of the existing dumpsite (which will not result from our project but is a part of the baseline scenario) may cause economical displacement for the informal waste pickers, but Project implementation may provide opportunities for formal employment at the MBT facility.

The mitigating measures will be proposed taking into account relevant local laws and regulations, as well as the best national and international expertise. Participation of international consultants during the design, tendering and construction supervision will facilitate successful implementation of the project in line with the best international practice. All significant negative

impacts will be mitigated through the mitigation measures defined in the ESIA and the EIA Report and the residual negative impact from the project implementation will be insignificant.

Outline of the mitigating measures and additional protection and preventive measures will be provided in the form of the Environmental and Social Action Plan (ESAP).

Monitoring is one of the core functions within environmental and social management. Environmental and Social action plan (ESMP) is also developed for the future project to ensure proper basis for the Facility operation, public communication and environmental protection. The project monitoring and reporting system will include the measures assuring transparency of the Project progress and environmental improvements enabling the involved companies to meet the local regulatory requirements and operate the facilities following good international environmental management practice.