# NON-TECHNICAL SUMMARY

**PROJECT:**

**ESTABLISHMENT OF 2,000 TPD CLINKER CAPACITY GREENFIELD CEMENT PLANT NEAR SHETPE VILLAGE, MANGYSTAU PROVINCE, REPUBLIC OF KAZAKHSTAN**

**COUNTRY: KAZAKHSTAN**

**DATE: 2011/05/10**

## Glossary

| | |
|---|---|
| CAGR | Compound annual growth rate |
| Caspi | CaspiCement LLC & CaspiNerud LLC |
| EBRD | European Bank of Reconstruction and Development |
| ESIA | Environmental and social impact assessment |
| EU | European Union |
| GHG | Greenhouse gas emissions |
| HeidelbergCement | HeidelbergCement AG and its affiliates |
| IFC | International Finance Corporation |
| PPE | Personal protective and equipment |
| RO | Reverse osmosis |
| STP | Sewage water treatment plan |
| tpd | tonnes per day |
| tpy | tonnes per year |

# 1. Introduction

**HEIDELBERGCEMENT** is the global market leader in aggregates and a prominent player in the fields of cement, concrete and other downstream activities, making it one of the world's largest manufacturers of building materials. HeidelbergCement operates on all continents except South America.

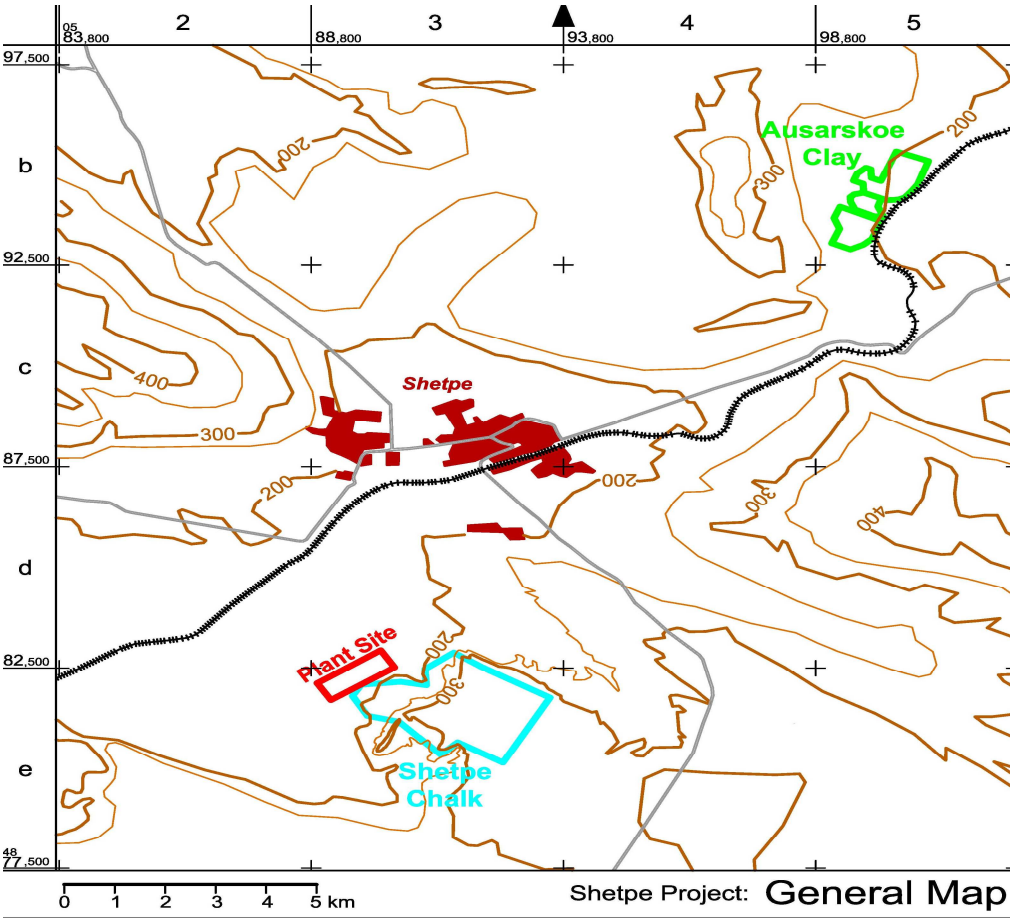
**CASPI** is proposing to establish a greenfield cement plant for a rated capacity of up to 2000 tonnes per day (tpd) clinker and up to 800.000 tonnes per year (tpy) cement. The plant is going to operate in dry process.

This Non-Technical Summary describes the above mentioned project in general and outlines the summary of the respective Environmental & Social Impact Assessment (ESIA), which includes the cement plant, captive raw material quarries, proposed roads from the plant to the quarries and from Shetpe village to the plant, water pipeline and the power transmission lines.

# 2. Project Description

## 2.1 Location

The cement plant is proposed to be located about 6 km (air-line distance) from Shetpe village in Mangystau Province in western Kazakhstan. The respective chalk quarry is located directly next to the plant site, whereas the respective clay quarry is located approximately 15 km (air-line distance) northeast of the plant site.



The Shetpe cement plant site is about 1650 km (air-line distance) from Astana the capital of Kazakhstan. The coordinates and elevations of the plant and mining areas are given below. The project location is shown in the map below.

Plant coordinates: 44°05'25 N, 52°07'20 E

Chalk quarry coordinates: 44°04'40 N, 52°09'35 E

Clay quarry coordinates: 44°11'40 N, 52°15'08 E

Elevation of Plant site: approximately 160 m above Mean Sea Level (MSL)


### 2.2 Product Mix

Ordinary Portland Clinker and Sulphur Resistant Clinker will be manufactured at the Shetpe Plant. Both cements shall meet the requirements of Kazakh national standard and shall be produced as per M400 grade. The cement capacity of the plant shall be up to 0.8 million tpy. The plant will achieve full capacity utilization in its third year of operations.

### 2.3 Cement Market

Cement consumption in Kazakhstan has declined slightly between 2006 and 2010 as Kazakhstan was affected by the global financial crisis which began in 2009. The Compound Annual Growth Rate (CAGR) was -2.3% per annum (pa) during this period.

However, the Kazakh cement market is currently regaining attractiveness because of growing cement consumption. According to PMR Publications cement consumption in 2011 will rise by 14% compared to 2010 and will amount to 8.75 million tons. It is estimated, that this double-digit growth of the Kazakh cement market will continue throughout the years 2012 and 2013.

## 2.4 Plant Project

The proposed plant capacity is primarily based on market considerations. The proposed location has two advantages: on the one hand the location is close to the raw material sources; on the other hand it is close to the market that arises from the activities of the oil industry in and around the Caspian Sea.

The raw material and fuel requirements for the proposed plant are to be met from different sources as given below.

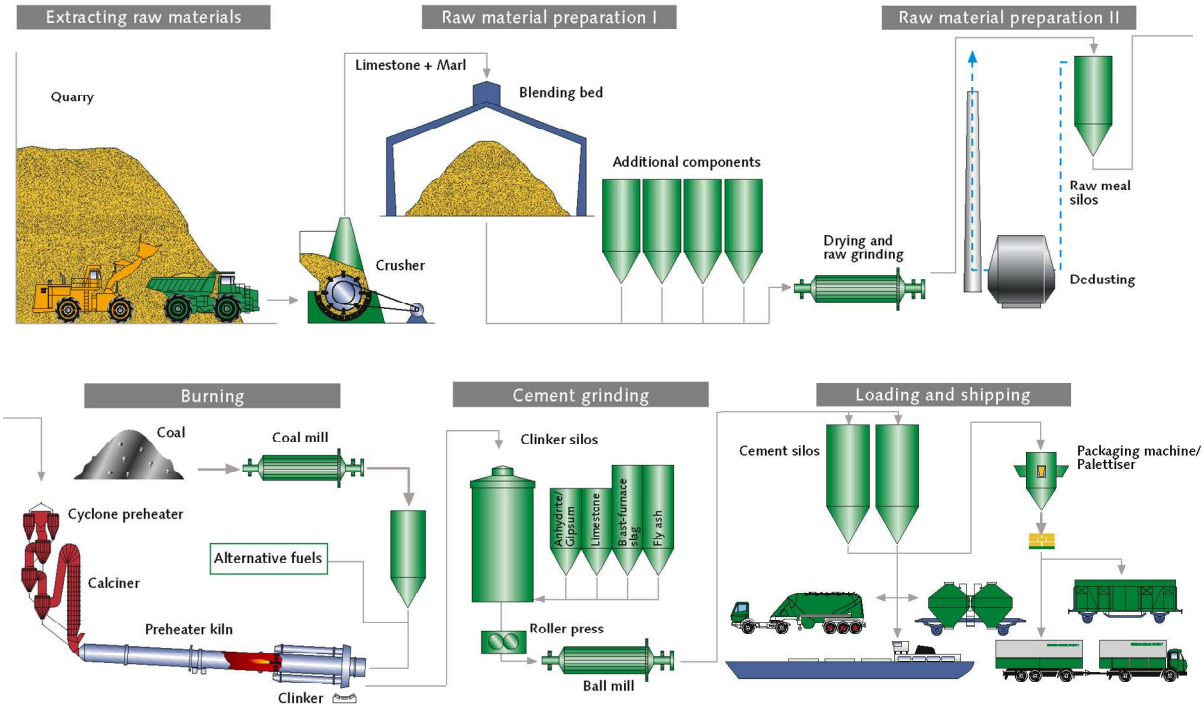
| Sn | Material | Distance from plant (km) | Transport | Remarks |
|---|---|---|---|---|
| **Raw Materials** | | | | |
| 1 | Chalk | Up to10 | Trucks | Crusher will be located at plant site. |
| 2 | Clay | Up to 30 | Trucks | Considered as a corrective. |
| 3 | Sand | Up to 50 | Trucks | Considered as a corrective. |
| 4a | Iron source | ~ 1000 | Railway | Considered as a corrective. |
| 4b | Iron source | ~ 3000 | Railway | |
| 5a | Gypsum | ~ 2500 | Railway | Considered as an additive. |
| 5b | Gypsum | ~ 2500 | Railway | |
| 6a | Slag | ~ 2500 | Railway | |
| 6b | Slag | ~ 2500 | Railway | |
| **Fuel** | | | | |
| 1a | Coal | ~ 3000 | Railway | - |
| 1b | Coal | ~ 3000 | Railway | |

The chalk deposit is located about 6 km in the south of Shetpe. The chalk appears in a plateau of a table mountain. The plateau is covered by steppe. Especially at the northwest and northeast flanks of the table mountain steep cliffs with deep canyons appear. Northwest of the mountain the topography is rough and chaotic as a result of land slides.

The clay deposit is located about 12 km in the northeast of Shetpe village. The clay appears in a wide valley which is covered by steppe. Along the west border of the exploration area the railroad connection West Kazakhstan – Russia exist.

## 2.5 Cement Production

For the manufacture of cement at Shetpe Plant the dry process will be used. In this process the raw materials which contain calcium, silica, aluminium and iron oxides are grinded and blended. Afterwards the so called raw meal is carried to the pre-heater where the chemical process of the conversion of the raw materials into clinker starts. After the dissociation of carbonate to calcium oxide and carbon dioxide in the preheater, the material is passed on to the kiln where calcium oxide and other elements react to calcium silicates and aluminates. The reaction product coming out of the kiln is called clinker. In the final process step the clinker is blended with additives like gypsum and then grinded. The product manufactured in the above described process is called cement. The figure below shows a general dry process of the cement manufacture.



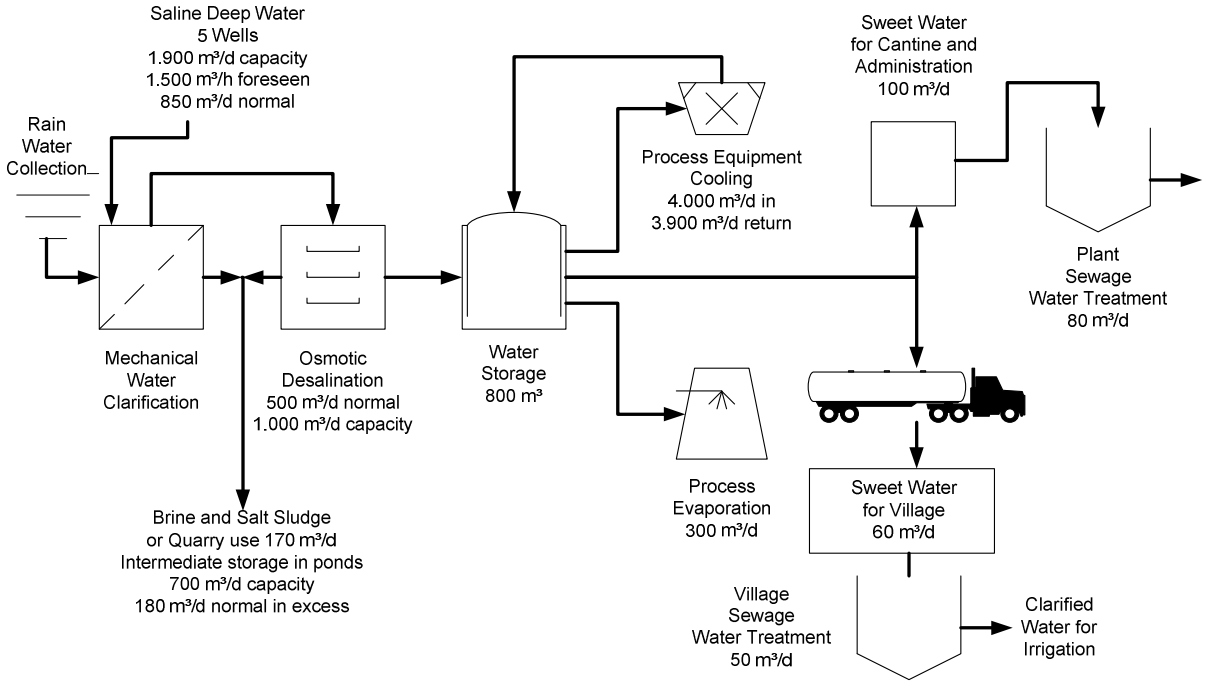

## 2.6 Project Technical Data at a Glance

The manpower requirement for operating the proposed plant is estimated as 350.

The power demand of the plant will be maximum 40MW and will be met from the national grid. The main feeder line passes near Koylyus, where a sub-station will be constructed and a power line drawn approximately 60 km. Water supply will be met from desalinated ground water sources. Five bore wells will be located around the plant. The design capacity of the five wells is 1900 m³/d covering the total requirement of water for the project including drinking and sanitation. The annual average sweet water consumption from the desalination plant will be approximately 500 m³/d.

No wastewater is generated from the cement production process. Wastewater generation from the plant property will be mainly in the form of household refuse and sewage. The plant and colony internal waste water treatment will clarify this sewage for irrigation use. Brine from the desalination plant will be used for dust abatement in the quarry. Excess brine will be stored in ground-sealed ponds for later use and as strategic reserve for fire fighting. Some of the brine-containing water will be evaporated in the surface ponds. A graphic of the water & sewage handling process is shown on page 7.

A residential colony to provide accommodation for plant personnel will be built as part of the project. The colony will not be destined to family housing, but is designated only for personnel on shift terms.




## 3. Policy, Legal and Administrative Framework

The ESIA study for the proposed cement project has been carried out within the framework of local, national and international environmental regulations. The legislative framework applicable to the proposed project is governed by the Republic of Kazakhstan, the International Finance Cooperation's (IFC) and the European Bank for Reconstruction and Development's (EBRD) guidelines and standards.

### 3.1 Regulatory Framework in Kazakhstan

The Republic of Kazakhstan ("Kazakhstan") adopted its Constitution in 1995, which stipulates fundamental principles in the country. Although the Constitution of the country has undergone a few changes, the political and economical system showed its stability and development. Other laws and regulations are derived from the Constitution.

In 2007, the Ecology Code came into force in Kazakhstan and it combined all main regulations related to ecology issues into one document, including duties and responsibilities of the authorized state bodies and of nature users as well as requirements on protection of natural resources.

According to the Ecology Code each new development activities and projects, which have direct or indirect impact on nature are subject of an ESIA. Cement plants as well as mining projects have significant environmental impacts, and, therefore, preparation of an ESIA is mandatory. The ESIA includes the evaluation of the impact on the nature from the beginning of the project (at the stage of planning and developing the project) and during the work of the ready plant (through limitation of the emissions into environment and realization of natural resources' protection measures).

The state authorities pay a great attention to the fulfillment of ecological requirements, and violations lead to severe consequences.

### 3.2 IFC/ World Bank Guidelines

The cement plant project described in this document was classified as a Category A project by IFC. IFC provided a detailed guideline on how to proceed with this Category A project.

Besides the regular process that includes i.e. the disclosure of this document, the parties agreed to follow the below listed guidelines:

- Workers' accommodation: processes and standards - A guidance note by IFC and the EBRD
- EU Council Directive 1985L0337 - EN - 25.06.2009 (where applicable)

### 3.3 EBRD Guidelines

The cement plant project described in this document was classified as a Category A project by EBRD. For this project EBRD agreed to follow IFC's procedures and regulations.

## 4. Description of the Project Environment

Precondition to obtaining a building permit is establishment of an ESIA. In the present case the ESIA has been already elaborated by Karagandinski Institute. The current ESIA, however, was prepared for a cement plant project with a capacity of 5000 tons per day. This project was due to the financial crisis first postponed and then downsized. The ESIA study for the downsized cement plant project is not yet available but will be elaborated in the future.

### 4.1 Topography and Drainage

The topography of the site area is dominated by the mountain Mangishlak. The site is situated inside south saddle between the ridge mountains West and East Karatau. The relief is smooth. The altitude above sea level of the site is approximately 160 m.

### 4.2 Climate

The climate of the area is characterized by semi desert. In the area of 30 to 40 km from the shore the sea breezes could soften the local climate, which results in milder winters and cooler summers, in comparison to the continental climate of Kazakhstan. The main characteristic climate of the site area, which is approx. 100 km from the shore, is characterized by temperature contrasts, cold stern winter, hot summer, deficiency of rain, dry air and dominance of bright dry weather. The average yearly temperature is from 9.5 to 11 degrees Celsius. The warm period is 280 days, which is characterized by average temperatures per day above 0 degrees Celsius. Average monthly temperature in summer time varies from 18 to 23 degrees Celsius. Average monthly temperature in winter time varies from -1 to +4 degrees Celsius. Absolute minimum is -28 in January and absolute maximum is 42 degrees Celsius in July and August. Annual precipitation is 150-180 mm.

### 4.3 Hydrology

The hydrological survey of the ESIA is based on the study from three water wells close to the site area, but these are not in the possession of Caspi. Caspi initiated therefore their own water wells with separate hydrological survey. Both surveys are matching each other.

Sources of water supply are three holes on the north - west side of the site area. Depth of the holes is 350 m. The water is sulfate – sodium chloride; moderately hard water, alkalescent, low-mineralized.

### 4.4 Water Quality

The underground water does not match the Kazakh requirements for potable water. It's necessary to make special actions for preparing drinking water from underground water.

### 4.5 Ambient Air Quality

As mentioned above, the population of Shetpe village is more than 12 000 people. So it is recommended to implement and provide future ambient air monitoring in line with local regulations.

### 4.6 Noise Levels

The new plant is located in distance of about 6 km from the residential area. In accordance with the Laws of Kazakhstan the noise levels are monitored at the boundary of the sanitary protection zone, which includes 1 km area from the fence of the plant.

### 4.7 Ecology

The area is situated in an arid semi-desert with little precipitation and a very sparse development of vegetation, which is limited to grasses and succulent low to very low shrubs. Trees or other higher vegetation do not occur naturally in the area and are restricted to irrigated areas in the wider surroundings, mostly at Shetpe. The immediate surroundings of the project area are characterized by a vast and slightly undulating steppe plain with small hills in the shape of plateaus. The transition from plateau to plain occurs in the form of heavily eroded lime stone cliffs with deep ravines and rock spurs.

In accordance with the local ecological conditions, biodiversity is limited while the abundance of local species can be high. Flora and fauna of the area are additionally influenced by the close proximity to Shetpe and a significant human presence. During the surveys conducted for the ESIA, no plant or animal species considered threatened or endangered in Kazakhstan were found to occur within the project area. All species recorded within the investigation area can be considered typical for and common within the wider biogeographic unit of the Mangystau area.

### 4.8 Cultural, Historical and Archaeological Features

In the plant and mining area no visible archaeological remains have been observed. As these areas lie in the hostile environment of the western Kazakh desert it is very unlikely to find any archaeological remains, which are of scientific, cultural, public, economic, ethnic or historic value in the future. However, in case any remains of this kind are found in the plant or mining area the findings will be treated according to Kazakh law.

### 4.9 Socio-Economic Overview

A detailed socio-economic overview of Mangystau oblast and Mangystau district (plant location district) is given below.

### 4.9.1 Mangystau Oblast

Mangystau oblast featured significant results in social and economic development in the last 5 years. This is proved by the basic macroeconomic indicators of the region development for this period which resulted in the oblast's leading position in the country regions rating for the 2010 year end results.

**Demographic situation**

For five years oblast population increased by 150% – from 375 thousand people in 2006 to 521 thousand people in 2010. Annual population growth ratio is about 5% - this is the second rank for the country after the Astana city. Only in rural areas the population number has grown by 250% times.

**GDP**

In the last five years the Gross Regional Product volume doubled. The oblast's share in GDP of the country increased from 5 to 7%. To date, the oblast is the second in this index per capita and shows the figure of 17 thousand USD, which is two times more than the average country indices. Economic growth of 102% is forecasted pursuant to 2010 year end results.

**Industrial production volume**

Industrial production volume almost doubled twice – up to 1.5 trillion KZT.
Today Mangystau's industrial production share amounts to 16.5% of the total industrial production of the country.

The processing industry also features a dynamic growth. Starting from 2006, its annual rates doubled. In 2010 this industry growth rate exceeded 55% due to positive trends in chemical, machine-building, food and light industries, which is three times higher than in average for the country.

About 40% of all major and average industries of the oblast introduced the international quality standards system. In 2010 their number increased by 39% compared to the number in the previous year.

**Investment Climate**

The growth of investments in fixed assets has become a recipe for a successful economic development of the region. From 2006, their volume doubled, including budgetary investments growth more than in five times. For five years, a total of 1.6 trillion KZT of direct investment (11 billion USD) were attracted in the region, of which 370.5 billion KZT or 2.5 billion USD were raised in 2010 only. Thus number exceeds the 2009 number by 12%. Investment potential of the oblast is annually confirmed by the positive and stable rating assigned by Fitch international ratings agency.

**Transportation and Logistics Sector Development**

Transit potential development and establishing of modern transportation and logistic sector are recognized as one of the most important strategic orientations of the oblast. Currently, a range of infrastructure projects focused on establishing of the new transit corridors are implemented in the territory of the oblast. First for the country concessionary project, a passenger terminal of the Aktau international airport, has already been built and commissioned. A railroad "Uzen – state boundary with

Turkmenistan" is under construction. The railroad will provide to Kazakhstan, China and Kazakhstan's partners in the Customs Union, Russia and Belarus, an entrance into the Persian Gulf and sea harbors of Iran, i.e., to the international markets. According to the analysts, in the future, the economic benefit from the transit will exceed the incomes from the oil and gas industry. The project implementation will undoubtedly contribute to the development of the entire western Kazakhstan infrastructure and the whole region economy. Jointly with the Ministry of Transport and Communications of the Republic of Kazakhstan and Asian Bank of Development, the reconstruction works were commenced for the auto road Zhetybai – Zhanaozen – boundary of Turkmenistan and Beineu – Aktau part of Atyrau – Aktau auto road. The works bidding for 74 billion KZT has been announced. In order to create a new railway connection to reduce the distance of the existing TRASEKA route along the East – West corridor, a Zhezkazgan-Beineu railroad construction project implementation work is performed in cooperation with the national company Kazakhstan Temir Zholy, with Beineu – Shalkar.

**Residential construction**

Another "fundamental" outcome of the past five years period is the completion of two stages of the housing program implementation. In this period, 2.5 million square meters of housing has been commissioned in the oblast.

**Businesses**

The share of population engaged in business in the five past years almost doubled, from 23.8% to 40.5%. For 2010 the products manufactured by small businesses showed enormous growth, tax paid amount grew by 2.5 times, and employment rate increased by 22%. As a state maintenance measure, another new program called "Business Road Map for 2020" has been started in 2010. 10 projects with a total value of 5 billion KZT in various sectors were approved under the program for the oblast. These projects received state support for the amount of 641 million KZT.

**Employment Conditions**

Average monthly salary currently is more than 140 thousand KZT (950 USD). The indicator for people living below the poverty line was reduced by 9% compared to 2006. Cash income of the population more than doubled – from 36 thousand KZT in 2006 to 76 thousand KZT in 2010. 78 thousand work places have been created in the period. As a result, the unemployment rate at the open labor market decreased by 3.4 per cent points from 9.7% in 2006 to 6.3% in 2010. The current registered unemployment rate is 0.5%. This was substantially facilitated the implementation of the state employment strategy, the "Road map".

**Food Market**

Prices for socially important goods remain stable. In three years, they succeeded to attain the lowest consumer prices index among the country's regions. Today the index is 106.9% with an average country index of 107.8%. Currently, this index is basically maintained by supplies to the region of about 20 staple foodstuffs from the neighboring countries and other oblasts of the country. The agreements with western and northern regions of Kazakhstan, and Iran and Azerbaijan entrepreneurs

are executed on a regular basis. At the same time, the works on own agricultural goods production improvement are currently performed. For instance, this includes an in-house flour production project. Livestock breeding is being actively developed. Last year the livestock of all cattle and bird species increased in average by 17%. As a consequence, own production of meat, milk and eggs increased by 12%. Camel milk production doubled and the volume of camel milk products increased by 70%.
Own pumpkin production in one year raised by 30%. Such trend was supported by the introduction of drip irrigation technology and hothouse farms expansion. In recent years, positive changes were observed in fishing industry growth. Currently, 60 entities engaged in this industry annually produce more than 500 tonnes of fish. 28 specialized fish and fish products sales outlets operate in the oblast, and 7 fish receiving points work on a regular basis. The consumer prices index stability is also maintained by the Agreement with MAEK-KazAtomProm LLP on Prohibition of Electricity Tariffs Increase.

**Tax Proceeds, Social Expenditures**

The growth of tax proceeds has become the result of the region's economic development. The oblast is still one of the republican budget donor regions. Last year, the proceeds to the state revenue made up 469 billion KZT, which is twice more than in 2006 (242 billion KZT). The tax base enhancement enabled to raise budget expenditures – from 46 to 94 billion KZT, in one last year only. Social expenditures have substantively increased in the last five years - from 18 billion KZT in 2006 to 47 billion KZT in 2010. As a consequence, this involved improvement of all indices indicating social health of the region population in the last five years:

- birth rate grew by 150 %;
- expected lifespan increased from 65 to 68 years;
- maternal mortality decreased by more than 60%;

From 2006 to 2010, 117 new social objects have been commissioned, including 88 kindergartens and schools, 22 health care organizations.

### 4.9.2 Mangystau District

The plant will be located in Mangystau (eponymous) district of Mangystau oblast, 6 kilometers from the district administrative center, Shetpe village. The population of Shetpe village is 12 thousand people (40% of the total population area). Mangystau district is the top developed agricultural area in West Kazakhstan with big opportunities and high performance figures. In 2010, the budget of the district amounted to 4 415 million KZT, of which local budget was 3 067 million KZT and republican transfers was 1 348 million KZT. In general, according to the 2010 year end results the district budget was spent by 98.7 %. The expenditure part of the budget for the current 2011 year equals 5 030 million KZT.

**Cattle breeding**

Cattle breeding businesses play a considerable role in the district's agricultural industry development. In accordance with the accounting analysis of the agro industrial complex, the district economy is characterized by a livestock population growth, including cattle stock (5 614 animals) which exceeds the past year results by 53%, camels by 36% (21845 animals) and horses by 46% (30692 animals).

Last year the meat products volume reached 4.5 thousand tonnes which by 53% exceeds the result in 2009. Milk products were about one and a half thousand tonnes, and wool production were up 400 thousand tonnes.

**Small business**

For small business support purposes, 51 entrepreneurs were aided through the microcredit organizations with a total amount of 45 million KZT, of which 12 million KZT were allocated to the businesses operating in cattle breeding industry, while 16 million KZT to those engaged in trading. Development of business allowed for the creation of 78 new work positions.

**Water supply**

One of the district's biggest issues is drinking water supply for the population. This issue will be solved by building the Kogez-Shetpe water pipe. Total project costs amount to 2 billion KZT, of which 660 million (completely spent to date) has been provided from the republican budget. 175 million KZT were allocated on water pipe construction in Shetpe which was planned to be completed in the next years.

**Infrastructure, Construction**

Public and engineering infrastructure construction is the basis for the settlement development. For the purposes above, Mangystau district provided for 1.265 billion KZT. In the frameworks of the "100 schools, 100 hospitals" program, seven residential buildings were constructed in Shetpe settlement. Five settlements of the district were connected to gas supply. 34 million KZT were spent last year for road maintenance, which resources have completely been spent to date. In accordance with the Road Map program, the internal settlement roads routine repair planned for 2011 has been accomplished. 50 million KZT were allocated for these purposes. Also Shetpe central streets' illumination has been completed.

**Kindergartens, schools**

Under the successfully implemented "Balapan" program, some 140 kindergarten places are being established in Shetpe settlement. Completion is planned for March 2011. Minicenters were opened in six schools of the district, and four kindergartens announced additional places opened. To date, 73.8% of children are covered by preschool education and upbringing. Three kindergartens' construction is planned in the settlements of Zhyngyldy, Zharmysh, Shayir and two in Tuschibek and Shebir.

**Healthcare**

A district hospital with 150 beds is under construction and its construction completion is expected this year. A decrease in mother and child mortality is observed. In 2010, no cases of mother and child death were recorded. At the same time, the district staffing level with health care manpower still leaves room for improvement. Currently, the district population provision with hospital beds is 68.8%, health care manpower 80.0 %, and medical advisers 37.5%.

**Social aid**

Public employment is the main priority of the state social policy. To date, 363 of the total number of unemployed persons (695) have been employed, and 94 have been forwarded to public works. Aid of

7 million 500 thousand KZT was allocated to 76 low income families. 69 million KZT were appropriated from the district budget was spent on social aid (lump-sum benefits, child allowances, allowances to handicapped persons and other welfare assistance.

## 5. Project Alternatives

In 2007 the government of Kazakhstan launched a huge investment program for the western area of the country. For the Aktau region it contained e.g.

- Construction of Aktau City
- Airport modernization
- Construction of nuclear power station
- The Caspian Sea shore construction
- Residential and industrial construction

Also in other areas of western territory e.g. Atyrau and Aktobe investment programs have been foreseen, which makes that region a target market.

Since in this area no cement producer is available and cement has to be transported there over many hundreds of kilometers, the most feasible solution is to build up a new cement facility there.

Due to the cement production process itself it is always advantagesus to build up a factory close to the raw material resources and to transport the final product to the market, rather than to locate the factory close to the market and transport the raw materials over long distances instead. Close to the city of Shetpe we identified a good chalk deposit, which gives enough reserves for the next decades, good and stable quality as well as nearby good clay deposits. Moreover the potential plant location is located close to a railway track, which is heading directly to Aktau with enough potential to carry additional train capacity. Also two roads are available for truck transport to Aktau.

Considering the above mentioned further alternative plant locations have not been investigated.

## 6. Potential Impacts & Mitigation Measures

The Operation phase of the proposed cement plant mainly comprises the following activities:

- Excavation of chalk and clay from the mine
- Transportation of chalk from mines to plant site
- Transportation of other correctives/ additives to the plant site
- Preparation of raw meal by adding correctives to chalk
- Clinker processing of raw meal
- Cooling and/or utilization of exhaust heat for drying purposes
- Blending & grinding of clinker by adding additives
- Packing & Dispatch

The details of main activities and actions to be undertaken and their impacts during operation phase of plant and mines are summarized below:

| Sn | Component | Activities | Potential Impacts |
|---|---|---|---|
| 1 | Transportation of raw materials and products | • Increase in traffic movement<br>• Washing and maintenance of vehicles | • Disturbance to community & its safety<br>• Contribution of dust and engine exhausts to ambient air quality<br>• Contribution to ambient noise level<br>• Disposal of solid waste & waste water |
| 2 | Operation of plant / mines | **Mines**<br>• Loading & transportation<br>• Operation of mining machinery<br>**Plant**<br>• Crushing of chalk/ other raw materials<br>• Preparation of raw meal<br>• Clinker processing of raw meal<br>• Cooling and/or utilization of exhaust heat for drying purposes<br>• Blending & grinding of clinker<br>• Packing & Dispatch | • Air emissions from operations are Dust, NOx, SOx, CO and CO2.<br>• Generation of noise<br>• Waste water generation from:<br>  • Water treatment plant, Domestic usages in plant<br>  • Solid waste from wastewater treatment plant as dry sludge, waste lubricating oil from machinery and municipal waste from domestic usages<br>• Accidental spillage of oil, if any. |
| 3 | Socio-economic | • Acquisition of land<br>• Payment of taxes and royalty<br>• Direct and indirect employment<br>• Development of infrastructure like roads, medical, transportation, etc<br>• Demand of local products and agricultural products<br>• Development of green belt | • Loss of agricultural land<br>• Loss of grazing area<br>• Employment to locals<br>• Business opportunities to locals<br>• Increase in per capita income<br>• Increase in literacy rate<br>• Change in living standard<br>• Regional development |

### 6.1 Qualitative Impact Assessment

The details of criteria adopted for impact assessment are as follows:

| Particulars | Impact Rating | | | | |
|---|---|---|---|---|---|
| | Nature | Duration | Likelihood | Severity | Potential |
| **Construction Phase** | | | | | |
| Land Use | Beneficial | Long term | Medium | Localized | Low |
| Air Quality | Adverse | Short term | Medium | Localized | Medium |
| Noise level | Adverse | Short term | Medium | Localized | Medium |
| Water Resources | Adverse | Short term | Medium | Localized | Medium |
| Waste Water | Adverse | Short term | Medium | Localized | Medium |
| Soil & Solid Waste | Adverse | Short term | Medium | Localized | Medium |
| Ecology | Adverse | Short term | Medium | Localized | Medium |
| Socio-economic & employment | Beneficial | Short term | Medium | Localized | High |
| **Operation Phase** | | | | | |
| Green House Gas Emission | Adverse | Long term | High | Major | Medium |
| Air Quality | Adverse | Long term | Medium | Localized | Medium |
| Noise level | Adverse | Long term | Medium | Localized | Medium |
| Traffic movement | Adverse | Long term | High | Localized | Medium |
| Water Resources | Adverse | Long term | Medium | Localized | Medium |
| Waste Water | Adverse | Long term | Medium | Localized | Low |
| Solid Waste | Adverse | Long term | Medium | Localized | Low |
| Ecology | Adverse | Long term | Medium | Localized | Low |
| Loss of agricultural/ grazing land | Adverse | Long term | High | Localized | Low |
| Employment & economic growth | Beneficial | Long term | High | Major | High |
| Socio-economic measures | Beneficial | Long term | High | Localized | High |

The qualitative impacts of the proposed project during construction and operation phases are as follows:

| Impact Rating | | Criteria | | |
|---|---|---|---|---|
| Nature of impact | Beneficial | Positive | | |
| | Adverse | Negative | | |
| Duration of impact | Short term | Impacts shall be confined to a stipulated time | | |
| | Long term | Impacts shall continue till the end of plant life | | |
| Likelihood of occurrence | Negligible | <10% | Low | 10-40% |
| | Medium | 40-60% | High | 60-80% |
| | Very high | 80-100% | | |
| Significance of impact | Minor | Noticeable impacts only | | |
| | Localized | Noticed by adjacent locality & may have direct impacts | | |
| | Major | Have direct sustainable impacts | | |
| | Massive | Ability to change the system | | |
| Potential impact level | Low | Has practically no impact | | |
| | Medium | Has impact in local area | | |
| | High | Has impact in region | | |

### 6.2 Mitigation Measures

The mitigation measures for the identified impacts are described below:

| Sn | Potential Impact | Main Source of Risk | Mitigation Measures |
|---|---|---|---|
| 1 | Natural Resources | Depletion of Limestone reserves and other corrective materials and additives | • Availability of raw materials shall be estimated accurately.<br>• Regular review of raw mix to get consistent quality of products.<br>• Continuous attempt to control waste during transportation, storage and handling of raw materials.<br>• Mining plan will be prepared to optimize the mining methodology and ensure the implementation of a progressive reclamation plan to restore areas where limestone has been excavated.<br>• Regular monitoring of availability of stocks and consumption of raw materials, dispatch of products and loss of material. |
| 2 | Air Emissions | | |
| A | Emission from mines | • Drilling<br>• Loading and unloading<br>• Crushing<br>• Transportation<br>• Wind erosion<br>• Traffic movement | • Limestone / Chalk will be quarried with excavators rather than blasting.<br>• Dust emissions from crusher will be controlled by bag filter.<br>• All dumps will be suitably covered.<br>• A speed limit will be defined for the trucks/ dumpers moving within the mining area.<br>• Regular brine solution spraying for dust suppression will be adopted within the quarry roads and haulage road from the chalk quarry to the plant via re-use of brine from desalination plant.<br>• Use of sharp teeth for shovels to minimize dust generation.<br>• All vehicles will be well maintained and their exhausts regularly tested.<br>• Dust masks will be provided to workers engaged at dust generation points like drills, loading, unloading points, etc.<br>• Reasonable plantings irrigated by the treated wastewater will be carried out in and around plant. |
| B | Air emissions from stacks | Air Emissions from:<br>• Crusher<br>• Raw Mill<br>• Coal Mill<br>• Kiln<br>• Clinker Cooler<br>• Cement Mill<br>• Packing Plant<br>• DG sets | • Ensure efficiency of combustion in kiln and emergency diesel generator sets.<br>• Suitably designed fabric filters will limit the dust concentration to 30 mg/ $Nm^3$ from all captured emission sources.<br>• Regular checks to identify failure of any pollution control equipment, automatic shutdown by the control system will be provided.<br>• Efficiency of each dust control equipment will be ensured to a minimum of 99%.<br>• SOx and NOx emissions will be within the norms of 400 mg/ Nm3 and 600 mg/ $Nm^3$ respectively as specified by IFC.<br>• A well-designed burner system will limit the core flame temperature to ensure a low value of NOx.<br>• Highly efficient firing to minimize CO emissions utilizing the technique of keeping a positive oxygen balance.<br>• Regular preventive maintenance of pollution control equipment.<br>• All vehicles will be well maintained and their exhausts regularly tested for emission concentration.<br>• Continuous dust monitoring devices will be installed on kiln emission point.<br>• Continuous SOx and NOx monitor will be installed on main stack. |
| C | Fugitive Emissions | • Storage and Conveying/ transportation of raw materials and products<br>• Leakages from machinery and pipes | • Jet Pulse bag filters will be provided at all dry material conveying and transfer points.<br>• Drop distances will be minimized by the application of best practise engineering.<br>• Dust suppression system by extensive venting and slit curtain at chalk dump hopper.<br>• Regular dust suppression with brine sprinkler on the haul roads.<br>• Plant roads & approach roads will be made of bitumen/concrete.<br>• Haulage road from chalk quarry made with gravel surface<br>• Mechanical vacuum cleaner shall be used for cleaning of dust on internal roads.<br>• Open areas within the plant premises/ along boundaries of the plant premises will be covered by vegetation belt. |
| D | Green house Gas Emissions | • All stacks<br>• Traffic movement | • The proposal to manufacture blended cement shall reduce clinker requirement in cement, thereby reducing GHG emissions.<br>• State-of-the-art 5 stage preheater technology will lead to increased energy efficiency thereby reducing GHG emissions. |

| | | | |
|---|---|---|---|
| 3 | Noise Emissions | • Operation of noise generating equipment like compressors, pumps, DG sets, etc.<br>• Maintenance<br>• Traffic movement<br>• System in operator's cabin | • Cumulative noise level at walkways and work areas will be <85 dB (A) and areas with noise level >85 dB (A) will be under mandatory requirement of hearing protection devices.<br>• Noise level at the boundary of plant / mines will be <65 dB (A).<br>• Regular maintenance of noise generating equipment.<br>• Provision of silencers will be made where appropriate.<br>• Necessary enclosures will also be provided on the working platforms/areas for local protection in high noise level areas.<br>• Proper lubrication & housekeeping to control noise levels.<br>• The operators will be provided with necessary safety and protection equipment such as ear plugs, ear muffs etc.<br>• Procurement of drill, loaders and dumpers and other equipment with noise reduction features. |
| 4 | Ground Vibration/ Fly Rocks | • Drilling<br>• Blasting | • Drilling and blasting to be largely avoided. Rippers and excavator to be used instead. |
| 5 | Ground Water Resources | • Make up water for cooling<br>• Dust suppression<br>• Domestic use | • Continuous attempt will be made to optimize/reduce the use of water.<br>• Water harvesting will be carried<br>• Regular monitoring of ground water table. |
| 6 | Waste Water | • Domestic sewage<br>• Reverse osmosis (RO) Rejects | • Sewage water treatment plant (STP) with tertiary treatment will be provided and no untreated waste water shall be discharged from the plant premises.<br>• Treated effluent will be used for dust suppression and plantation / greenbelt development.<br>• Rejects from reverse osmosis will be sprayed on haulage roads to the extent possible.<br>• Construction of suitably designed drains all along the roads and boundary of the plant premises.<br>• Appropriate storm water and runoff control systems will be provided to minimize the quantities of suspended material carried off site. |
| 7 | Solid waste (haz-ardous & nonhazard ous) | • Maintenance and Operation of integrated plant<br>• Storage and handling of fuel<br>• Accidental spillage | • Whenever reasonable, use of non-hazardous instead of hazardous materials.<br>• All hazardous (ignitable, reactive, flammable, corrosive, and toxic) materials will be stored in clearly labeled containers or vessels.<br>• All hazardous wastes, process residues, solvents, oils, and sludges will be properly disposed.<br>• Recycle or reclaim materials where reasonable.<br>• If recycling or reclamation is not reasonable, wastes will be disposed of in an environmentally acceptable manner and in compliance with local laws and regulations.<br>• Careful garbage transportation to dumping site and disinfection of transport vehicles body.<br>• Fire prevention systems and secondary containment will be provided for storage facilities, to prevent fires or the release of hazardous materials to the environment. |
| 8 | Spill Manage-ment | • Maintenance and Operation<br>• Storage and handling of fuel<br>• Accidental spillage | • Impervious liners in place for fuel, lubricants and chemicals storage area.<br>• Effective berms capable of containing 110% of the stored volume and containing all potentially contaminating materials to be used for fuel and lubricants storage area.<br>• Oil drip pans will be used wherever there is significant potential for leakage including, but not limited to diesel generator engine, compressors, pumps or other motor , maintenance areas and fuel transfer areas. |
| 9 | Occu-pational Health & Safety | • All Operations | • Provision of PPE such as ear muffs, helmets, boots, dust masks, eye protection, etc. to employees.<br>• Adequate training will be provided to the staff.<br>• Regular medical check up of workers. |

### 6.3 Public consultation

| Impact | Monitoring method | Parameters | Location | Frequency |
|---|---|---|---|---|
| Air quality | Measurement / Sampling | NOx, SOx, CO2, dust | Pyro-processing stacks, Cement grinding and clinker cooler stacks | Continuous |
| Noise | Measurement | dB | Mines, Crusher, raw mill, cement mill; four sites around plane site | Biannually |
| Surface and ground water | Sampling | Temperature, pH, Oil content, suspended solids | Ground water wells, installed grease traps, oil/water separators, sedimentation tanks | Quarterly |
| Soil | Sampling | Moisture content, pH, salinity, nitrogen, phosphate, chloride, potassium, sodium | Agricultural plots near project site | Annual |
| Solid Waste | Audits, Visual Inspection, Metering | Generation, storage, recycling, transport and disposal | Plant premises | Quarterly |
| Biodiversity | Audits, Visual Inspection | General condition of the floral cover | Plant, mines and landscaped areas | Annual |
| Resource use | Metering, Audit | Water and energy consumption; Raw material consumption | Plant, mines | Continuous |
| Health and Safety | Health and safety surveys | Illness records, accident statistics | Plant, road linking plant | Continuous |

Public consultation plays a key role in enabling the public to participate in the planning of project that affects the people directly. Also per Kazakh law a public hearing has to be held prior to obtaining any building permit. The public hearing has to be officially announced in public newspaper several weeks beforehand in order to enable all potentially affected people to participate and to prepare themselves for questions and comments. Such public hearing was already held. The meeting was properly minuted.

Participants of the public hearing have been local inhabitants, the Akim, who is the local governor and the eldest men of the settlement, who are playing an essential role in the local society.

Caspi gave a presentation introducing the project and highlighting the strong commitment from the HeidelbergCement on environmental and social issues.

The major issues identified and the suggestions proposed during the public hearing include:

- Environmental issues as dust emissions, water treatment, considering wild life
- Social impact as how many workplaces will be generated, how many local workers will be engaged, whether training and education programs are foreseen
- Impact on population in terms of energy consumption from public grid and whether enough would be available for population and which kind of equipment will be used and whether there could be any threat.

During the answers it was emphasized that Caspi

- Is going to minimize potential impact by applying European norms in terms of dust emissions.
- Is willing to engage suitable local workers for plant operations by implementing training and education courses, provided that they successfully passed respecive trainings.
- Is going to install a new high voltage line for power supply in order not to affect the power supply for the settlement area.
- Is going to install only proven technology with equipment supplied from China as well as Europe and other countries.

### 6.4 Socio-Economic Development Plan

HeidelbergCement as a social-oriented group pays great attention worldwide to the community development around its locations. Activities for socio-economic development are carried out in accordance with Corporate Citizenship Policy and Plan of HeidelbergCement Sustainability Ambitions 2020. Caspi as a part of HeidelbergCement will actively contribute to improving and development of socio-economic conditions of the plant location area. The details of the socio-economic development are given below:

#### 6.4.1 Community Development Fund

Caspi plans to spend about 20 million KZT for socio-economic development of the area, and for sponsoring, charity and donations. In Kazakhstan there is a usual practice of signing an annual memorandum between local authorities and large enterprises to allocate funds for socio-economic development. The memorandum specifies the budget and the goals for which this budget is allocated. Currently several state and regional programs of socio-economic development are being realized in the plant location area, and Caspi will take part in their implementation.

#### 6.4.2 Employment and Business Opportunities

Caspi is interested in employing local people from Shetpe village and surrounding settlements. By the start of the plant operation it is assumed that in the plant about 30% of staff will be sourced from local communities. Within five years after the plant launch it is planned to increase the number of the local employees to 70%. Since the operation of the plant requires certain knowledge, Caspi plans to train local employees and improve their skills both on the plant and in other units the HeidelbergCement and specialized educational institutions in Kazakhstan or Russia. Besides putting the plant into operation will stimulate the development of small businesses and create jobs in infrastructure around the plant like transportation, auto workshops, restaurants, and other small shops.

#### 6.4.3 Infrastructure Development

Newly constructed asphalt roads from the village to the plant, as well as the railway line which is under construction now will improve the transport infrustructure in the area. In coordination with local authorities, Caspi is going to make reconstruction of the Shetpe railway station. Also in cooperation with local authorities some funds will be allocated for repairs and maintenance of existing roads in Shetpe, and for Shetpe street lighting improvement. It is planned to donate certain volumes of cement for repairs of public and residential buildings. In the future Caspi plans to help provide drinking water to

inhabitants. Currently the water pipe from Kogez settlement to Shetpe and a water pipe in Shetpe village are under construction. It is planned to assist in maintenance of the waterpipes and repair if necessary.

#### 6.4.4 Health & Education

There will be a medical office in the plant, where plant staff will be able to get medical care and pass regular medical inspections. In cooperation with the Department of Heath & Safety trainings on health protection / prevention of occupational diseases will be carried out. Leaflets and other materials on this issue will be distributed. Great attention will be given to provision of hot meals for workers of the plant. It is planned to open a canteen at the plant. Caspi will operate its own pastry shop and coffee shop at the plant where workers will be able to buy juices, dairy and confectionery. Caspi will support new regional hospital, which is currently constructed in Shetpe. Sponsoring of new medical equipment is being considered. Sponsorship of kindergartens, schools and centers for further education in the area is planned, as well as the allocation of funds to purchase needed teaching materials, equipment for language laboratories, multimedia classrooms, and information technology classrooms. Also cement donations are planned for repairs of schools and kindergarten buildings.

#### 6.4.5 Community public events

Caspi will partly sponsor public celebratory events in Shetpe, such as the national holiday of "Nauryz" or state holidays at which public actions are carried out.

#### 6.4.6 Stakeholder engagement

Stakeholder engagement efforts have been already conducted previously. Meetings with stakeholders were held, as well as public hearings to assess the environmental impact of the future plant.
Currently stakeholder engagement program is under development, which will include all tools of dialogue with the community, as well as the grievance mechanism.

Contact details for the stakeholder engagement representative for Caspi, are as follows:
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## 7. Conclusion

As mentioned above there is a cement supply gap in Kazakhstan because of high demand. That is why it was decided to launch a cement plant in Shetpe/Kazakhstan. The project is based on close colaboration between HeidelbergCement and IFC.
The cement plant will operate two quarries. The chalk quarry is located directly next to the plant site. The clay quarry is located roughly 15 km northeast of the plant site. All sorts of produced cement will

meet the requirements of Kazakh standards. In accordance with the time shedule, the plant will most probably be able to reach production peak (100%) in the third year of its existence.

Resulting from Kazakh law an ESIA had to be created in the course of project preparation. The current ESIA, however, is based on a project of a 2.0 mtpy cement plant which was planned in 2009. Due to the financial crises the capacity of the cement plant was adjusted to a lower capacity. To meet Kazakh laws, in the further course of the project an ESIA for the adjusted capacity will be prepared. The technical data included in the ESIA (e.g. on NOx emissions) can be considered an upper limit which will not be exceeded in the current project.

The scaled down cement plant project will impact the environment. To minimize negative and maximize positive impacts Caspi will follow IFC's performance standards. The related actions have been summarized in the so called "Environmental and Social Action Plan".
Summarizing the above stated findings, the cement plant project near Shetpe village will be a great contribution to further economic development of the region. Caspi will be able to deliver cement to support the improvement of the regional infrastructure and, additionally, further improve the economic situation of the region as it will directly and indirectly increase local employment.