CUSTOMER: STATE CONCERN "TURKENHIMIYA"

GENERAL CONTRACTOR: THE CONSORTIUM OF THE COMPANIES «GAP INSAAT YATIRIM VE DIŞ TICARET ANONIM SIRKETI »(TURKEY) AND «MITSUBISHI CORPORATION» (JAPAN)

THE PROJECT «EXPANSION OF MOORING PORT POINT IN THE CITY OF GARABOGAZ, BALKAN WELAYAT»

ENVIRONMENTAL IMPACT ASSESMENT (EIA)

2015

ENVIROMENTAL IMPACT ASSESSMENT

(EIA)

THE PROJECT «EXPANSION OF MOORING PORT POINT IN THE CITY OF GARABOGAZ, BALKAN WELAYAT»

Content

Introduction

The expansion/construction project « Ferry mooring port point« at Garabogas (Bekdash) in Turkmenbashy etrap Balkan welayat is performed in the framework of Program of development of oil and gas and chemical industry and fishery branches of Turkmenistan for the period 2012-2016 and also according to the National Program on social and economic development of Turkmenistan for 2011-2030.

One of principles of preservation of the environment is mandatory preparation of Environmental Impact Assessment (EIA) at decision-making on performance of economic and other activity (the Law of Turkmenistan «On environmental protection», 2014.).

The assessment of impact on environment is performed for economic and other projects which can have direct or indirect influence on environment, irrespective of organizational-legal forms of ownership of subjects of economic and other activity.

This package of documentation should provides generalization of results of Environmental Impact Assessment which is performed within the framework of elaboration of the documentation on the project “Expansion of mooring port point” Garabogaz (Bekdash) » in Turkmenbashy etrap Balkan welayat.

The documentation should include: the characteristic of an existing condition of components of environment around the site on reconstruction and fitting out Garabogaz mooring and estimated impact of the object on environment.

The ecological assessment is performed for the prevention of possible degradation of environment under the influence of planned economic activities, ecological stability of territory on which the site of the object of reconstruction is located.

The primary goal of EIA process is assistance to decision-making under the project and interfacing with parties involved with a view of minimization of influences on environment, decrease in social and economic consequences and influence on population health, and also creation of conditions of steady social and economic development of the territories within the area of the project impact.

The environmental impact assessment provides revealing of potentially significant influences related with performance of planned activity on expansion of a mooring port point «Garabogaz (Bekdash)» and describes activity which will help to avoid, minimize, correct or compensate these influences.

Criteria of an impact assessment are based on two basic characteristics:
1) duration, scope and nature of prospective changes;
2) the characteristic of object of influence.

The purposes of EIA performance:
- Definition of possible influences on the environment, caused by project implementation;
- Estimation of ecological consequences from performance of project activity;

- Working out of nature protection measures and choice of the project decisions providing reduction and prevention of negative influences of planned economic activities.

The results of EIA performance:

- Collecting and the analysis of materials on natural specifics of area of possible influence of the project, a condition of components of an environment;
- The analysis of project activity for revealing of significant ecological aspects of its impact on environment;
- Carrying out of an estimation of influence of the project activity on components of environment for the forecast of ecological and social consequences;
- expected assessment of efficiency of recommended nature protection activity;
- Definition of ecological conditions and requirements to project activity at the subsequent stages of performance – designing, construction and operation.

Results of an estimation of influence on environment were defined considering the principle of the sustainable development which means achievement of sound and stable equilibrium between economic, ecological and social consequences from project performance.

During preparation of materials following documents are used:

- The request for the project “Reconstruction of mooring port point” Garabogaz (Bekdash);
- The general plan, schemes, drawings;
- Database of the Developer.

Project EIA is prepared by Affiliate of the Turkish company«Gap Insaat Yatirim ve Diş Tiçaret Anonim Sirketi» in Turkmenistan
(hereinafter referred as – «GAP Insaat»).

1. GENERAL DATA ON THE PROJECT

At the present time, the General Contractor – the Consortium carries out construction of the Factory on ammonia and carbamide manufacture in Garabogaz under the contract with the Customer – State concern "Turkmenhimiya",.

The Consortium includes the companies «Mitsubishi Corporation» (Japan), «Mitsubishi heavy Industries, Ltd» (Japan) and «GAP Insaat».

Construction of the Factory on ammonia and carbamide manufacture in Garabogaze is caused by necessity of creation for Turkmenistan new capacities on manufacture of ammonia and a carbamide for its further export to the world market for agricultural purposes, and also for social and economic development of Balkan welayat. Considering abovementioned the project site is chosen: reconstruction of existing port is planned for reception of sea vessels and possible transportation by sea and export of products produced by the Complex.

Project capacity on production of ammonia and carbamide is as follows:

- Liquid ammonia - 2000 t/day (660 thousand t/year);
- The granulated carbamide - 3500 t/day (1155 thousand t/year).

Since the carbamide is considered most effective of mineral fertilizers (a carbamide and ammoniac saltpeter) a construction in Turkmenistan of a new complex on ammonia and carbamide provides following:

- To attract direct foreign investments;

- To satisfy requirements of agriculture of Turkmenistan for all-purpose mineral fertilizers;
- To carry out replacing of import share in agrochemical sector;
- To produce product (the granulated carbamide) of high quality for its export on the world market.

The present project EIA on mooring expansion is prepared by the Subcontractor of the Consortium - the company «GAP Insaat».

Works on designing and mooring expansion of the port point «Garabogaz (Bekdash)» have been commenced considering the requirement on enlarging the dimensions of a pier for mooring sea vessels of the big overall dimensions for the purpose of expansion of the nomenclature of the imported and exported goods, including industrial products, according to the production program under construction of Factory on ammonia and carbamide manufacture in Garabogaz, and also for the purpose of upgrading of an engineering infrastructure of mooring area within the allocated site. At that the most important is increasing of seismostability of berthing hydraulic engineering constructions.

The project includes three elements:
- Reconstruction of a mooring,
- Reconstruction of operational water area;
- Major repairs of access channels (dredging of the navigating channel).

Project EIA represents the documentation on expansion of a mooring and correspondingly assess an impact which can be caused by performance of works on mooring expansion.

2. LEGISLATIVE BASE

The constitution of Turkmenistan guarantees to people the right *on healthy environment* (Article 36), and defines national natural resources as non-recoverable national resources and consequently protection of these resources is a fundamental principle of a national policy.

The law of Turkmenistan «On nature protetcion» (2014) fixes the right of citizens of Turkmenistan, foreign citizens and stateless people on favorable environment, on its protection against the negative influence caused by economic and other activity (Article 9).

Nowadays issues of preservation of the environment and the state control over observance of the nature protection legislation in Turkmenistan are regulated by a number of laws on nature protection and corresponding sub-laws:

1) Law «On nature protection» (2014);
2) Law «On ecological expertise» (2014);
3) the Decree of the President of Turkmenistan on approval of «Procedures on performance of the state ecological expertise» (1996);
4) Law «On air protection» (1996);
5) Law «On ozone layer protection» (2009);
6) Law «On especially protected natural areas» (2012);
7) Law «On flora» (2012);
8) Law «On fauna» (2013);
9) the Code of Turkmenistan «On water» (2004);
10) the Code of Turkmenistan «On land» (2004);
11) the Forestry code of Turkmenistan (2009);

12) the Sanitary code of Turkmenistan (2009);

13) the Code of Turkmenistan on administrative violations (2013);

14) the Decree of the President of Turkmenistan on approval of the « National Plan of Turkmenistan on prevention and liquidation of oil spills» (2001);

15) the Decree of the President of Turkmenistan on the approval of the «National Caspian Plan of action (NKPD) of Turkmenistan» (2008);

16) the Decree of the President of Turkmenistan on the approval «Rules of protection of coastal waters of Turkmenistan from pollution by sea vessels» (2005);

17) the Decree of the President of Turkmenistan «On the Interdepartmental commission of Turkmenistan on Caspian sea issues» (2007);

18) the Decree of the President of Turkmenistan on the approval of the «Regulations on licensing of activity on use of natural resources and preservation of the environment» (2010);

19) the Decree of the President of Turkmenistan «On mandatory ecological insurance» (2013);

20) the Decree of the President of Turkmenistan on the approval of the «Rules of protection of coastal waters of Turkmenistan from pollution by sea vessels» (2005);

21) 21) State standard of Turkmenistan TDS 579-2001: «environmental impact assessment from economic and other project performance in Turkmenistan» (2001);

«Methods of an assessment and estimation of a damage to environment owing to pollution of water objects in Turkmenistan», and «Methods of an assessment and estimation of a damage to environment owing to pollution of soils in Turkmenistan» (the Order of the Ministry of Nature protection dated 09.02.2012, the State registration of the Ministry of Justice for №630 dated

02.03.2012);

23) Standard fees for environmental contamination by the enterprises, the organizations and establishments of all patterns of ownership located in territory of Turkmenistan (confirmed by the Order of the Ministry of Nature Protection approved by the Ministry of Finance, 2014;

24) Sanitary norms on of industrial enterprises projects SNT 2 (the Order of the Ministry of Construction №MB-94 dated 11.05.2009. The state registration of the Ministry of Justice №489 dated 19.06.2009);

Procedure of EIA performance in Turkmenistan, specified by the State standards TDS-579-2001 «Environmental impact assessment from economic and other project activity in Turkmenistan», includes the List of types of activity subject to EIA (specified in Appendix A to the above-stated standard).

According to the legislation of Turkmenistan, performance of EIA is a necessary condition at realisation of any planned activity and-or any project. Projects on the economic activities, new technologies and equipment, and also projects on reconstruction of the operating enterprises are subject to EIA performance and the state ecological examination according to laws and regulations on order of carrying out of the state ecological expertise.

Especially it is necessary to state, that at realisation of the civil-engineering design of the Factory and all its infrastructures **a special attention will be paid by the Consortium to nature protection requirements on economic activities** in a coastal zone of Caspian sea for prevention of environmental contamination of the sea and observance of obligations of the country under the Frame convention on protection of the sea environment of Caspian sea (the Teheran Convention), ratified by Turkmenistan in 2004, and also the

Report on protection of Caspian sea against pollution from land sources as a result of activity carried out onshore (joined Turkmenistan in 2012) to the Teheran convention.

Also it is necessary to stress, that «**Regulations on protection of coastal waters of Turkmenistan from pollution by sea vessels**» specify main principles and rules on prevention of pollution of coastal waters, measures on influence minimization on the sea environment at accidental or emergency spills, and also an interdiction for dumping of different types of waste and ballast waters in internal and territorial waters of Turkmenistan.

Therefore, EIA Report on the project «Expansion of a sea mooring port point« Garabogaz (Bekdash)» in Balkan welayat is carried out according to requirements of the Legislation of Turkmenistan concerning nature protection and prevention of possible negative impact on environment, including the sea environment of Caspian sea, and health of people.

3. LOCATION OF THE MOORING PIER

Administrative location

The site of projected expansion of an existing mooring is located on the bank of Caspian sea within sea port point Garabogaz (former Bekdash) area in Balkan welayat. The existing mooring is located perpendicularly to coastal line and is projected deep into the seas.

The general data on an existing mooring

According to the passport on a berthing construction the existing ferry pier is constructed and commissioned in 1986. The mooring is designed for performance of cargo operations.

The length of a mooring is 128.50 m, width – 15.35 m.

Mark at a construction bottom-7.100 - 6.600.

There was no reconstruction, restoration or mooring major repairs works.

Social and economic aspects

The site planned for expansion of a mooring, is located in the Turkmenbashy etrap Balkan welayat. The site has been used earlier. On this place the existing mooring pier is operated. The site of projected territory is located in its coastal part, extends in the sea by a mooring, at the distance of 1.25 km from Garabogaz, 85 km from the city of Turkmenbashy, 200 km from Балканабад.

On a site of expansion of an existing mooring there are central engineering networks of water supply and the water drain.

The site is located on distance of 1,5 km from a highway «Turkmenbashy-Garabogaz» and 1,5 km far from the railway.

Around a mooring, on the bank of Caspian sea a Water-desalinating unit (OU) of a project capacity 500 m^3 a day is located. Actual capacity is 280-300 m3/hour.

In the nearest settlements – Garabogaz and Turkmenbashy there is a population which can be involved for performance of construction and operation works.

4. CLIMAT CONDITIONS IN THE PROJET AREA

4.1 Air condition

According to data of Service "Caspian control" at the Ministry of Nature protection background concentration of polluting substances in the air in Garabogaz area are the following:

- Solid substances (dust) - 0,1 mg/m^3.
- dioxide nitrogen - 0,03 mg / м^3.
- Oxide carbon - 2.0 mg / м^3.
- Hydrogen sulphide - 0.001 mg/m^3

4.2 Climate peculiarities

Air temperature

The below-specified data on temperature of air are presented by meteorological station of Turkmenbashy (long-term average values):

Month	Absolute min.	average min.	average	Average max.	Absolute max.
January	-21.5 (1969)	-0.3	3.3	7.5	20.7 (1966)
February	-21 9 (1 69)	- .2	3.9	8.7	23.3 (2004)
March	-12.6 (1996)	3.2	7.7	13.1	29.0 (2008)
April	-2.6 (1976)	8.5	13.7	19.9	36.0 (1982)
May	0.9 (2003)	13.6	19.5	25.8	40.7 (2007)
June	6.6 (1978)	18.9	29.1	31.6	42.4

					(2010)
July	14.1 (1992)	22.2	28.2	34.6	44.7 (1993)
August	1 2 (1992)	22.0	28.0	34.5	44.5 (2006)
September	3.3 (1973)	16.7	22.7	29.3	43.5 (1972)
October	-2.9 (1987)	10.9	19.4	21.5	33.4 (1960)
November	-12.1 (1950)	5.0	9.3	14.2	28.1 (2006)
December	-16.3 (1948)	1.2	4.9	9.1	24.6 (1998)
Year	-21.9 (1969)	10 1	15 1	20.	44.7 (1983)

Parametre	**Winter(^{0}C)**	**Summer(^{0}C)**
Seasonal average	4,1	27,5
The maximum average value	9,9	32,3
The maximum fixed value	22,0	44,0
The minimum average value	-3,8	22,4
The minimum fixed value	-17,0	10,0

Average temperature

Average temperature of air at 13:00 in the hottest month of year, oC	+27.1
Average temperature of air in the coldest month of year, oC	+2.5

Temperature records for each day are defined as the lowest and highest value on daily data basis. Monthly records of weather are defined on a number of data on the monthly basis. Monthly data are taken for a period 1883-2012 - air temperature, 1936-2012 - precipitations.

Precipitations

Month	Norm	Monthly minimum	Monthly maximum	Daily maximum
January	12	0.0 (2003)	32 (1978)	17 (1978)
February	13	0.0 (2001)	51 (1952)	35 (1952)
March	17	0.0 (1937)	71 (1979)	32 (1979)
April	16	0.0 (1943)	88 (2003)	49 (2003)
May	9	0.0 (1958)	129 (1972)	68 (1972)
June	3	0.0 (1937)	26 (1969)	26 (1969)
July	2	0.0 (1938)	50 (1976)	48 (1976)
August	5	0.0 (1936)	32 (1990)	25 (1996)
September	5	0.0 (1936)	46 (1951)	44 (1982)
October	11	0.0 (1936)	51 (1965)	32 (1965)
November	19	0.0 (1976)	57 (1964)	31 (1964)
December	13	0.0 (1950)	46 (1991)	19 (1991)
Year	125	32 (1950)	221 (2003)	68 (1972)

Direction and speed of a wind

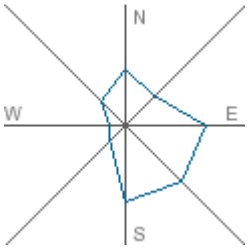
Frequency of a wind (numerator), %; average speed of a wind (denominator), м\с; a calm, %:

Wind direction	N	NE	E	SE	S	SW	W	NW
January								
Repeatability of a wind on rhumb, %	12/4.9	12/4.7	39/6.0	16/5.1	6/6.3	3/5.4	4/5.4	8/5.6
Average speed of a wind is based on long-term data, km/s11.0								

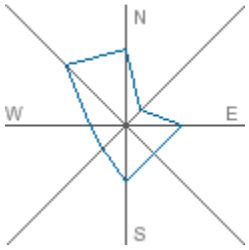
July								
Repeatability of a wind on rhumb, %	16/5.0	16/5.1	15/6.1	2/4.6	1/2.5	7/4.6	8/4.9	26/5.2
Average speed of a wind is based on long-term data, km/s1.0								

Repeatability of various directions of a wind, %

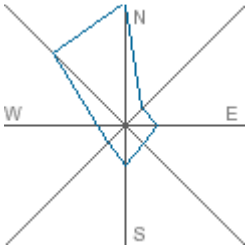
direction	jan	feb	march	apr	may	june	july	aug	sep	oct	nov	dec	year
N	14	17	19	19	22	29	31	28	23	20	7	12	21
NE	10	11	8	5	6	5	6	7	10	12	1	10	9
E	0	17	17	14	11	10	8	15	3	22	22	25	17
SE	20	16	11	10	7	6	7		9	11	17	24	12
S	19	17	15	14	10	8	10	11	11	13	16	17	13
SW	5	5	6	8	8	6	6	5	5	6	4	3	6
W	4	6	7	9	11	9	7	6	5	5	4	3	6
NW	8	11	17	21	25	27	25	20	14	1	8	6	16
still	18	18	18	19	18	13	13	1	19	2	22	18	18



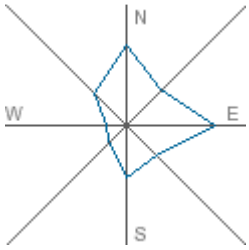
January



April



July



October

Humidity

Data on atmospheric humidity are accepted as following:

jan	feb	march	apr	may	june	july	aug	sep	oct	nov	dec	year
76	72	68	63	56	49	49	44	46	58	72	75	61

Height above sea level

Caspian sea is located approximately on 13 m below the average sea level.

4.3 Hydro-geological conditions

In the hydro-geological relation the area of the factory construction is a part of east part of Middle Caspian artesian basin and is dated to water-bearing horizon sea of Hvalyn adjournment (III century). Depth of laying level of subsoil waters changes from 5 m to 20-30 m. The increase in depths of laying of subsoil waters occurs while removal from Caspian sea. Water containing layers of a complex are interlaying sand and anisomerous sandstones, sandy loams, loams, sandy clay. The flow of subsoil waters is directed towards Caspian sea and Garabogazgol gulf with a bias 0.001-0.002.

On separate sites of Hvalyn water-bearing horizon it is subdivided by clay layers into two, and sometimes and on three sub-horizons. A water profuseness of Hvalyn deposits is weak. Efficiency of horizon is low; the water discharge in manually dug out wells, as a rule, is up to 0,01 l/seconds the Mineralization is very low from 0.6 till 27-36 gr/l and above. Mineralization change occurs like along the area, and within depth, with the tendency of increase towards Caspian sea. On its chemical composition the water is chloride- sodium, chloride-sulfate-sodium. An accumulating of underground waters occurs basically due to infiltration of an atmospheric precipitation which happens on all area of development of Hvalyn deposits and water steam condensation.

Subsoil waters on a site are met almost by all wells on depth of 2,4-5.7 m that corresponds to conditional marks of 9,8-8,7 meters.

In general, underground waters have a high mineralization, and their general salinity exceeds 50 gr/l on the biggest on part of water bearing horizon. Within a narrow strip along the Caspian coast, salinity of underground waters decreases, owing to mixture with sea water, and water contains a considerable quantity of chlorides of sodium and magnesium. Decrease in salinity of underground waters corresponds to increase of concentration of ions of magnesium and sulphate. Underground waters contain a small amount of microelements: iodine – 1,0-5,0 mg/l; bromine – 30-60 mg/l; borum – 15-30 mg/l.

Elements of a hydrographic network are erosive ravines and the channels of seasonal water outflows dumping waters of a superficial drain along land relief in the sea or no drainage kettles.

4.4 Geomorphological features

On its tectonics character the area of the factory construction is a part of a South Turkmen regional zone of the Turan plate and is dated to Krasnovodsk syncline, transitive from orogenic areas to a platform.

From orographical point the site is located in the western part of Krasnovodsk peninsula, in a southern part of a sandy massif of the Oktum-Kum. The desert Oktum-kum borders in the southeast on the Kubadag junction-block raise, in the east and the north-with area of a depression of the Krasnovodsk plateau (height Sarychingerek), in the west, north and northwest - with the coastal shore-saline zone bordering Caspian sea.

In its geomorphological structure the area of project works is a part of West Turkmen lowland, within sea abrasive-accumulative plain of Caspian sea (m III hv), located on absolute marks from (-) 20 m to +50 m.

Late tertiary abrasive-accumulatingplain was generated by receding after Hvalyn transgression Caspian sea and occupies the most part of Krasnovodsk peninsula. Sea Hvalyn plain represents itself a series of step terraces going down to the sea and coastal banks from gravel and a pebble.

There are two complexes of Hvalyn terraces: low Hvalyn, located above zero bed contour line, characterized of considerable wind-born sediments and an erosive partition and late Hvalyn ones, located on negative marks (to-16). The plain is composed from the sea sandy deposits containing large fragments of shells of Hvalyn molluscs, pebbles and clay, the general capacity to 10.0 m. The predominating factor of this area is deflation process.

On this part there are ancient wind-born deposit relief forms (eol Q_3), formed by wind blowing and re-depositing of the top layer underlaying sea Hvalyn sediments. In its cut old Hvalyn sandy adjournment contains large quantity of oolitic sandy grains and fragments of shells. Low Hvalyn deposits include grey and yellow-grey fine-grained sand and black clay, interlaying with breccia.

Sandy deposit Oktum-Kum laid by low Hvalyn sandy sediments extends from the southwest to the northeast almost for 80 km with a width in its northern part to 30 km, in southern part - to 7 km. This area is characterized by development of hilly-ridge and ridge-hollows semi-fixed and fixed sand. Hollows and falls in a relief are with takyrs (clay). In the desert centre there are mooving sand dunes. The length of dune ridge reaches 1 km, and width of 2-4 km.

The modern geomorphological shape of area has developed in the course of the continental long-term development which happens in post-akchalyg period. Since then to present time, the basic processes which have created its modern morphological shape are processes of arid denudation and, partial abrasions including, first of all, processes of physical and chemical aeration, deflations and erosion is till 15-20 m. of a relief Type is deflation-accumulative one.

4.5 Geological structure and engineering-geological researches

The platform is located to the north-east of Garabogaz. A relief of the platform which is a coast of Caspian sea is equal with marks from 10,3 to 14,8 m.

In its geological structure the area is composed of deposits of Quaternary period, formed basically from sea deposits and underlaying calcareous marls and sandstones Akchalyg stage N2aK. Quaternary deposits are presented by bulk soils tQ4; sand-shell rocks mQ4 and rare by loams ℓ-mQ4.

Bulk soil are found by boreholes within the construction site, their capacity is within range of 0,5 - 1,0 m. It is mainly sand with shells, limestone and marl rubble; and also construction debris. Mostly on the studied site sand-shell rocks of a sea origin prevail. At visual inspection sand is of yellow and grey colour, mainly large, seldom fine-grained and salted. Its capacity changes from 3,0 to 10,0 m.

The structure of sand layer is very not uniform; there is large variety of a material various coarseness on stratification. Large sand is observed from a surface almost everywhere. Below on a cut in sand there are lenses and layers of silty loams and sandy loams, with inclusion of gravel and a marl and limestone pebble.

On the mineralogical structure sand-shell rocks are a sea cockleshell of various dissociation and roundness with the average size of grains from 0,3

to 3 mm. Laguna-sea deposits ℓ-mQ4 have small capacities of 0,8-0,9 m. and the limited distribution. On an investigated site they are found in two boreholes and presented by silty loams, tight, with sand layers, nests and crystals of a plaster.

Loams lie down under sea sand shell rocks on depth of 9,2-9,6 m. Indigenous rocks of Akchagyl layer N2aK are presented by marl and sandstones. Marls are grey, wind born, weak and fissured. The drilled thickness is 0,1-0,3 m. Sandstone shell rock is found at several drilling. The drilled thickness is 0,2 m. At visual inspection sandstone is light grey, wind born and fissured, weak and fine-grained.

Bulk soils and the salted sand-shell rocks are very corrosive to metal.

According to the National card of seismic division into zones of Turkmenistan (1999г.) seismicity of area of a mooring is 7 points.

4.6 Description of flora and fauna

4.6.1 Flora

The coastal site is characterized by the rare hallophilic vegetation, mainly, salt resistant grass and wormwood.

Selitryanniki. This family Selitryanniky includes three different varieties:

- selityanka (Nitraria komarovii),
- selin (Stipagrostis karelinii)
- shorchair (Aeluropus littoralis).

This group of plants grows on low hilly sand on low places along periphery of sor depressions.

Wormwood is less often. Basically this variety grows in the western part of a site. The most popular variety is a wormwood kemrudskaya (Artemisia kemrudika). On coastal dunes one can find also a feather grass (Stipa arabica) and barley hare (Hordeum leporinum).

4.6.2 Fauna

The most widespread around area around a mooring, are invertebrate animals, including insects (Insekta), pincers (Acarina), spiders (Arania), wood lice (Isopoda) and grasshoppers (Tettigoniodea). A rich variety of invertebrate is caused by their adaptedness to local ecological conditions.

Around the site usually one can see reptiles. Saline soils and sandy massives are occupied by various versions of lizards - geckoes (Gymnodactus, Alsophylax, Cyrtopodion caspius), агам (Agamasanguinolenta) and sandy toad adamas (Phrynocephalus interscopularus, Phrynocephalus guttatus, P.reticulates).

It is possible to meet as well the Central Asian turtle (Testudo horsfieldi).
In area live an arrow-snake (Psammophis lineolatum), water (Natrix mosaic), a runner scales (Spalerosphis diadema schiraziana, Coluber karelini karelini. Besides, there one can meet sandy carpet viper (Echis carinatus pyrmidum) and the Caspian turtles (Mauremus caspica).

From a class of mammals (Mammalia) most typical by types and quantity are presented rodents (Rodentia), including leptodactylous gopher (Spermophilopsis leptodactylus), grey hamster (Cricetulus migratorius), gerbils (Rhombomys opimus, Merionesmeridianus), jerboas (Alactagus pygmaeus, Alactaga elater strandi), desert hare (Lepus capelsis) and others.

From predators there are wolves (Canis lupus desertorum), foxes (Vulpes vulpes), bandagings (Vormela peregusna) and corsac foxes (Vulpes corsac).

The geographical position and a variety of places of distribution has led to presence of the diverse bird's fauna consisting of several hundreds of varieties, including many sea birds who permanently live or winter at the Caspian coast.

The Caspian coast is characterized by a wide variety of water birds and coastal birds, including some migrating kinds, such as flamingo who winter around Hazar state natural resort, to the north from a project zone. Migrating types usually appear between September and October and remain all the winter long till the end of February.

Coastal birds are usually live in the Turkmenbashy gulf. In coastal bird's fauna the water herdboy, a heron and game (ducks and geese) prevail.

Water shepherdesses are presented by a bald-coot, a partridge and spotty crakes.

The most widespread herons include Kentsky plovers, the Indian lapwing, a usual lapwing and others.

Sea birds are presented by various morwennol and seagulls who are breeding in Caspian sea, including considerable colonies of sandwich morwennol, Caspian morwennol, thin beak seagulls and silvery seagulls. The smaller quantity of black-headed seagulls could be sometimes seen in a project area.

East coast of Caspian sea is the main route of migration for a considerable quantity of birds (not less than 5 million copies each season, that is in the spring and in the autumn).

Expansion of a mooring and its operation can create insignificant obstacles for avifauna, which could lead to some changes in an arrangement of rest spots of birds of passage. However it is necessary to notice, that the overwhelming majority of the avifauna is concentrated for wintering much further to the south, on territories of Hazar reserve.

As a whole, in territory of Krasnovodsk peninsula it is possible to observe 5 versions of flora and 12 versions of fauna recorded in the Red Book of Turkmenistan.

From the animals included in the Red Book of Turkmenistan, seldom one can meet a monitor lizard (Varanus griseus) and traces of a porcupine (Hystrix indica). Gerpetological data prove, that the population of lizards and porcupines increases. The area of distribution of a monitor lizard includes now the most part of territory of the country. The area of distribution of a porcupine moves, mainly, to agricultural areas where as a result of plantings

fruit and melon and watermelons cultures the favorable forage reserve is created.

4.7 Caspian sea

The physical-geographical characteristic

As the reconstructed mooring stands out from a continental part in the sea and influences at its operation all components of the sea environment it is very important, along with other parameters, to examine the characteristic of the sea environment of Caspian Sea.

Caspian sea is the largest on a planet inland without outflow reservoir, which level lays below the World ocean and is subject to short changes. The basin area is 3,5 million км^2. The sea washes coast of five states: Turkmenistan, Azerbaijan, Iran, Kazakhstan, Russia.

Proceeding from morphological features, Caspian sea can be divided into three parts: Northern, Average and Southern Caspian sea.

Temperature of sea water

On the basis of available data on temperature of sea water below-mentioned data will be used at designing:

parameters	Winter (^{0}C)	Summer (^{0}C)
surface	5,0	24,3
sea bed	5,0	19,0

Sea bed relief

On its physical and geographical aspect and on character of an underwater relief the sea is divided on three basic provinces corresponding to Northern, Average and Southern Caspian sea which are separated by Mangyshlaksky and Apsheron-Pribalhansky ridges correspondingly. The conditional border between northern and average parts passes in the area of an island Chechen - Tjub-Karagan town between average and: southern one – in the area of an island the island Ziloy – town Kuli .

The shelf of Caspian sea is on the average has a depth till 100 m. The Continental slope which begins below shelf border ends in the middle approximately on depths of 500-600 m, in a southern part, where it is very steep, of 700-750 m.

At east coast a shelf is more extensive, its average width about 130 km.

Northern part of the sea is shallow, its average depth 5-6м, the maximum depths 15-20м are located on border with the middle of the sea. The sea bed relief is complicated by presence sand banks, islands and valleys.

Sea level

In closed and no tides Caspian sea there are observed long-term, seasonal and level fluctuations.

In a long-term course of an average level the periods are alternated of low and high level. The highest level was observed in the beginning of XIX century in 1929. Owing to reduction of a river drain level has started to fall sharply; the lowest level was marked in 197r. Since 1979 sea level began to raise and by March 1995 it was high to the average level on 158 cm

Annual level of Caspian sea maximum is observed in June-August and a minimum in December - February. The size of seasonal fluctuations of levels is 0,3-0,4 m, and in some years about 0,6m. In the mouth of Volga river areas there are observed the most considerable seasonal fluctuations of level (on the average 1m).

These fluctuations of level caused by winds are observed across the sea, but especially in its northern part in November and December. Under the influence of strong long winds here are observed set-up of waters to 4,5 m and set-down to 3 m comparing to average level.

As a whole dependence setting up and down from a wind direction to Caspian sea can be characterized as follows: winds from the north and the northwest in northern part of the sea cause set downs, most strongly at the western coast. In an average part of Caspian sea there are set ups which size increases from the north on the south. However on separate sites in average and especially in a southern part winds from the north can cause wave set downs.

Winds from the east and the northeast cause set up waters in the western part of the sea and set down in east, and winds from the West on the contrary, set ups in east part and set downs in the western.

At winds from the south there are observed set downs in the western part of the sea and set ups in the east.

It is necessary to notice, that combinations of winds of various directions in separate parts of the sea create more difficult distribution of set ups and down.

Average duration of set downs and ups in described area is mainly 10-12 ч, maximum 24 ч, and in very rare cases can exceed two days.

In Caspian sea there are observed also seiche level fluctuations which do not exceed 0,5 m, and the period changes from 10 minutes till several hours.

Average long-term characteristics of currents of Caspian sea

Currents in Caspian Sea have complicated nature. The major factors forming a mode of currents are: winds, spatial heterogeneity of density of water, a configuration of a coastal line a sea bed relief, and in northern part of the sea, besides, a river flow. Wind currents prevail. Their direction in shallow areas as a whole coincides with a direction of dominating winds, and in deep-water it changes a wind direction to the angle of approximately 45 °.

The current following along east coast on the northwest, rather weak and unstable, but at winds from the south and the southeast can reach its speed 2 knots.

Hydrological mode

The hydrological mode of Caspian Sea is formed under the influence of following factors: climatic conditions, a river drain, depths of the sea, character of coast and tortuosity of a coastal line.

High temperature of air in the summer and a considerable quantity of clear days cause water warming up on considerable depth that influences density of water and icing of seas.

The river flow plays an essential role in distribution of temperature, salinity and water density in a coastal zone. Influence of a river drain is especially strong at northwest coast in a place of a confluence of the river Volga.

Distinctions in depths and a bottom relief in different parts of the sea also play the important role in a hydrological mode of the sea. In deep-water parts a lot of heat which strongly influences in the winter temperature distribution in the summer. The sea bed relief affects a mode of disturbance and currents.

Little tortuosity of a coastal line and absence of islands at the western coast of an average part of the sea and at southern coast of its southern part cause wave disturbance in these areas of the sea.

Shallowness of northern part of Caspian sea causes more intensive, than in other areas, vertical mixing of water weights, and in the winter, in a combination to low temperature of air, promotes forming of ice.

As a whole for a hydrological mode of Caspian sea the complicated system of superficial currents, prevalence of waves in height to 2 metres, considerable set ups and downs fluctuations of level and low enough salinity are the most dominant features.

Winds

Wind mode in various parts of Caspian sea is different.

Northern part of the sea. In the high sea and at coast all year round winds from the east and the southeast prevail which total repeatability in separate months reaches 60 %. From winds of other directions winds from the north, the northwest and the West (repeatability of each of them to 30 %) are frequent.

Average monthly speed of a wind everywhere is 3-6 km/s, and its maximum values are observed from October-November till April.

Calms are observed seldom; their repeatability, as a rule does not exceed 10 %.

Prevailing directions of strong winds are east, southeast and northwest.

Middle part of the sea. In the high sea and at the western coast all year round winds prevail from the southeast, the east - repeatability of each of them fluctuates from 20 to 40 %.

Average monthly speed of a wind in the majority of points is 5-7 km/s.

Repeatability of calms within a year is from 4 to 12 %.

The average monthly number of days with speed of a wind of 15 km/s and above, mainly from 2 to 8, and more often strong winds are observed from October till April;

Duration of strong and storm winds usually less than 12 hours.

The direction of strong winds, as a rule coincides with a direction of prevailing winds.

Southern part of the sea. In the high sea all year round winds prevail from the north. At east coast from October till February winds from the east and the northeast, their repeatability accordingly 20-50 and 20-30 % dominate; from March till September winds from the north prevail, which total repeatability is about 60 %. Average monthly speed of a wind is 3-6 km/s.

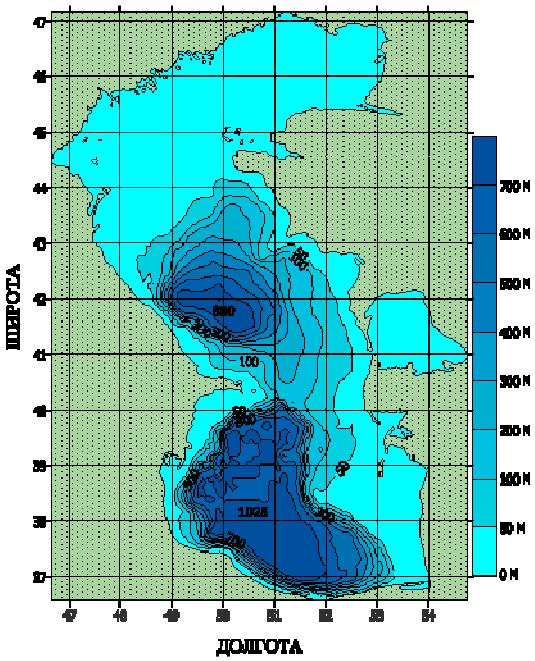
Repeatability of calms at east and western coasts changes from 3 to 14 %, only on separate sites of east coast in September - April it reaches 25 %. At southern coast repeatability of calms is 20-40 %.

The average monthly number of days with speed of a wind 15m/sec and more, as a rule, does not exceed 5. Such winds blow usually less than 12 hours.

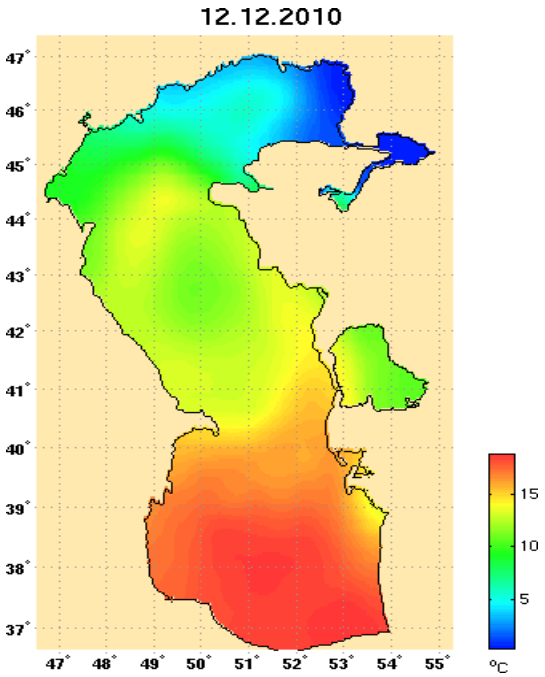
Breezes at southern coast of Caspian sea are observed all year round, and on other sites – from May till September.

The sea breeze usually begins in the morning, e in some hours after a sunset is replaced by the coastal. The sea breeze raises relative humidity and lowers air temperature, and coastal wind causes the reverse phenomena.

Currents *Depth*


ШИРОТА
ДОЛГОТА
700 M
600 M
500 M
400 M
300 M
200 M
100 M
0 M

Climat


12.12.2010
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The biological marine environment

Phytoplankton

Since fresh-water and sea types dominate in total amount of the Caspian phytoplankton, it is not a typical for central and southern part, where levels of salinity are maximals. Southern Caspian sea contains eurahaline (tolerant to a wide range of salinity) types, a sea, coastal type and a type which exist in salty waters. About 118 varieties and subspecies have been registered, which is less, than in northern part owing to absence of fresh-water types. Dominating forms are green-blue seaweed, diatomaceousseaweed and green seaweed.

Zooplankton

Variety of a zooplankton in Caspian sea as a whole is not so various. Local types, including variety predatory crustaceaare well presented in the south. In southern basin there are 44 types of a zooplankton, with dominating types *Eurytemora* and *Liocalanus*.

Until recently the Mediterranean complex of fauna has been presented only by several types of a zooplankton. However, in the late seventies 20 centuries, *Acartia clausi* has appeared for the first time in Caspian sea and began to increase since then in the big sizes. Larvae Mediterranean natural invertebratealso become a growing important component of a zooplankton (Kosarev and Jablonsky 1992, Grigorovich and other 2003).

All type of the Arctic complex are limited by deeper parts of the central and southern Caspian sea. Misids are especially important component in a sea zone. Sea misids are found out in a plankton on depths from 20 to 500м. The biomass of misids within some months, especially in deep-water zones of the

central Caspian sea, can exceed joint quantities of a biomass of other zooplankton.

Phytobenthos

There is no abundance of sea macrophytes (sea seaweed and blossoming plants) in salty water of Northern Caspian sea in Southern Caspian sea owing to the extreme salinity which leads to decrease of a variety of blossoming seaweed.

Dominating sea macrophytos in Southern Caspian sea are *Zostera minor, Ruppia maritima* and naiad *Najas marina*. Kind *Zostera* minor especially widespread in open water, but also grows on shoal in gulfs. It is observed in several places at coast of Chelekensky peninsula and in the Turkmen bay.

Zoobenthos

The large scale of distribution of structures benthonic invertebrates in Caspian sea in the majority are resistant to salinity. Hence, the fauna in Caspian sea includes sea invertebrates of the Mediterranean origin while northern basin includes low setaceous and hyronomides larvae which mainly are fresh-water living.

Forty four types of benthonic invertebrate have been registered in southern Caspian sea. Dominating kinds are many setaceous *Nereis diversicolor (Hediste diversicolor)*, folding molluscs *Cerastoderma lamarcki, Didacna barbotdermarnyi, Dreissena rostriformis, Abra ovata* and *Mytilaster lineatus,* and also crustacea *Balanus improvisus, Niphargoides grimmi, Pontogammarus maeoticus, Corphium chelicorne, Rithropanopeus harrissi,*

Paleaomon adspersus and *Pelegans*. In Caspian sea it has been registered, that to 36,4 % of benthos consists from side swimming crustacea.

Sea communities also differ at smaller distances. Such distinctions often concern physical and chemical variables, such as depth and distribution of particles of deposits. There are three main sea communities:

- *Side swimming dominating communities*. Amphipodas (mainly *Corophium* and *Chaetogammarus*) were dominating fauna in the western part of the Block II. Many setaceous *Ampharetid* also often met in the majority of these samples. Some samples within this group have been rather diminished.

- *Layers of mussels.* In some zones layers of mussels, basically consisting of *Mytilaster lineatus.* Other small molluscs, as for example *Pyrgohydrobia spp* and presented folding molluscs *Abra ovata,* have been found out among mussels. Crustaceas, especially side swimming freshwater hoppers (mainly *Chaetogammarus*) and *Corophium* were also quiteoften. These communities basically have been found out in an average part of the block on depth to 20m.

- *Communities of Abra and lowsetaceous* . In smaller areas benthos is presented of big number of folding molluscs *Abra ovata*, and also numerous *lowsetaceous* and imported flat worms *Nereis diversicolor (Hediste diversicolor)*.

Fish

The fish fauna of Caspian sea is represented of 126 varieties and subspecies, with prevalence of cyprinid. Low concentration of a zooplankton and benthos are insignificant.

Unlike invertabrates, some kinds of fishes have been imported from the Mediterranean sea. It is Atlantic silver salmon, subspecies of a sea needle, a golden-grey mullet and a jumping mullet.

The local component of fauna is characterised by a variety both endemism of bull-calves and herring. Sturgeons also are diverse. There are six types of sturgeon (sorts *Huso* and *Acipense*) in the Caspian sea which produce to 90 % of world reserve caviar.

The fish fauna of Caspian sea can be divided into four unions, on the basis of their inhabitancy and a life cycle, i.e. a kind of the present sea fishes, the fishes on migration, semimigrating fishes and river species. Some of them are used for fishing industry, in particular small fry, a herring, a mullet and sturgeon.

- The Turkmen small fry is concentrated in Atrek basin and the surrounding sea, extending to the north not further, than the Krasnovodsk gulf.
- To herring are presented by two types in a project zone: herring Alosa caspia which all year round is present near coast of Turkmenistan and herring A.brashnikovi who winters in the south.
- The mullet is observed on a sea shelf of Turkmenistan, in the spring when it moves on the north from the wintering near Iran. It extends within summer during feeding in the sea for returning to wintering in the autumn.

- Sprats throw caviar and winter near coast of Turkmenistan, especially near the Krasnovodsk gulf and southern Chelekensky gulfs. They move further from coast also extend to the north for feeding in summer months.
- The most important types of sturgeon are beluga, stellate and Russian sturgeon. All three types winter in a project zone while beluga and stellate sturgeon meet also in the summer. The zone round island Ogurchinsky also is known as a zone of growing of young beluga.

Fishery

Around the site there are about 50 % from 64 types of the fishes living directly in the sea. Most numerous of them are herring, cyprinids, goby, mullets, sturgeon, crustasea.

In Caspian sea lives three types of sprats, some transitional and local types and subspecies сельдей (all types), mullets (before spawning and, especially first time, after spawning the big concentration of fishes and young fish are extended along the coast throughout tens in km on the surface of water), cyprinid (kutum and rybetz), sturgeon (a sturgeon and stellate surgeon, beluga is extremely rare), numerous types of bull-calves, crusrasea (crawfish and shrimps).

The area above the bay Kianly is a good place for feeding different types of fish, especially juveniles. The main area of the bay is shallow, the bottom is covered with marine vegetation, the bay is rich in food organisms, phytoplankton and zooplankton, benthos. It is fenced off from the sea, stone ridge, has an extensive zone of influence, since it covers most of the shallow

waters along the coast from the ravages of the coastal zone, the northern and north-westerly winds.

Marine Mammals

Marine mammals are represented by the Caspian seal. The Caspian seal is the only marine mammals inhabiting the Caspian Sea. Like its relative the Baikal seal, Caspian seal population is considered to be annular seal, which developed in isolation, becoming endemic to the Caspian Sea. There is a small population nowadays due to excessive hunting for centuries and still going on in some regions. They are described as "vulnerable" in the Red List of Threatened Species IUCN (International Union for Conservation of Nature).

Caspian seals eat different fish, including crustaceans, gobies, herring and coho salmon, although about 80% of their diet is sprat. They migrate, trying to get on the ice in winter in the Northern Caspian, moving south in the spring for feeding and breeding. From May to June seals most vulnerable, because they have not yet fattened their fat reserves, following their migration to the south. Seals also molt in the spring. During the summer there is an output only young; adults spend most of their time at sea, even sleeping on the surface of the sea. Adult are very sensitive to the impact of an oil spill at this time.

4.8 The presence of archaeological, historical and cultural monuments on the project site

On the site there are no archaeological, historical and cultural monuments.

4.9 Environmental and other restrictions

Representatives of the local flora and fauna listed in the Red Book of Turkmenistan, on the project site are not revealed.
The territory of the state natural reserves, natural parks, zoological nature monuments at the site of the project are not present.
Cultural heritage and archaeological sites on the plot of land considered as absent.

Water protection zones and coastal protective belts

On a project site zones of restriction uses related with necessity of observance of a special mode of use are allocated.

The industrial platform of the port point Bekdash is located in a water protection zone.

Within water protection zones coastal protective belts are allocated where additional restrictions of economic and other activity are provided.

Observance of a special mode in territory of water protection zones is a component of a complex of nature protection measures on improvement of a

hydrological, hydrochemical, hydrobiological, sanitary and ecological condition of water objects and an accomplishment of their coastal territory.

The sizes and borders of water protection zones and coastal protective belts and a mode of their use are established, proceeding from physical-geographical, soil, hydrological and other conditions taking into account the forecast of change of a coastal line of water objects.

Within area of water protection zones designing, construction, reconstruction, commissioning and operation of economic and other objects are supposed only under condition o providing protection of water objects from pollution, a contamination and an diminishing of waters according to the water legislation and the legislation in the field of preservation of the environment.

5. THE REVIEW OF PROJECT SOLUTIONS

5.1 Data on an object functional purpose

The reconstruction purpose of fitting out of a mooring is the increase in its parameters for mooring of vessels with the big overall dimensions. Working out of project solutions on increase in parameters of a mooring according to the project requirements is executed according to dimensions of a conditional vessel with admissions: length of 155 m, width of 20,5 m, a draught of 8,4 m, height of a above water board to 11,5 m.

The technology and the works organization at the present stage remain at existing level. Constructive decisions are defined from a condition of mooring of a rated vessel with observance of industrial, fire, sanitary, ecological safety and a labor safety according to requirements of acting standard documents. The made decisions allow to improve technology and the works organization on a mooring, introduction of the newest technological processes and operations, methods and ways of the organization of work within the framework of current activity on modernization. In existing territory functional zoning taking into account technological communications and fire-prevention requirements is provided. All territory is divided into zones:

- adjoining territory;
- Rear zone;
- Zone of open warehouse platforms;
- The industrial zone including industrial buildings and constructions.

Производство работ по реконструкции причала осуществляется в границах территориальной зоны.

5.2 Scheme of delivery of a carbamide to a mooring

Mooring reconstruction/expansion are related, first of all, with an export possibility to the international market of products of Factory in Garabogaz, namely a granulated carbamide, by sea transport.

Under previous scheme the granulated carbamide was stored in warehouses of Factory and loaded in trucks at the speed of 320 t/hour then went for shipment to a mooring.

Under the new scheme capacity of reloading is increased up to 1200 t/hour. In factory area the new container platform for the empty containers arriving from a mooring is constructed. According to the new scheme transportation of a granulated carbamide is possible in two ways: wagons with loaded containers and by tape conveyor from factory to a mooring, distance about 2-3 km, accepting production from warehouses of factory productivity 1200 t/hour. In territory of new expanded mooring, in its coastal part, there will be constructed a container platform for reception of loaded containers. On a mooring loading of vessels will be provided in containers by crane equipment and a carbamide in bulk from bunkers through auger devices. At the moment of loading of a carbamide in bulk there could be emissions in atmospheric air of a carbamide dust.

5.3 Relief and drainage system

Directly pocket and territory of an existing mooring is filled up by technogenic soils which are filled as bulk soil, by the form an initial material is natural large rocks, sandy and coherent soils; on consolidation degree of a filling - to compacted. Technogenic soils lie down on a mooring surface.

The drainage system from mooring territory is carried out in earlier constructed drainage tray with the further rain waters supply through system of the closed rain water drain to treatment facilities. For safety in case of hit on a tray of wheel motor transport, overlapping of trays by lattices is provided.

The water collecting tray blocked by lattices, is provided from monolithic ferro-concrete in width of 0,3 meters, length 231 meter and with initial depth заложения 0,3 meters. For drain of rain waters from a water collecting tray, a drainage sink is provided.

All rain drain from mooring territory it is taken away by the closed network to local treatment facilities located around a mooring.

5.4 Characteristics and technical indicators of transport communications

The entrance to projected constructions is carried out on existing highways with asphalt concrete coating. Internal motorways provide technological and fire-prevention access to industrial buildings and warehouse platforms.

Coating of existing access roads is asphalt concrete and cement concrete. Under the project it is asphalt concrete.

Technological passages are combined with fire-prevention ones with an exit on existing port roads

5.5 Description of a design

Mooring is represented by "Larsen-V" single-tier anchoring two layers thin wall from metal grooves. From the front (ferry) part of a mooring it is installed modular ferro-concrete end wall to which frames of fender devices are fixed by chains. From the back side of a mooring – fender from monolithic ferro-concrete. The space between mooring walls is filled up by a sandy ground. The end wall part of a mooring has rounded shape on outline and strengthened profile. Here are established forward folding sign and projector mast, and there is lifted on 2.3 m over territory of a pier a platform with mooring pillar and a gangway. Mooring pillars are located also on the back side of a pier. On a mooring there are 3 types of fending devices. On a mooring there a crane he track in width 10.5m and two railway lines on the tie-ballast track. The territory coating is provided from concrete plates of thickness 14 cm

1 type of fending devices – for a ferry mooring in a type of fending dolphins which represent designs from metal pipes with the boards fixed to them from vertical wooden bars. From the rear party of a tubular frame there are holders with the shock-absorbers established in them from rubber pipes Д=400мм, length 500мм. The top part of a frame fastens extension chains to the end-wall.

2 type – for a front part of a mooring – from vertical elements, each of which consists of three rubber cylinders D=400mm, length 2.0; 2.0 and 0.5 m hanging on one general chain.

3 type – for a rear part of a mooring – represents suspended at mooring pillars on chains links from old tyre covers.

Results of inspection of an existing mooring

As a result of control inspection of moorings and diving inspection of a bottom of operational water area of a mooring besides defects of hydraulic engineering designs, the following technical condition of a mooring is revealed: discrepancy of actual marks of a bottom at moorings with the project ones; destruction of coverings of moorings; ground sagging; there are many garbage subjects of adjoining water area and along mooring walls.

Besides other fending type 2 devices on a mooring end-wall are absent; from the rear party of a pier fending devices of type 3 places are absent, tyre covers have ruptures, the number and diameters of tyre covers mismatch the design values; wooden bars of boards of fending devices of type 1 are broken out on the top part, have cracks and fissures; there are no covers on vertical tubular elements of fending frames, and also are absent or rubber inserts-shock-absorbers are of smaller diameter; the mast has no rail protection, it is not painted; a platform rail protection in a pier end-wall is absent; guard timber is destroyed in some places, in a front part of a mooring the wooden timbering is not removed from it; in a rear part instead of destroyed guard timber unpainted semi-pipes D=350мм are used; the electrical column has no grounding; the cable tray is hammered, wires are

laid in not isolated pipe, and in connection places to a mast and folding sign – in short pieces of pipes without isolation; Outlines of a end-wall of a mooring in the plan mismatches the project; concrete end-wall a mooring in cross-section section has cracks; the territory coating of concrete tiles is absent; the existing concrete coating on the most parts of territory of a mooring has hollows and cracks; on a site of interface of a pier with head foundations in a ferry box there is no wooden board of the fender.

5.6 Process of reconstruction

It is required to execute repair work on dredging due to silting, to increase number of fender devices and to repair existing devices, to restore the destroyed facing plates. It is necessary to consider, that water is very aggressive to metal structures, and low aggressive to armature of ferro-concrete designs: at regular immersing, and very aggressive in a zone of regular wetting.

Mooring reconstruction provides:

- driving in of edging from groove type PShS 45-150-3245;
- filling of pockets between existing and projected walls by stone in weight 15-100kg;
- Dismantling and restoration of an existing coating;
- removal of filing territories to a mark of +1,4 m (under the device of anchor systems);

- driving in of anchor walls from groove PShS 45-150-3245;

-Packing of anchor draughts in diameter of 80 mm and flight of 2 m in tuss of existing end-wall;

- The construction of ferro-concrete end-wall on end-wall of an existing design;

- Installation of fenders;

- Installation of mooring devices of type TCO-80 on distance of 1 m from a mooring cordon in line with existing pillars.

Purpose of fitting-out mooring is the same.

The works include following:

- Mehanical assembly,
- Pipeline,
- Power system,
- metal works,
- Painting,
- mooring tests.

At a mooring it is provided to carry out complex repair (as a variant, separate repair services, navigating repair).

5.7 Sea vessels parameters

The nomenclature of vessels at fitting-out mooring is defined by the operation program. Below data on description of vessels for working out of the plan of pier is specified. Namely:

- Type of the greatest vessel which will be used for Garabogaz – is on a route to Baku:

- Total length – 140 m;
- The general width – 17 m;
- Depth – 6 m;
- Height over a waterline – 15 m;
- Draught – 4.6 m in the sea;
- Load-carrying capacity in the sea – 6528 т;
- Number of containers – 274 (204 in hold + 70 deck).

- Parameters of a vessel of the smaller type for loading.

Universal vessel, the dry-cargo ship, one-decked, with an engine and bridge arrangement in a fodder part, no crane, box-shaped, a flooring of a floor from a steel:

- The nasal maneuvering device – is not present;
- Length of a vessel – 108.4 m;
- Width of a vessel – 14.8 m, height – 5.0 m;
- Draught on the main waterline – 3.26 m;
- Ballast draught – about 2.6 m;
- Gross tonnage – 2544 т, pure capacity – 979 т, deadweight – 3004 DWCC = nearby 2930MTC;

Displacement – 4397 t;

- Capacity of holds – 4383 m^3/154719 pounds 3;
- Hold 1 – 1062 $м^3$;
- Hold 2 – 1118 $м^3$;
- Hold 3 – 1118 $м^3$;
- Hold 4 – 1085 $м^3$.

- Parameters of the smallest vessel of type for containers

- Total length – 129.5 m;

- Width – 15.8 m;
- Draught – 3.7 m;
- Displacement 4130 t;
- Total load-carrying capacity – 4000 т.

5.8 Mode of pier operation

With a view of increase in throughput of a mooring and effective shipment by the project it will be developed two basic variants of loading on a vessel of products made at Factory:
- Volume loading (in bulk);
- Production loading in containers.

In case of carbamide loading on containers, they are delivered by motor vehicles to a mooring, where are reloaded into vessel holds.

For loading of a carbamide in bulk from Factory the carbamide goes on the tape conveyor to a mooring where bunkers are filled, and then there is a filling of holds through hatches.

In case of mass *loading* the mooring should provide shipment:
- Daily industrial volume 3x 3500 MTC=10500 under normal weather conditions, at work 24 hours a day (including all factors: the equipment of working speed, time for customs registration, boundary formalities, preparation of operations, a vessel mooring/demooring etc.)

In case of *loading* of containers the mooring should provide shipment:

- Daily industrial volume loading 2x3500 MTS = 7000 at work 24 hours a day. «The stock factor» at loading in containers is accepted low, than at loading by bulk because on loading in containers weather conditions do not influence and it is not required to perform cleaning and preparation of a vessel for loading.

To fulfil these requirements it is necessary to satisfy following conditions:
- The equipment should is capable to carry out to 1200 MTS per hour at loading by bulk;
- The equipment, and also container platforms should be capable to carry out operation on reception of 350 empty containers + 350 loaded containers a day.

For this purpose it is required not less than two cranes working on average speed of 17-18 containers an hour. Necessary access to a mooring for an unloading of empty containers, their carrying over and loading should be provided.

- Simultaneous mooring of two (2) courts (one should is under loading, one more prepares for loading or prepares for departure after loading works) should be provided;
- Simultaneous loading of two courts is not obligatory a condition until reloading capacities is provided.
The equipment allows working on both sides of a mooring both for containers, and for loading of cargo in bulk.

Speed of loading

Daily speed of loading onboard a vessel should be considerably above, than daily capacity. It is connected by that can influence loading of sea vessels:
- Weather conditions which can lead to delays of movements of a vessel during swimming, loadings and unloadings;
- Mooring of empty and not approach of the loaded vessel to a place:
3-4 hours on preliminary operations can be needed before loading will begin and will come to the end to anchor a vessel, check of cleanliness of empty and then loaded vessel, to define full quantity of the loaded cargo.

The plan of loading of a vessel a carbamide is offered for approval.
Option 1: loading of containers with a carbamide on a type vessel of "the smaller size» two (2) elevating cranes on a mooring. This schedule models operation on loading on a continuous basis within 1 week. It meets requirements of high level Trammo 2x3500 container loadings.

Option 2: loading of containers with a carbamide on the biggest vessel two (2) elevating cranes of a mooring. This schedule models operation on loading on a continuous basis within 1 week. It meets requirements of high level Trammo 2x3500 container loadings.

Option 3: loading of carbamide in bulk aboard the "smaller" one (1) by regular truck vessel. This chart simulates the loading operation on a continuous basis for 1 week. It meets the requirements of high-level Trammo 3h3500 bulk handling tpd.

Calculation of requirements on trucks at the plant and the size of the

container yard (storage only of loaded containers)

This schedule simulates operation on filling container in the factory, and stacking them on the container ground within 91 minutes corresponding to a factory rate of continuous operation loading of 1 container (4h80t / h = 320t / h, 16 containers per hour). This allows loading and stacking containers 175 of carbamide a day (16.6 hours is required for the loading volume equivalent to the daily production of the plant, therefore leaving 7.4 hours per day for maintenance and use of other transport equipment for loading operations).

For planning and calculations it is assumed that the minimum 540 empty containers will be delivered initially to start commercial operations of loading the factory.

In case of failure of the belt conveyor or loader vessel, a back-up operation is scheduled for loading of 320 tons / hour, i.e. approximately mts 6400 per day.

6. THE CHARACTERISTIC OF SEPARATE PARAMETERS OF TECHNOLOGICAL PROCESS

The repair works at a mooring is performance of separate technological operations and in its majority, both on time, and on the sequence, are not dependent. Technological processes and operations are based on modernization of the existing operation equipment.

At a mooring there are mainly dismantling-assembly repair works to be done and control and metering and test works on following systems and units:

- Hydraulic systems;

- Ventilation and air-conditioning systems;
- The deck equipment;
- Electric equipment and ship automatics;
- Pumps and fittings;
- Ship internal combustion engine;
- turbocompressor;
- hatches;
- welding works of the above-water part;
- Piping.

Basic technological processes include metalwork, assembly, testing, welding, assembly and painting technological operations. All operations are carried out with use of the modern process equipment, general use equipment and tools.

Delivery of all cargoes to a mooring pier is carried out as inter factory turnover of goods from warehouses and main shops. The biggest volume of cargoes occurs between fitting-out mooring and production unit. Transportation of cargoes basically is carried out by wheel machinery and the tape conveyor. Cargo handling works on a mooring are carried out by the portal crane or the crane-manipulator.

For operation process the reconstructed mooring is equipped by following equipment:

– The crane portal – 1pc.;
– The crane-manipulator - 1 piece;
– A loader frontal – 1 piece;
– The compressor electric mobile capacity of 28 kw – 4 pieces;
– A theodolite with a set of adaptations;

– Carts for transportation of gas containers.

7. CONSTRUCTION WORKS

8.

The construction/expansion site is connected to a factory dirt roads system.

Existing coating of the site is cementing concrete. On the site there are existing portal cranes, drainage tray with a grid.

The bottom of a mooring at the bottom of water area is presented by limestone, a marl lie and sand with shell.

A pocket and territory of an existing mooring is filled up by anthropogenic soil which on its filling method is considered as bulk soil, by the form of a primary material is natural fragmental rock, sandy and consolidating soils; on degree of filing compaction as packed. Anthropogenic soils lie from a mooring surface down.

The construction site is located in the port zone protected by a solid fence and having system of protection and security illumination.

At manufacturing of monolithic ferro-concrete head a concrete B25, F200, W6 type on sulphate-resistant Portland cement is used. Reinforcing of the end is carried out by reinforcement of a regular profile.

Existing anchor bars do not have sufficient bearing ability to stand the increased loadings. Therefore the project provides the installation of new anchor bars. Diameter of installed anchor bars is 80 mm, an installation step – 2 m.

For the anchor bars installation a partial dismantling of existing end wall (for example, tuss) till a mark a minus of 0,60 m. is performed

After anchor bars pulling through below under crane track beams its installation to new interlocking wall and anchor wall should be made.

Filing up is performed by a good quality rocky soil. Under crane tack beams filling should be made by rubble of a coarseness 20 - 40 mm with its compaction.

Near to a cordon four distributing power columns of type EPS-400 should be installed to connect sea vessels to onshore power system. Power supplies of columns are carried out from switching board on the underground cable laid inside a pipe.

At points of crossing of communications with existing engineering networks or laying near the foundations of buildings and constructions it should be laid in protective cases. Diameter of a case should be 150-250 mm more than the diameter of the working pipeline.

In mooring territory the monolithic concrete coating should be made.
All building designs and products are delivered from local manufacturers and suppliers.

The preparation stage

Before erection of edging, the preparatory and dismantling works should be performed:

- Dismantle of pole fenders (rubber cylinders D=400 of mm);
- Dismantling of a coating and removal of a soil from mooring territory;
- Partial dismantling of an existing ferro-concrete superstructure and stone massive;
- Dismantle of mooring piles.

The basic requirements for the preparatory period:

1) Temporary power supply is carried out from diesel engine-generator PSM AD60 (60кВт, 60Гц), the lining of power cables of under the regular scheme is carried out at the main construction stage.

2) Prior to work commencement, all necessary materials and adaptations should be prepared, to places of manufacture of works necessary machinery and equipment should be delivered. The workers occupied in works with harmful or dangerous working conditions, should be provided with special clothes, footwear and other personal protection means and with personal hygiene means– washing off and neutralizing means,

3) Temporary water supply is carried out by transporting water. Water for technological process is stored in separate tanks (during winter time – with heating), potable water is stored in the enameled tanks of a capacity of 20 liters, no longer than within 24 hours. The average quantity of potable water,

required for one worker is defined as 1,0 - 1,5 l in winter; 3,0 - 3,5 l in summer.

4) All personnel involved in construction works should be provided with the good-quality potable water corresponding to requirements of acting sanitary rules and specifications.

5) a construction site Illumination to execute by the flood lights installed on wooden support.

6) External fire extinguishing is performed out from the existing fire hydrant located on distance no more 150 m from a construction site.

7) Household premises should be provided by primary fire extinguishing means according to PPB-01-03, and by a mobile communication.

8) Земляные работы осуществляются экскаватором с емкостью ковша 0,5 м^3.

9) Dismantle of ferro-concrete blocks is carried out by means of a dredge equipped with a hydrohammer. Removal of ferro-concrete panels is carried out by means of a truck crane

During performance works on mooring expansion it is supposed to perform following types of works.

The basic period:

a) construction of a berthing wall from groove mark NS-SP-V L;

b) Fixing of a groove NS-SP-V L by bars to anchor wall;

c) filling of a soil till a mark of a line of a cordon;

d) construction of monolithic designs of a superstructure;

e) installation of mooring piles;

f) installation of fenders;

j) Installation of power system (under the project scheme) with their connection to distributing columns.

Besides other mooring expansion is it is required performance of auxiliary types of works, namely:

- Earth works (removal of a ground of project scope, digging of a foundation ditch, etc. under objects onshore warehouses, terminals for storage of the granulated carbamide),
- pilling piles in a sea bottom;
- Ferro-concrete works (pouring of geometrical reinforcing forms by a concrete mixture which are a basis of overlapping and support pylons),
- filling of pockets by rock soil;
- Installation of water tanks,
- Construction of buildings and structures, the technical block including transformer substation, emergency diesel engine,
- Mechanical works (different),
- Electric works (layinf of cables, illumination connection and so forth),
- Works on the device of underground technical structures (galleries), the storm water drain;
- Works on asphalt laying;
- Construction and installation of designs;
- welding, painting works etc..

The quantity of the basic construction materials as follows:

Length of the reconstructed site	M	236,0
Monolithic ferro-concrete of the top structure of a mooring:		
- concrete B25, F200, W6	m3	661
- reinforcement class A-III	t	42,5
Metal, namely:		
groove NS-SP-V L	t	1604
channel 27П	t	26,2
range □ 80 mm	t	84,5
Metal designs steel ones Ст3	t	113,3
Rubber ones fender devices h=600 мм, L=1,5 m	pc.	29
mooring piles bars 60 тс	pc.	10
Coating of the territory:	m2	5200
concrete	m3	1040
crushed stone	m3	1560
electrodes	kg	550
diesel fuel	t	2600

Requirement on power and water for the construction works

The requirement for power is defined from number and capacity of electrical consumers on a construction site taking into account factor of simultaneous work. Electrical consumers at construction stage are temporary premises of builders, welding devices, electrical vibrators.

To provide required project capacity on a construction site to use available near construction site objects, transformer substations. Laying of electric power to consumers is carried out by the cable lines laid on temporary support.

Requirements for construction works in *the compressed air* for performance of construction and installation works are satisfied by mobile compressors.

The total expense of electrodes on performance of welding works during construction period is 550 kg.

9. ENVIROMENTAL IMPACT ASSESSMENT DURING MOORING EXPANSION

At EIA elaboration analyses of potential sources of influence which is in general performed according to investigation of interaction between planned activity and existing characteristics of environment under the influence of human activity. So, influences on environment result from interaction between harmful factors of environment and recipients of environment. In

this project, recipients are people and environment consists of following components: air, marine environment, soils, subsoil waters.

8.1 Types of influence (impact)

Potential types of influence on environment are:

- Emissions of harmful substances in atmosphere at operation of motor transport, diesel installations of sea vessels and the construction equipment on the project construction site;
- The construction debris formed on the construction site;
- Noise influence of construction machinery and vessels in the construction site.

Under the present project it is possible to define three directions of nature protection activity:

- Reduction of emissions in atmosphere;
- Prevention of pollution of water area of Caspian sea;
- Minimization of pollution of a top soil.

8.2 Air impact assessment

Pollution sources, qualitative and quantitative characteristics of emissions of polluting substances

Principal view of influence of economic activities on a condition of air basin is a pollution of atmospheric air by emissions of polluting substances.

The atmospheric air impact assessment is made for the purpose of acceptance of ecologically related administrative decision on possibility of realisation of project activities by means of definition of possible adverse influences, an estimation of ecological consequences, working out of actions for reduction and prevention of influences. For this purpose following challenges have been formulated:

- Identification of sources of emissions of polluting substances in atmospheric air;
- Quantitative and quality standard of emissions of polluting substances;
- Working out of the actions directed on preservation of the environment during project activity.

The present project considers influence for an expansion/construction stage. The standard approach based on comparison of calculated concentration of polluting substances (3B) in a near ground layer of atmosphere with maximum permissible concentration (maximum concentration limit) of inhabited area has been applied to definition of degree of risk of pollution of atmospheric air.

Thus it is necessary to consider, that at a construction stage of a mooring a period of impact on quality of atmospheric air will be very short.

The analysis of methods of works on mooring reconstruction of a port point Garabogaz (Bekdash) allows to define the basic sources of pollution of atmospheric air which some types of the equipment and machinery produce. During construction stage there will be a pollution of a near to ground layer of atmospheric air from:

- Toxic emissions of engines of road-construction machinery, cargo motor transport and sea vessels with units for piling piles, mechanisms and cars (mobile sources);
- The dust lifted in air at construction work and movement of motor transport;
- At the account of emissions from performance of welding, painting works, cutting of metal;
- The engine of a diving boat at water area inspection;
- Excavations.

The scope of construction works on construction of buildings and structures during which time there is an air pollution include following:
- Works on a construction of a zero cycle and general construction works;
- Installation works, equipment installation.

At the construction stage the main emissions are made by mobile sources of pollution. Sources of pollution of atmosphere during construction are the technological processes related with work of engines of cars and the construction machinery, handling of loose materials (a ground, rubble), electric welding work.

The quantitative estimation of emissions of polluting substances from sources from the project activity was carried out according to acting standard and procedures and the accepted design solutions.

At definition of level of influence during mooring expansion the most adverse period was analyzed, considering the most intensive emissions during the most busy construction period - work of port ships, construction machinery and equipment, performance of basic construction activity.

Components	Is maximum-one time maximum concentration limits, mg/m^3 accepted in Turkmenistan	Substance code
Carbon Oxide (CO)	5,0	0337
Nitrogen Oxide (NO2)	0,085	0301
Sulfur Dioxide (SO2)	0,5	0330
Hydrocarbons (CHn)	1,0	2754
Soot	0,15	0328
Welding Aerosol	0,5	9002
Manganous Aerosol	0,01	0143

For the construction works it is required to mobilize following machinery and equipment:

- Autodump-body truck «Kamaz-5511» - 3 units;
- The onboard car with the crane the manipulator «Hyundai HD 260» – 1 unit;
- motormixer «Nissan Diesel» - 1 pc;

- autoconcrete pump«Mercedes Benz» - 1 pc;
- The bulldozer «Komatsu D65» - 1 pc;
- Dredge «Komatsu PC 300» - 1 pc;
- Vibration roller «Shantui SR 18M-2» - 1 pc;
- The automobile crane, load capacity 20т «Kato SS-350» - 1pc.

At work of welding equipment, construction machinery and cargo motor transport there are following compounds emissions in air – iron oxide, manganese and its compounds, nitrogen dioxide, nitrogen oxide, carbon (soot), sulphur dioxide, carbon oxide, fluorides gaseous and kerosene.

The earth from dismantling of tranches and foundation ditches is transported to a temporary storage ground. Natural humidity of earth at digging is 10 %. At transportation to atmospheric air harmful substances are emissed: a dust inorganic dust with the content of silicon to 20 %.

Refuelling of cars and the equipment is made on specially equipped platforms of the mooring. At refueling of construction machinery and motor transport the following emissions are produced: hydrogen sulphide, hydrocarbons C12-C19.

At diesel generator operation there are harmful substances emissions, such as arrive: nitrogen dioxide, nitrogen oxide, soot, sulfurs dioxide, carbon oxide, benzapiren, formaldehyde, kerosene.

There are no other sources of emissions on the construction site.

Results of calculation of emissions of polluting substances in atmospheric air on similar types of works, as a rule, testify on observance of the hygienic quality standards of atmospheric air considering background pollution of atmosphere on all substances which are produced at construction site.

Actions for control of emissions under adverse weather conditions (HMY)

Control of emissions of harmful substances in atmosphere is understood as their short-term reduction during the periods of adverse meteorological conditions (NMU), leading to formation of high level of air pollution. Control of emissions is carried out considering forecast NMU on the basis of preventions of possible dangerous growth of concentration of impurity in air for the purpose of its prevention.

Depending on expected level of pollution of atmosphere 3 degrees of risk preventions are made.

Preventions of the first degree are made, if increase of concentration is 1,5 high, the second degree, if there is a concentration from 3 to 5 maximum of the limit value is expected, and the third - over 5 times above the limit value. Depending on degree of the prevention the enterprise is transferred for operation on one of three modes.

For the first operation mode, a set of activity should be undertaken in order to decrease the risk to 15-20 %.

For II and III modes the plan of actions is developed with identification of sources and harmful substances which are significant from the point of view

of atmosphere pollution on border to the nearest residential area. Decrease in concentration of polluting substances in a near ground layer of atmosphere on the second mode should be provided on 20 - 40 %, on the third on 40 - 60 %.

Some of such types of activity are following:

- To forbid operation of equipment in a loaded mode;
- To limit scope of construction works;
- To stop construction works;
- To water dusty roads near residential area and the site;
- The materials containing harmful substances to store in hermetical closed container.

8.3 Influence on surface water objects

Duration of reconstruction of the mooring, accepted by the project, is 10-11 months.

The project provides installation of a household trailer for workers to warm up, a composting toilet and a container for disposal of a household waste.

Requirements for water consist of needs of water for industrial, economic-household and fire-prevention purposes, proceeding from the acting standards on water norms.
Under the present project for water for industrial needs is not required according to technology of works performance.

Temporary water supply to household premises is performed from an existing well within the port territory. Drinking water supply is provided by transportation.

Water removal from wardrobe with a washstand is carried out on the polyethylene pipeline in diameter of 100 mm length of 27 m in a water-proof ferro-concrete well of a capacity 5 м3 with further disposal by vacuum-car in water removal system.

For natural needs on a platform of household small town dry closet should be provided. Sewage from a dry closet is disposed as needed.

At work on reconstruction of a mooring there are no direct dumps of sewage in water area of Caspian Sea.

- дорожно-строительная техника, применяемая для производства работ.
The basic sources of pollution of sea waters at reconstruction of fitting-out mooring port point Garabogaz are:

- The construction of a berthing wall from groove;
- filling of a ground in between grooves space;
- The road-construction machinery used in works.

A negative impact of hydraulic engineering works on the water environment is related with f following factors:

- Increase in concentration of the weighed substances at performance of project types of works (filling of spaces between edging and an existing wall; the construction of groove walls);
- allocation of a part of a sea-bottom of water area at performance of groove edging of moorings. Performance of edging of a mooring and construction of a groove walls will have insignificant influence on water resources since edging represents a row of grooves NS-SP-V L hammered on distance of 1,8 m from an existing mooring.

Filling mooring pockets it will be carried out by a good quality soil.

Filling should be performed in a pocket of the mooring protected from sea water area by groove edging to exclude pollution of a suspension around the site. Therefore, the project solutions provide decisions on reconstruction of mooring Garabogaz which allow to lower level of negative impact on the sea environment to a minimum. As a whole, negative impact will be in the form of temporary change of hydrochemical indicators of sea water, and also destruction of a small amount of bottom dwellers and planktonic communities around the site of performance of hydraulic engineering works.

Nature protection actions

For the prevention of pollution of water object at performance out of construction work following actions should be provided:

- performance of works to carry out strictly in a zone taken away by the general plan and fenced;
- The reporting and liquidation of all actual sources of pollution around project site and in adjoining territory;
- The construction site should be kept clean, observance of norms of temporary storage of waste and the control over periodicity of emptying containers for the waste;
- Definition of a special zone for parking of motor transport and mechanisms (the platform of temporary parking of industrial motor transport should have solid border coating equipped with trays for a direction of a superficial drain to a sediment basin of temporary treatment facilities of the storm water drain);
- Interdiction for washing cars and machinery within the site;
- refuelling of machinery by fuel only in specially equipped places;
- The fuel stations should be provided by shut off valves and pallets for collecting of spills;
- The ordered transportation and warehousing of bulk and liquid materials;
- providing a platform for washing wheels of motor transport with the closed system of water treatment on its departure from a construction site.

The water protection activity provided in the project allows minimizing impact of planned activity on a condition of water area of Caspian sea in a area of works performance.

At observance of technology of works, the negative influence on the sea environment is local and for a short period. Taken measures on prevention and influence decrease are assessed as sufficient.

8.4 Influence of planned activity on a condition of water biological resources

Actions for reconstruction of fitting out of Garabogaz mooring include construction of a berthing wall from groove panels.

The area of allocation of a sea bottom at construction is 350-400 м^2.

A performance of filling works by rubble in inter groove space will cause a destruction of planktonic organisms in water of about 2000 м^3.

The damage to fish stocks owing to losses of pelagic caviar and larvae of fishes will occur irrespective of losses of fodder organisms in the same volumes of water as by the transition moment of plankton on exogenous feeding the structure of a fodder plankton considerably varies during natural vegetational fluctuation of a plankton community. Besides, consequences from destruction of fodder organisms and early stages of fishes (caviar and larvae) are various on time of their approach: losses of a part of a fodder plankton affect a condition of fish stocks current year or the next year, and

the destruction of fishes at early stages of development has more remote consequences.

8.5 Noise influence

Mooring construction/expansion will be accompanied by increase of noise level around object placing related with operation of construction machinery. Noise is produced at construction work performance by: motor transport, engines of cranes, compressors. Only motor transport, cars and mechanisms in a serviceable condition, with mufflers for the engines, working in the conditions specified in its operation manuals are supposed.

Influence will be limited by the construction works period.

Considering, that influence is limited in time by the construction period, and only within the site area, influence is estimated as insignificant and does not require any separate assessment.

As sound reducing activity it is required to provide following:

- construction work to perform during day time with minimum number of cars and mechanisms;
- The most intensive on noise sources should located on the maximum possible removal from public and office buildings;
- The continuous operating time of the machinery with high noise level within an hour should not exceed 10-15 minutes;
- Restriction of speed of movement of motor vehicles on a construction site.

8.6 Influence on flora and fauna

Direct influence on vegetative and the fauna at performance of construction work is not expected.

Especially protected nature territories on the project site are absent.

During work all requirements of the legislation on nature protection of Turkmenistan, in particular concerning flora and fauna will be observed.

8.7 Change of a landscape

Influence on fertile layers of earth is not expected.

Work on mooring reconstruction can cause changes of a relief due to sea bottom allocation for the project. Reconstruction of a hydraulic engineering construction (mooring) will expand an area of a anthropogenic relief. Planned reconstruction will lead to local changes at microrelief level within the limits of the developed area of anthropogenic relief.

On surrounding landscapes influence of the project construction will be minimal.

8.8 Waste disposal

The environmental impact assessment of the project from waste disposal aspect and consumption in the construction site is executed based on the basis of the project construction work which will be specified in the project as a part of the design documentation according to acting standards and regulations.

The object characteristic from aspect of a waste disposal

Construction of the mooring is performed during two periods: preparatory and the basic. The preparatory period includes the works related with mobilization and preparation of a construction site providing the normal commencement and development of the basic period.

As a result of dismantling works a following waste is formed:
- solid rubber waste;
- Waste from asphalt concrete and-or its mixtures in the lumpy form;
- Breakage of ferrous metals unsorted;
- breakage of ferro-concrete products, ferro-concrete waste in the lumpy form.
- The earth formed at carrying out of digging works, not polluted by dangerous substances. On departure from a construction site the platform for a washing of wheels of motor transport with the closed system of water treating should be provided. At work of installation for a washing of wheels sewage flows down on a surface of a washing platform in a sand trap where there is a sedimentation of the largest suspension; from a sand trap sewage by submerged pump is supplied to the treatment unit. Treatment unit is equipped by the block of a thin-layer upholding in which the branch of the weighed particles and emulsified mineral oil is carried out. The treated water passes through the mesh filter in the chamber of pure water, whence it is

taken by the washing pump and trasported through washing pistols on wheels of the car which is on a washing platform.

During operation of the unit on washing wheels following waste is formed:
- Waste (deposits) at mechanical and biological sewage treatment;
- Emerging film from petrocatchers (gasoline traps).

At diesel engine-generator service it is formed of rubbing cloth polluted by mineral oil (the content of oils above 15 %).

The following household waste is formed:
– Dust from household premises not sorted (excepting large-sized);
- Waste (deposits) from cessbasins and
- Economic - household drains.

При проведении сварочных работ штучными электродами образуются отходы - остатки и огарки стальных сварочных электродов.
At performance of welding works pieces of electrodes are formed.

As a result of construction work at technological losses (defect, fight, breakage which has lost consumer properties) a waste is formed – construction debris.

At this stage to speak about a quantitative assessment of a formed waste is early. It is possible to execute only predicted assessment of its formation. So, for example:

- Rubber waste is formed as a result of dismantle of pneumatic devices of approximately 7.25 т;

- breakage of ferro-concrete products, ferro-concrete waste in the lumpy form is nearby 1652,5 т;
- Breakage of ferrous metals not sorted - 16 t;
- Waste of asphalt concrete and-or asphalt concrete mixtures in the lumpy form - 178,5 т;
- The earth formed at carrying out of digging works, not polluted by dangerous substances - 204 т (the construction period);
- The used welding electrodes - 0,07 т;
- rubbing cloth polluted by oils - 0,128 м^3.

Storage/transportation/recycling

Accumulation of a waste in territory of the construction site or temporary warehousing of a waste (for of period no more than six months) should be done in places (on platforms), equipped according to requirements of the legislation on preservation of the environment and the legislation on sanitary-and-epidemiologic well-being of the population, with a view of their further use, neutralization, placing and transportation.

The dust from household premises not sorted (excepting large-sized) will be collected in the metal container of capacity 0,75 м^3, installed on the construction site territory in specially allocated place.

Waste formed by construction dust will be stored on specially allocated sites with a solid coating, in process of formation to be transported to range.

At temporary storage of a waste on the open areas, the surface, a waste stored in bulk should have built water-proof and chemically proof covering (asphalt, etc.). Along platform perimeter should be provided damming-in.

The part of construction debris can be used for filling on a construction site and for layer of road bed.

Used welding electrodes, a breakage of ferrous metals not sorted will be stored in metal barrels of capacity 0.2 м^3, in process of accumulation of enough quantity the scrap metal will be sold to the specialized enterprises having the license on this type of activity.

Transportation of the used electrodes is made by cargo motor transport upon large quantity accumulation.

Waste of the ground formed at carrying out of digging works, not polluted by dangerous substances without accumulation is transported from the construction site to the dump places approved by the local governments.

Temporary accumulation of rubbing cloth polluted by mineral oil is planned to carry out under the canopy excluding hit of water and extraneous subjects on the planned platform, protected from exposure to direct sun rays and an atmospheric precipitation, in specially allocated metal containers with covers.

In process of accumulation the enterprise concludes contracts with the specialized bodies on export and recycling of the waste.

Waste (deposits) from cessbasins and economic-household drains is transported when required by special machinery by he licensed organization right after emptying.

Asphalt concrete waste and-or asphalt concrete mixtures in the lumpy form without accumulation is transported to asphalt concrete factory for processing.

Temporary storage of a solid rubber waste is planned to carry out under the canopy excluding hit of water and extraneous subjects on the platform, protected from action of direct sun rays and an atmospheric precipitation and its further delivery by corresponding organization for recycling.

Ferro-concrete waste goes on base of the construction organization for processing.

8.9 General nature protection actions

During construction accumulation *of sewage and dumps* to Caspian sea is not provided.

The dust and household waste are collected in containers and transported to a dump site.

Fuelling of motor-vehicles by fuel, washing and repair onshore is not provided. At motor transport work *any spills* and fuel leaks *are prohibited*.

Operation of engines of motor vehicles and mechanisms while idling is prohibited.

For *protection of air basin* at works performance it is provided:

- Adjustment of fuel equipment of internal combustion engines and installation on them of neutralizers of oxidation of products of incomplete combustion;
- hermetic sealing of process equipment.

Soil impact

Actions for protection and rational use of the earths include: performance of the actions excluding hit of PETROLEUM PRODUCTS on the earth at work of construction machinery and mechanisms, cleaning of construction debris.
The control of performance of nature protection actions is carried out by the organization performing works, and corresponding state bodies on environment protection.

Construction and operation stages

At designing of any object the impacts are always considered which are able to occur during performance of construction work on components of environment both in the course of performance of works, and at the further operation. In this case *a stage of construction* is much more considerable concerning its influence degree on environment, than an operation stage since a large number of machinery is concentrated on a small site. The favorable fact is that works are short-term, during certain period, types of works are various on specificity, during their performance the various machinery will be involved.

Namely: earthen, welding, painting works, installation/construction of buildings and structures, asphalt coating of passages, painting and

decorating and so forth is not supposed performance of all types of works simultaneously. Therefore process of construction and erection works is limited by time frameworks and influence on the environment cannot be considered as constant, stable and able to lead of a disbalance of the environment.

Anthropogenesis influence on air in the construction site is temporally and will not render any essential influence on pollution of atmospheric air during construction period.

10. INFLUENCE ON ENVIRONMENT AT OBJECT OPERATION

According to the technical project the project of reconstruction of an existing mooring pier, for the purpose of expansion of territory of a mooring, increase in depths at a mooring and increase of scope of operational loadings in surrounding area is developed.

While in service projected mooring will not be an environmental contamination source.

Important point is that designing is carried out on the existing mooring pier with insignificant expansion that excludes any negative influences related with ethnogeny development of the residential area.

Besides, the present project specifies the actions aimed on decrease of negative influence on surrounding environment and health of people.

The purpose of reconstruction of a mooring is the increase in its parameters for mooring of vessels with the big overall dimensions.

Till the commissioning of the Factory complex on carbamide and ammonia manufacture in Garabogaz the scope of cargo handling works will be considerably increased, there will be essential changes in structure of the turnover of goods, more required big open spaces.

At a mooring it is provided to carry out servicing of various types of vessels with parameters not above rated parameters of a vessel.

Thus sea transport is one of the most popular for external economic transportations. Therefore it is necessary to enlarge foreign trade goods traffics through expanding of infrastructure of sea transport, namely, sea port point Garabogaz.

The information presented by the present project on operation of the object, is only informative, for representation of an overall picture of a reconstructed mooring, and is not an object of research of the present project.

9.1 Technical infrastructure of a mooring

Water supply and sewerage

Water supply of an expanded mooring will be existing networks of water supply.

Water source for fire-prevention needs of reconstructed fitting out a mooring is the existing economic-drinking and fire-prevention water pipeline in diameter of 150 mm, crossing the mooring territory.

Fire water system of reconstructed fitting out mooring (mooring vessels) is provided from project system of economic-drinking and fire-prevention water pipelien in conditional diameter of 150 mm
On the site there is existing self-flow water drain system and a new one is part of the project.

The volume of sewage will make 37,6 m3/day

Sewage will be discharged in an internal sewer network in the tank of sewage in capacity 50 м^3 with the subsequent transportation of drains in the places approved by municipal services and bodies of sanitary end epidemiological service.

10. RESULTS OF THE ASSESSMENT OF INFLUENCE OF PLANNED ACTIVITY ON ENVIRONMENT

In the present report the complex assessment of the environmental impact is performed, the actions minimizing harmful influence on environment are developed, and ecological safety of planned activity is grounded. Influence is considered for a construction stage of the project.

While in service projected mooring will not be a source of considerable environmental contamination.

Influence on ***atmospheric air*** is assessed by moderated, insignificant and rather short-term.

The water protection activity specified in the present report allow to minimize influence of planned activity on a condition ***of water object*** (Caspian sea). At observance of technology of works, the negative influence rendered on water object will be local and short-term. Project activity on prevention and minimizing of impact are assessed as sufficient.

Work on mooring reconstruction will have direct influence on ***water bio resources*** and its environment. Level of influence of planned economic activities on water bio resources and its environment on condition of observance of the planned water protection actions and recovery activity on

caused damage to water bio resources and its environment is within required standards.

Conditions of formation, collecting and storage of any ***waste***, accepted by project solutions correspond to ecological and sanitary norms.

Functional use ***of the ground area*** corresponds to the confirmed town-planning documentation.

No impact on fertile layers of earth is expected.

Work on mooring reconstruction can cause changes ***of a relief*** due to sea bottom allocation for reconstruction. Reconstruction of a hydraulic engineering construction (mooring) will expand an area of a anthropogenous relief. Planned reconstruction will lead to local changes at microrelief level within the limits of the developed area of anthropogenous relief.

On surrounding landscapes influence of planned project construction will be minimal.

Actions for preservation of the environment include a complex of the actions obligatory within the framework of the project, for achievement of efficiency of a preventive nature protection policy, namely:

- leveling;
- technological;
- Constructive and space-planning;
- technical;
- Compensatory ecological and economic;

- special standard;
- Additional technical nature protection;
- The industrial ecological control and monitoring of environment;
- Funding.

11. ECOLOGICAL MONITORING AND ENVIRONMENT QUALITY CONTROL

Environment monitoring represents a complex assessment of a condition of the environment, directed on forecasting of changes of a condition of environment under the influence of natural and anthropogenous factors.

The ecological monitoring purpose is carrying out of study of environment condition, estimation and the forecast of changes of a condition of environment under the influence of natural and anthropogenous factors, trustworthy information reception about an ecological condition of environment in a zone of construction work impact.

Main principles of carrying out of ecological monitoring

The program of study during works on a mooring is based on principles of an objective and authentic estimation of sources of technogenic influence of the enterprise and their influences on environment, receptions of authentic and comparable data on influence scales.

The ecological control of operation

The control in the field of preservation of the environment (the ecological control) is the system of measures aimed on prevention, revealing and non admission of violating legislation on preservation of the environment, observance by subjects of economic and other activity of all the requirements, including specifications and standard documents on preservation of the environment

The control over a condition of atmospheric air around a construction site

Mooring reconstruction

Taking into consideration scales of construction of projected object, the program of the control over a condition of atmospheric air around the construction site is not developed.

Industrial inspection on waste disposal

The special attention is given to the control of waste disposal on a construction site, namely:

- To control installation of metal containers for collecting of a solid household waste with its further export from the construction site;
- To control of installation of containers for or collecting of a solid household waste on the impenetrable bases;
- The control of storage of a waste on a special platform with the foundation and damming along its perimeter;
- The control of timely transportation of a construction debris and solid household waste;
- The control on keeping the site area tidy and clean from waste and rubbish;
- The control of installation of toilet cabins and timeliness transportation of a waste from toilet cabins;

- The control of realisation of measures on prevention of pollution of water objects by production and household wastes.

The project ecological control over a condition of water resources

The basic sources of pollution of superficial waters at reconstruction of fitting out Garabogaz mooring are:
- The construction of a berthing wall from grooves;
- filling by ground of inter groove space;
- The road-construction machinery applied for works performance.

The negative influence of hydraulic engineering works on the water environment will be related with following factors:

- Increase in concentration of the weighed substances at performance of planned types of works (filling spaces between edging and an existing wall; the construction of groove walls);
- отторжение участков морского дна акватории при выполнении шпунтовой оторочки причалов.

- allocation of a part of a sea bed at performance of groove edging.

At that a filling is performed in pockets of the mooring protected from water area of the sea by groove edging that excludes distribution of a suspension around the site. Thus, the made project solutions on reconstruction of fitting out Garabogaz mooring allow to lower level of negative influence on water objects to a minimum.

12. CONCLUSIONS ON THE POSSIBLE IMPACT ON ENVIRONMENT AT PROJECT PERFORMANCE

The purpose of the reconstruction is the increase in parameters of a mooring pier for mooring of sea vessels with the big overall dimensions.

Social and economic consequences of realisation of the project are estimated as positive.

Solutions on reconstruction and mooring operation are developed with the obligatory observance of requirements of the acting nature protection legislation of Turkmenistan, providing minimization of ecological risks and negative influence on a condition of a surrounding environment, including with a special focus on water biological resources.

EIA results were defined taking into account observance of a principle of the sustainable development which essence is in achievement of sound and stable equilibrium between economic, ecological and social consequences from the present project performance:

Positive economic benefit from project performance will provide long-term benefits for Factory on ammonia and carbamide manufacture in Garabogaz due to providing solutions to a transportation of production. As a whole

functioning of a complex of all infrastructure of the Factory, including a mooring, becomes a source of new financial receipts in the state budget as a profit on export of products, increase in a turnover of goods and taxes collection;

- The general negative influence on environment is defined on a principle of possible ecological risk, but this risk in the given project can be essentially lowered by means of compensatory measures. The major factors of influence related with performance of the project on a mooring, are qualified by the Developer as the short-term ones and mainly on the construction stage.

In general it is necessary to state, that the project documentation and company «GAP Insaat» proposals correspond to principles of a sustainable development and practically exclude unacceptable influence of ecological and social factors.

Upon the results of the performed environmental Impact Assessment (EIA) a conclusion is made that on condition of performance of the project nature protection actions, level of influence of works under the project « Expansion of a mooring of a port point « Garabogaz (Bekdash) in etrap Turkmenbashy Balkan welayat on a surrounding environment is within the required norms and corresponds to requirements on ecological safety in the area of project performance.