Ministry of Construction and Urban Development

Project Initiator:

MONGOLIAN NATIONAL WATER CENTER
(Mongolian National Water Center)

FEASIBILITY STUDY OF THE

"TAISHIR-ALTAI"WATER SUPPLY PROJECT
(Brief introduction)

CONTRACTOR:

PRESTIGE CO.LTD

PRESTIGE ENGINEERING CO.LTD

EURO KHAN

FERROSTAAL INDUSTRIEANLAGEN GmbH

PIPELINEINGENIER-TEAM GmbH

ULAANBAATAR CITY
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“Taishir-Altai” project

The feasibility study of the “Taishir-Altai” water supply pipeline is being initiated by the “Mongolian National Water Center”. The project is related with the Goal 7 of Mongolia’s Millennium Development program by improving water supply conditions and facilitates to the implementation of the goals forwarded by “Water Year 2011”. The feasibility study was developed in 2012. Prestige Engineering Co.,Ltd has changed selection of materials and budgets and updated the feasibility study in 2016.

Basis of project

According to the “Water Law”, the “Law on the utilization of the water supply and sewerage of the city and populated settlements”, the national “Water” program and provisions of the government action program approved by the State Ikh Khural; the alleviation of climate change and dryness facing Mongolia, expanding scope and the adverse impact of desertification, preserving natural resource and style of living, establishment of the effective forms of business economy and ensuring of the sustainable growth for welfare condition is becoming important. These are the basic grounds to consider water consumption from the new angle and in close coordination with the country’s future development and progress.

The water supply afflictions of the Altai city

Current water source of Altai City is not meeting the standards of the public potable water supply, the ratio of calcium and magnesium is improper and the amount of water resource is unable to meet present requirements. Thus it has adverse impact on human health. Though many survey and investigation projects for underground water resource were held over the past years, but have not found any resources meeting the water quality standard or adequate quantity of resource.

Project goal

The project goal has been aimed to ensure the stability of the nature and environment reflected on the Millennium Development targets, to improve potable water access, and improve hygiene conditions as a result of which the welfare of Ger population and quality of services shall become better.

Significance

The implementation of the project shall have the following social, economic and ecological significances:

1. This project will create the opportunity to supply Yusunbulag soum of Altai city, with potable water which meet the standards.
2. Consuming the pure surface water shall decrease infectious disease caused by poor quality water, public health will be improved.
3. Regular water supply shall favorably influence the chances for small to medium sized enterprises to develop.
4. In order to create jobs and improve the local food supply will be able provide required water needed to develop farms.
5. Will create ideal opportunities to develop tourism by supplying plentiful standard quality water.
6. Thus, reducing the mechanical movement of population migration, and create conditions for population growth.
7. The main limitations of water resource, supply and infrastructure problems hindering the development of Altai city will be solved.
8. Ensure economic growth and living standard of the population.

Project component

Water supply facility shall have the following component:

1. Water intake
2. Water treatment plant
3. Booster pump station
4. Water supply pipeline
5. Power line
6. Automation and communication system
7. Water storage tank

Technical solutions

The “Taishir-Altai” water supply project is designed to utilize the hydrotechnical facility at the dam of the Taishir HPP in order to supply the local population with clean potable water without any hindrance to the process and to the environment by pumping through the underground pipe system.

a) Water transmission pipeline

Alignment alternative “III” with 2 booster pump stations and DICL, ductile iron pipeline was selected based on the length of pipeline, engineering geological condition, technical solution and economic comparisons.

This alternative has good condition for water intake facility and less length of pipeline and relatively less power line length.

Brief indicators:

- Water pipeline length 52.8 km
- Pipeline material, diameter, pressure DICL, ductile iron pipeline
- Pipe diameter, pressure DN250, PN60
- Booster pump station 2

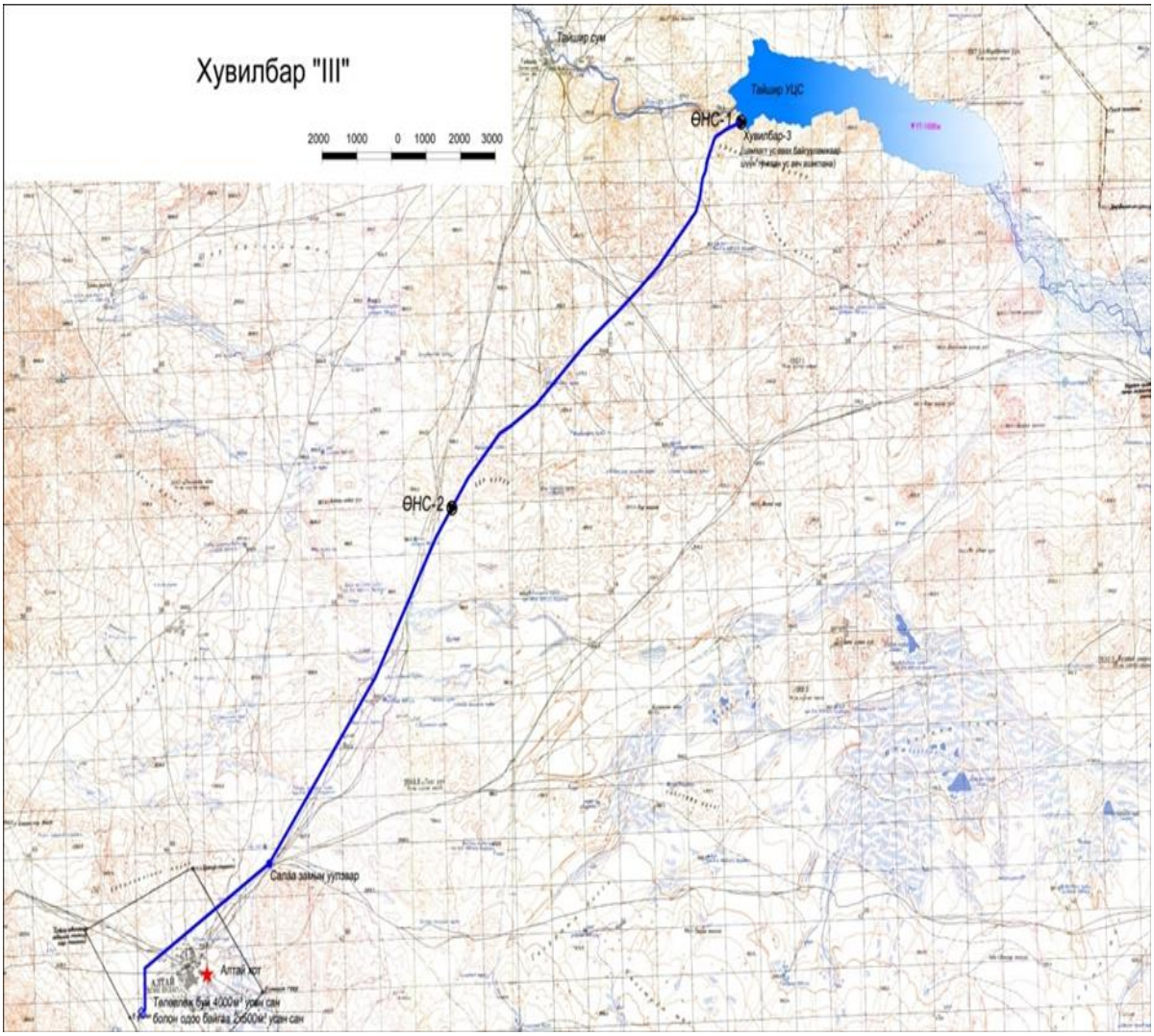

Figure 1. Selected ductile iron transmission pipeline alignment

б) Water intake structure

The structure of the water intake facility was selected comparing 5 alternatives such as boreholes, water tower facility, horizontal radial water intake facility, horizontal surface, underground facilities. Based on the economic aspect and stable operation the horizontal water intake facility was chosen.

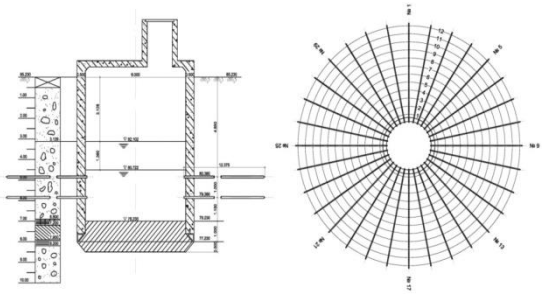

Figure 2. Underground horizontal radial water intake facility design

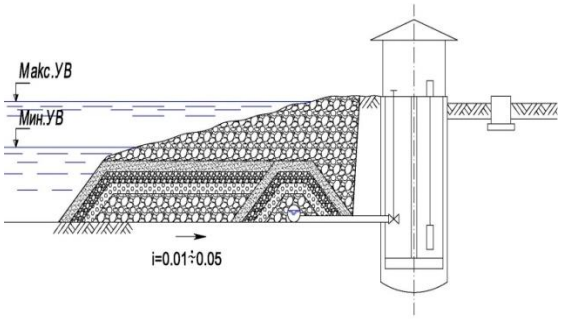

Figure 3. Underground horizontal water intake facility design

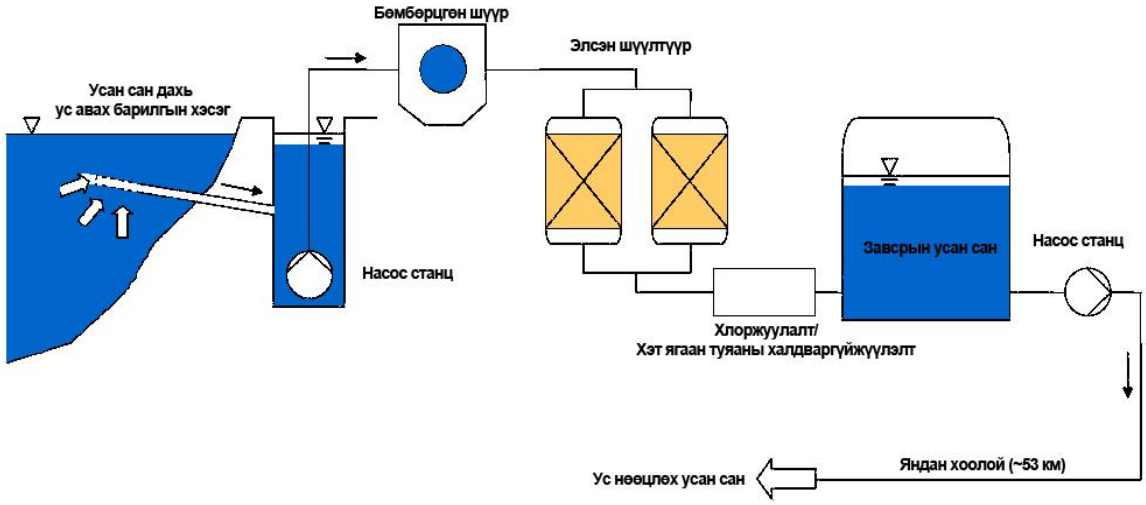

Figure 4. Simplified diagram of water treatment facility

Project environmental impact assessment

The water will be supplied from the Taishir HPP water reservoir through the water transmission pipeline therefore there will be no adverse effects on the environment. The transmission pipeline passing through Taishir soum by creating 5 water points the favorable conditions to establish agricultural farms to supply to provide fresh hygienic food will be created, and food supply and ecology of Altai city will improve. Also, there will be the advantage of creating opportunities for anti-desertification green zones.

Investment calculation

In the previous “Taishir-Altai” project FS of 2012, the investment cost was calculated for GRE pipeline which would have cost 53.1 billion tugrugs and 29.8 million euro to implement.

In the updated 2016 feasibility study the pipeline is changed to ductile iron which would cost 43.4 billion tugrug and 17.2 million euro to implement.

Table 1. *Төслийн үндсэн үзүүлэлтүүд*

Indicators	Measuring unit	Amount
First investment	million tugrug	43,387,445.5
Project period	Year	30.0
Depriciation amount per year	million tugrug	1525.4
VAT	%	10.0
Income per year and expense	%	10.0
Discount interest	%	15.0

Note: The discount rate is calculated based on the 2016 Mongolian bank interest rates.

Conclusion

1. Current water resource for Altai city is very limited and sometimes water supply interrupt due to ground water level drop that cause difficult condition for the population. No sufficient water supply, both in quantity and quality impact to human health and become source for illness and infectious deseases. Although there was an effort to find good reliable water resource (quantity and quality) for the Altai city in the last decades, so far the issue has not been solved.

   Upon implementation of the “Taishir-Altai” project the Altai city shall have reliable, good quality water supply on constant basis that form healthy and safe living condition for the city population.

2. Quality of water used today in Altai city water supply facility is not meeting standards of potable water becoming the source for different diseases. Implementation of “Taishir-Altai” project is designed to ensure the population with good quality water meeting the standard of the population.

3. At the level FS calculated water demand for Altai city population at 2040 and usage of surface water for water supply will be sufficient solution. it will be a specific project that using surface water for solution of water supply in Mongolia and intenting to save

underground water. It will be a model project for utilizing cheaper water resource in regarding water economic value.

4. Improvement in water supply is the good basis for development of business in the city and as well as developing agriculture, animal husbandry that will improve living condition of the population.

5. The economic value of the project is quantified as 49.95 million euro or 87,41 billion tugrug from the social, economic, human health and ecology even without considering negative impact to the econmony when water is being transported by water track.