

11 Water Conservation

11.1 Principle of Water Conservation

The Moin River has sufficient water resource which fully meets the project's water needs. However, taking into account the local overall development and the subsequent development, the Project lays great emphasis on water conservation. The effective means for water conservation are considered in the new project design, including promotion of economizing water, reduction in effluent discharge and increase wastewater reuse. The Project takes into account the optimization of water use on condition that the water consumed by the project should be guaranteed to maximize economic benefits. In addition, the Project gives full consideration to the environmental capacity to minimize the impact on the environment.

11.2 Water Conservation Measures

(1) Promotion of water-conservation technologies, processes and products

In production, the water-conservation processes, technologies and equipment items are provided to improve the efficiency of water use. The waste water reuse technologies are select to improve the recycling utilization rate. With the on-stream of the Project, the treated water from the wastewater stripping unit will be used as water flooding. The supernatant of the sedimentation tank in sludge discharge process will be returned to the clarifier for recycle. The backwashing water from filters and ultrafiltration system will be collected to the clarifier for recycle. The rejection of the reverse osmosis process at demineralized water plant will be sent to the industrial water treatment plant for recycle.

(2) Taking effective measures to improve the condensate recovery

The plot plan layout is designed in such a way that the units are configured on an integrated basis. This achieves thermal integration and cascade reuse of the steam. A condensate recovery system is provided so as to maximize the reuse of condensate throughout the refinery. The condensate recovered will be returned to the demineralized water plant for treatment and reuse for the purpose of water conservation and making good use of water resources.

(3) Taking effective measures to improve the wastewater recovery

All drainage systems for clean wastewater and wastewater, wastewater with differet quality shall be separated, so that different treatment measures shall be adopted to satisfy the different reuse requirements.

(4) Maximizing the cycle of concentration of recirculating cooling water, providing that the industrial water quality is acceptable

Where the local industrial water quality is acceptable, a higher cycle of concentration

(which is 5 in the project) of recirculating water will be designed. This decreases the waste water effluent and industrial water makeup, and benefits to protection of the environment, prevents the thermal pollution, to achieve the purpose saving energy and water.

- (5) In both basic design and detailed design phases, full consideration shall be given to the selection of water-conservation and energy-conservation instruments and related valves for the purpose of measurement, regulation and control.
- (6) The new technology to detect leaks and reduce permeability will be used for water supply pipe networks in order to prevent the escape and leakage.

11.3 Water Conservation Indicators and Analysis

The total water consumption and the total water discharge amount for the project are shown in the water supply and drainage section in the FSR.

The water supply system is designed to supply makeup water for demineralized water, makeup water for recirculating cooling water, fire fighting makeup water and for lab & potable water, of which any water supplies for flushing and sprinkling, potable water, fire fighting makeup water, unforeseen water supplied intermittently, which not included in the total water consumption.

The raw water consumption in the project is 252.519×10^4 t/a, of which the water consumed by processing per ton of crude oil is at 0.842 t/t.

The raw water (Moin river water) is really a hard water source which contains solids and salts for the feed suction well which is strongly affected by the sea. But in the Project, the raw water yet to be considered as river water not sea water or brackish water. Nevertheless, the raw water consumption of per ton crude oil is slightly higher than the average of refining of the china's enterprises.

Table11.3-1 Water consumption of the refining of the china's enterprises

No.	Company	Crude Runs (10 ⁴ t/a)	Raw Water Consumption (10 ⁴ t/a)	Unit Water Consumption (t/t)	Remarks
1	The Project	300	213.4	0.71	
2	Dalian Petrochemical Company	1109.7	595.4	0.54	Seawater desalination
3	Daqing Refinery	573.2	573.2	1.00	
4	North China Petrochemical Company	284.5	272.2	0.96	
5	Dagang Petrochemical Company	368.9	339.2	0.92	
6	Harbin Petrochemical Company	219.69	101.06	0.46	
7	Zhenghai Petrochemical Company	1744.2	732.9	0.42	Seawater desalination
8	Shanghai Petrochemical Refinery	1029.5	948.9	0.92	
9	Dushanzi Petrochemical Company	402.32	281.62	0.7	
10	Dalian West Pacific Petrochemical Company	754.1	416.2	0.55	Seawater desalination
11	Average water consumption of the refining of the china's enterprises			0.63	