Environmental Impact Report on Construction Project

(State Environmental Assessment Certificate B Document No. 1705)

Project Title: Energy System Optimization (Energy Saving) Project for 150,000t/a Synthetic Ammonia & 30,000t/a Methanol Facility of Heilongjiang Heihua Co., Ltd.

Owner (Seal): Heilongjiang Heihua Co., Ltd.

Compiled on: February 9, 2009

Prepared by the Ministry of Environmental Protection

Project Title: Energy System Optimization (Energy Saving) Project for 150,000t/a Synthetic Ammonia & 30,000t/a Methanol Facility of Heilongjiang Heihua Co., Ltd.

Project Title: Environmental Impact Report on Energy System Optimization (Energy Saving) Project for 150,000t/a Synthetic Ammonia & 30,000t/a Methanol Facility of Heilongjiang Heihua Co., Ltd.

Project Type: Technical reconstruction

Consigned by: Heilongjiang Heihua Co., Ltd.

Compiled by: Environmental Impact Assessment Lab of Qiqihar University

Assessment Certificate: Grade B, State Environmental Assessment Certificate B No. 1705

Legal Representative: Chang Jianghua

Executive Director: Li Yingjie

Project Executive: Zhao Fuquan

Project Technical Auditor: Li Yingjie

Major Authors

Author	Technical Title	Job Certificate No.	Major Work	Signature
Zhao Fuquan	Associate Professor	B17050003	Engineering analysis	
Dong Guowen	Lecturer	B17050007	Environmental impact analysis	

Profile of Construction Project

Project Title	Energy System Optimization (Energy Saving) Project for 150,000t/a Synthetic Ammonia & 30,000t/a Methanol Facility of Heilongjiang Heihua Co., Ltd.				
Client	Heilongjiang Heihua Co., Ltd.				
Legal Representative	Wang Hongwei		Contact	Wang Xiaodong	
Correspondence Address	2 Xiangyang Street, Fularji District, Qiqihar City, Heilongjiang Province				
Contact Phone	15946503620	Fax		Zip Code	161041
Construction Site	Heilongjiang Heihua Co., Ltd.				
Project Reviewed by:			Approval No.		
Construction Nature	New Construction □Expansion□ Technical Reconstruction√		Industry & Code	Chemical	
Total Land Area	1,005,000m^2		Landscaping Area	30%	
Total Investment	RMB 129.19 million	Environmental Protection Investment	RMB 1.30 million	Proportion in Total Investment	1.0%
Assessment Fund		Expected Date of Production	December, 2009		

Project Content & Scale:

I. Project Background

In view of the disadvantages of the existing energy supply and utilization, Heihua Co., Ltd. has worked out the following plan to optimize its energy system after the thorough survey and demonstration in a move to conform to the industrial policy of the state and support the overall and long-term development:

To optimize the coal-burning boiler, the air separator and the Nordex gasification furnace of the system with the annual capacity to produce 150,000 tons of synthetic ammonia and 30,000 tons of methanol so as to reduce the ammonia consumption of the synthetic ammonia system.

II. Project Survey

1. Project Title: Energy System Optimization (Energy Saving) Project for 150,000t/a Synthetic Ammonia & 30,000t/a Methanol Facility of Heilongjiang Heihua Co., Ltd.

2. Owner: Heilongjiang Heihua Co., Ltd.

3. Construction Site: The coal-burning boiler optimization project plans to use the space between the old boiler and the steam turbine, the 16,000Nm^3/h air separator will be built on the north side of the small air separator, the gasification furnace optimization project will occupy the empty land in the south of the plant area, and the construction site is adjacent to the carbon black workshop in the east, close to the riverbank in the south, next to the gasification workshop and the coal yard in the west, and the ammonia compression facility in the north. See the sketch map of the project area and the sketch map of the floor planning.

4. Project Contents

The energy system optimization (energy saving) project for the 150,000t/a synthetic ammonia & 30,000t/a methanol facility of Heihua Co., Ltd. consists of the energy system optimization for the coal-burning boiler, the energy system optimization for the air separator and the energy system optimization for the Nordex gasification furnace.

(1) Energy system optimization for the coal-burning boiler

The existing three old 40t/h chain boilers will be dismantled and replaced with two 75t/h circulating fluidized bed boilers. The thermal efficiency of the existing boilers is 65%, and this figure will be increased to 89.2% after reconstruction to save the consumption of fuel coal used to produce the steam needed by the synthetic ammonia system.

(2) Energy system optimization for the air separator:

The existing old air separators, including one 6,500Nm^3/h separator and one 3200Nm^3/h separator, will be eliminated and replaced by one 16000Nm^3/h air separator to provide more oxygen and nitrogen for the synthetic ammonia system, there slashing the unit energy consumption for oxygen from 0.341kg of standard coal/Nm^3 to 0.059kg of standard coal/Nm^3.

(3) Energy system optimization for the coal-burning boiler

Pure oxygen will be used to replace enriched oxygen in the gas production process so as to increase the density of oxygen in the gasifying agent in the Nordex furnace, enhance the content of the effective gas in the coal gas for the Nordex furnace and reduce the content of such ineffective gases as methanol there. At the same time, the coal supply system for the Nordex furnace will be rebuilt to raise the combustion efficiency of the gas production coal for the Nordex furnace. These measures will cut down the unit energy consumption from 3.25t to 3.0t of raw coal per ton of ammonia.

5. Public Works

5.1 Water Supply

The production water used by Heihua Co., Ltd. comes from the Nenjiang River. An intake pump station is built 1km away from the plant area with a building area of 1332m^2 and a water intake & transmission capacity of 12000m^3/h.Two DN1000mm prestressed reinforced concrete pipes are used to transmit water. There are two water supply trunks, respectively northward and southward, in the plant area, and three ring joints are arranged, thereby ensuring the reliable water supply in the plant area. Restricted by the material of the water transmission pipes used in the early construction period, the actual water transmission capacity is 8000m^3/h at present.

At present, Heihua has four circulating water facilities: 1. The purification, synthesis and carbamide circulating water facility (one circulation) with a capacity of 156628m^3/h; 2. the circulating water facility for desulphurization, methanol and air separation (dual circulation) with a capacity of 5886m^3/h; 3. the gas production-generated turbid water circulation facility (turbid circulation) with a capacity of 2000m^3/h; and 4. the methyl-carbonate circulating water facility (not commissioned) with a capacity of 1000m^3/h.

The existing domestic water source of Heihua is the municipal water supply pipeline network. Northwest to the plant area are two Dg250 water transmission main pipes in parallel, and the water is introduced into the plant area via a Dg200 pipe and a Dg100 pipe. The domestic water supply capacity is roughly 132m^3/h, while the current water consumption is 95m^3/h, creating a balance of 37m^3/h.

After this project is finished and commissioned, the consumption of production water, desalinating water and circulating water will not rise, the existing production water source, the circulating water facilities and the desalinating water station can satisfy the need of the project, and no addition facilities will be needed.

5.2 Water Drainage

Heihua now has three water drainage systems, respectively for clean water, production wastewater and domestic sewage, and has the relatively sound sewage treatment device. The wastewater conforming to the standard after treatment is drained into the Nenjiang River via the water drainage system.

Heihua originally had a 200m^3/h phenol-containing wastewater biochemical treatment station. Now, it has been expanded into a 400m^3/h sewage treatment project. Phase I of the project will realize the drainage up to the grade II standard, while Phase II will fulfill the reuse of all sewage.

After completion, this project will deliver no influence on the wastewater drainage of the original system, which can meet the requirement of this project.

5.3 Steam Supply

The self-contained thermal power plants of Heihua now has three coal-burning chain boilers, each having a capacity of 40t of steam per hour (steam pressure at 3.82Mpa (absolute pressure)), and four circulating fluidized coal-burning boilers (three in use and one for standby) with the capacity of 75t/h (at the absolute pressure of 3.82MPa). These devices provide a total nominal capacity of 420t/h, and the actual steam supply capacity is about 390t/h.

Under this project, the chain boilers will be removed and replaced by two 75t/h circulating fluidized bed boilers to increase the thermal efficiency and enhance the steam supply capacity.

5.4 Power Supply

Heihua now has two 110KV power lines connected with Fularji No. 2 Power Plant, and has built a 110/6KV general step-down station, which is equipped with two 25MVA master transformers. The thermal power plant is provided with one 6MW back pressure generator and

one 12MW double-extraction condensing generator (the former only works in winter), providing a total installed capacity of Heihua is 75.5MVA. In addition, Heihua also has two double-loop power lines connected with Fularji Thermal Power Plant as its backup power source. At present, the total power load of Heihua reaches about 60MVA. The original power supply system can satisfy the need of this project.

6. Staffing & Production Shift

This project is a reconstruction project, so it will have no need to add new operators and management staff. The production workplaces will operate in three shifts, and the staff will be arranged according to four shifts. That is, the production workplaces will implement the continuous working hour system based on four shifts and three operations per day, and the management staff will be arranged to work in the day shift.

7. Project Progress

Conduct the feasibility study, preliminary design and equipment procurement from October, 2008 to September, 2009; complete the civil work construction from September, 2009 to July, 2010; and fulfill the equipment installation, testing and trial operation, and organize the project operation assessment and the final acceptance from August to December, 2010.

Original Pollutants & Major Environmental Issues Relating to Project

The existing pollutant sources and their emissions of Heihua are as follows:

1. Waste Gas

The atmospheric pollutants emitted by Heihua are the soot and SO_2 emitted from the coal-burning boiler of the thermal power plant, which reaches about 677.88 tons and 1,344.51 tons each year respectively. The emission of the atmospheric pollutants is detailed in the table below:

Existing Atmospheric Pollutant Sources & Pollutant Emission Project Title	Source No.	Pollutant Source	Waste Gas Qty. (10,000 m^3/h)		(m) Height of Exhaust Funnel (m)	Pollutant Type	Dust Removal Efficiency (%)	Emission		Standard Value	
								mg/m^3	kg/h (kg/t焦)	mg/m^3	kg/h (kg/t焦)
Coking System	G1-1	Coal pulverization	3.6		30	Dust	95.0	150	5.4	150	27
	G1-2	Coking furnace fume	1#、4# furnaces	32	90	Soot/Dust	——	250	80.0 (1.1)	300	(3.5)
						SO_2		230	73.6 (1.1)	500	(5.5)
			3# furnaces	8	90	Soot/Dust	——	250	20.0 (1.5)	300	(3

								.1)		
					SO_2		230	18.4 (1 .1)	500	(5 .5)
	G1-3	Coke interception	——	Inorganized	Dust	——	——	40.0	——	——
					SO_2	——	——	6.2	——	——
	G1-4	Transfer	——	Inorganized	Dust	——	——	0.8	——	——
	G1-5	Wet quenching tower	——	Inorganized	Dust	60.0	——	18.2	——	——
	G1-6	Coke sieving	5.4	30	Dust	80.0	600	32.4	150	23
Ammonium Nitrate System	G3-1	Nitric acid tail gas	4.0	100	NOx	——	1000	40.0	1400	52
	G3-2	Evaporation & granulation	38.0	62	Dust	——	100	38.0	150	106
Carbamide System	G4-1	Desulfurization tail gas	0.9	28	H_2S	——	120	1.08	——	1.14
	G4-2	Tail gas from absorption tower	0.06	80	NH_3	——	10	0.006	——	133
	G4-3	Granulation tower	40.2	70	NH_3	——	16	6.4	——	102
					Dust	——	41	16.5	——	136
Thermal Power Plant	$G_{plant-1}$	Fume from chain boiler	12..0	60	Soot	98.0	80.7	17.7	150	——
					SO_2	——	253	51.2	1200	——

	$G_{plant-2}$	Fluidized bed boiler	32.0	80	Soot	99.0	160.1	91.2	300	——
					SO_2	——	1077	232.3	2100	——

2. Wastewater

The main water pollutant sources at present are mainly distributed in the coking system, the chemical product recovery system, the ammonium nitrate system, the carbamide system, the gas generation system (Nordex furnace) and the self-contained thermal power plant. The wastewater of the entire plant is drained into the Nenjiang River after the treatment by the wastewater treatment station. Due to the failure to realize the compliant sewage emission, the original sewage treatment plant is now under reconstruction. The entire plant emits about 6 million tons of wastewater each year, 445.2 tons of the COD and 447.6 tons of NH-N, both water pollutants. The specific wastewater emission is shown in the table below:

Existing Water Pollutant Sources & Wastewater Emission Direction Project Title	Source No.	Pollutant Source	Wastewater Qty. (t/h)(t/h)	Pollutant Type	Pretreatment	Direction
Coking	W1-1	Sealing water for ascending pipe	0.2	COD_{cr}, volatile phenol, cyanide, NH-N, oil		Sewage treatment station
	W1-2	Floor water	2.0	Suspended substance, oil		
Gas Purification & Chemical Recovery	W2-1	Dephenolization wastewater	45.0	COD_{cr}, volatile phenol, cyanide, NH-N, oil		Sewage treatment station
	W2-2	Final cooling water	24.0	COD_{cr}, volatile phenol,		

				cyanide, NH-N, oil		
	W2-3	Fine phenol water	34.0	COD_{cr}, volatile phenol, cyanide, NH-N, oil		
	W2-4W2-4	Coke wastewater	327.8	COD_{cr}, volatile phenol, cyanide, NH-N, oil		
Synthetic Ammonia & Ammonium Nitrate	W3-1W3-1	Evaporation condensing water	95.0	NH-N, oil, volatile phenol		Sewage treatment station
Carbamide	W4-1W4-1	Methanol refining wastewater	0.5	Methanol		Sewage treatment station
	W4-2W4-2	Hydrolysis wastewater	20.0	Carbamide, NH-N		
Nordex Furnace	W5-1W5-1	Turbid Circulation Water	30.0	COD_{cr}, volatile phenol, cyanide, NH-N, oil		Sewage treatment station
Hydrogen Peroxide	W6-1W6-1	Production wastewater	500.0	COD, anthraquinone, trioctyl phosphate, trimethylbenzene, and hydrogen peroxide	Compliant oxygen treatment	Nenjiang River
Thermal Power Plant	$W_{电}$-1 W_{plant}-1	Dehydrating water	256.0	Salts	——	Nenjiang River
	$W_{电}$-2	Ash flushing	——	SS、	Sedimentation &	——

	W_{plant} - 2	water		SS, salts	reuse	

3. Solid Waste

Solid Waste Emission from Current Project Solid Waste Name	Generated Quantity t/a	Generation Location	Mode of Treatment
Boiler clinker	9.8×10^4	Boiler & dust catcher	To brick plant for brick production
Gas generation furnace slag	6.98×10^4	Nordex Furnace	To brick plant for brick production
Gas generation coal ash	10.47×10^4	Nordex Furnace	Comprehensive utilization
Waste catalyst	350	Desulphurization, decarbonization, conversion and ammonia synthesis at Carbamide Plant	Recycled by manufacturer
Tar residue	10	Chemical recovery device of Coking Plant, ammonia clarifying tank	Recovered for coking

4. Noise

Major Noise Sources No.	Noise Source	Sound Level (dB)	Location	Qty.	Remarks
1	Induced draft fan for the boiler of the power plant	94	Boiler room	7	Pneumatic, continuous
2	Carbon/Nitrogen removing fan	90	Ammonium Nitrate Plant	1	Pneumatic, continuous

3	High-pressure liquid ammonia pump	95	Carbamide Plant	1	Mechanical, continuous
4	High-pressure methylamine pump	95		1	Mechanical, continuous
5	Carbamide solution pump	90		1	Mechanical, continuous
6	Smelted carbamide pump	90		1	Mechanical, continuous
7	Circulating water pump	90	Circulating water pump room	5	Mechanical, continuous
8	Gas production turbid circulating water pump	90	Turbid circulating water pump room	1	Mechanical, continuous
9	Steam emission from the boiler of the thermal power plant	97	Thermal Power Plant		Accidental
10	Emission from the air separator	96	Outside the Air Separator Plant		Emission at start and stop, accidental
11	Emission from the Carbamide Absorption Tower	94	Carbamide Synthesis Tower		Pneumatic, accidental
12	Emission of CO_2	97	Carbamide Synthesis Tower		Pneumatic, accidental
13	Emission of main steam from the carbamide synthesis compressor	94	Outside the compressor room		Pneumatic, accidental
14	Sealing nitrogen compressor	104	Nordex furnace	1	Pneumatic, accidental
The in-plant noise may realize the emission in compliance with the standard.					

Profile of Natural Environment & Social Environment in Construction Project Place

Profile of Natural Environment (Terrain, Relief, Geology, Climate, Meteorology, Hydrology, Vegetation and Biodiversity):

1. Geographical Location

Qiqihar City lies on the midstream in the western part of Heilongjiang Province on the fertile Songnen Plain. The city is adjacent to Suihua City in the east, Baicheng City of Jilin Province, Hulun Buir City of Inner Mongolia and Heihe City in the north. Qiqihar is the political, economic and cultural center in the western part of Heilongjiang Province.

Fularji District is one of the seven districts of Qiqihar City. The center of the district is 37km southwest to the central urban area of Qiqihar City and lies on the west bank of the downstream of the Qiqihar Section of the Nenjiang River. The district lies on the east longitude 123°45′ and the north latitude 47°15′. The district borders Angangxi District in the east, Longjiang County in the west, Tailai County in the south and Meilisi Daur District. The urban district is 4.5km long from east to west and 12.7km long from south to north. The district covers a total area of 375 square kilometers, including an urban area of 37 square kilometers. Heihua Co., Ltd. lies in the southwestern part of Fularji District, and neighbors Beiman Special Steel Co., Ltd. in the north, Xinmin Road in the northeast and the Nenjiang River in the south.

2. Geology & Terrain

The entire area belongs to the plain terrain with slight wavy rises and an elevation of 150-160m. As a plain area, the area has taken shape from the impact by the Nenjiang River and its branches, and formed during the continent making movement 2 million years ago. As it received the sand piling from the Nenjiang water system in the long term, the area has a deep accumulative formation, and its geological formation is the interconnection between the Cathaysian second subsidence zone and the third uplift zone. With a flat terrain, the area belongs to a typical plain and hill zone. The main strata are substantially composed of mild clay, light mild clay, mild clay-gravel interbedded formation, mud-sand interbedded formation, thick sand and fine sand, and belong to the medium compressed soil layer. The allowable bearing capacity of the foundation soil is 1,220t/m^3.

3. Climate & Weather

The project site is situated at the middle latitude and on the eastern edge of the Asian Continent. With a continental monsoon climate of the mild temperate zone, the area has the dry and windy spring, the humid and rainy summer, the short autumn with the early frost and the long and cold winter, and the heating period lasts as long as half a year. The area is part of the Songnen Plain, with an average elevation of 146m and a continental monsoon climate of the mild temperate zone. The annual average temperature is 3.37 in the area, where the average temperature is -16.8 in January

and 24.1 in July. The extreme low temperature is -37.4 and the extreme high temperature is 39.0 . In the area, the maximum permafrost is 2.3m, the average annual rainfall is 415.5mm, the frost-free period is about 136 days, and the perennial dominant wind is the north-north westerly.

4. Hydrology & Water System

The major surface water system in Fularji District is the Nenjiang River. As the largest branch of the Songhua River, the Nenjiang River originates from the Yilehuli Mountain on the north ridge of the Greater Khingan Range, flows into Fularji District via the central urban area of Qiqihar City, snakes across the eastern part of Fularji District to go southwards into Tailan County, finally arrives at Zhenlai County of Jilin Province and joins the Songhua River via Da'an City of Jilin Province. Spanning a total length of 1,370km, the Nenjiang River covers a drainage area of 283,000 square kilometers. Its major ranches include the Gan River, the Namoer River, the Nuomin River, the Chuoer River and the Taoer River. The upper reaches of the Nenjiang River and its branches wind their way across the forest-covered mountain area with good vegetation and slight soil erosion, and the rivers have a very low sand content. The middle and lower reaches cross the Songnen Plain, go past the diluvial uplands with steep slopes and torrents, and produce the strong agent of erosion, thereby becoming an important sand source of the Songhua River. The lower reach of the Nenjiang River constitutes the watershed between Jilin Province and Heilongjiang Province. The watercourse here has a very small slope, and the river snakes at a slow speed with a width of 400-1000m. The flow path usually looks like a net, and there are many islands and sandbars in the river. Along the river are the widespread marshes and lakes. The riverbank in Jilin Province is the uplands, which are usually the steep cliffs above 10m and constitute the natural riverbank, while the riverbank after Dalai is completely the embankment. The surface of the river is 1-2km wide and 8-13m deep in the flood season. The river freezes in mid-November each year, freezes up in late November, unfreezes early next April and totally unfreezes in mid-April, reaching a freezing period of about 160 days.

5. Soil & Vegetation

The area has diverse soil types, mainly including black soil, chernozem, meadow soil, marsh soil and sand, where chernozem and meadow soil take a proportion above 90%. The soil features high heat, good permeability, light weight and fertility. The area has an arable land area of 192,539 mu (1 mu = 667 square meters), including 4,260 mu for greenhouses, 14,090 mu for rice field and 174,189 mu for other purposes. The major crops are rice and corn.

6. Mineral Resources

The mineral resources that have been discovered and exploited in the area include petroleum, natural gas and sandstone. Petroleum and natural gas have been exploited by Daqing Lianyi Co., Ltd.

Profile of Social Environment (Social & Economic Structure, Education, Culture and Cultural Relic Protection):

1. Administrative Divisions and Populations

Fularji District is the satellite district of Qiqihar, consisting. Fularji exercises jurisdiction over 9 subdistrict offices and 3 townships. There're 236 neighborhood committees and 23 villages in the district with a total population of 280,000, covering 16 ethnic groups such as Han, Daur, Hui, Man, Korean, etc. Presently Fularji is operating 6 functional districts: Central Commercial District, South Industrial District, Tiebei Economic District, Tiexi Multifunctional District and Peripheral Agricultural District.

2. Industrial Distribution

Northeast China had become the emphasis of heavy industry developments since the founding of the new China. Among the 156 key construction projects in the First Five-Year Plan, 3 were settled in Fularji: Fularji Heavy Machinery Factory (presently China First Heavy Industries), Qiqihar Steel Factory (presently Beiban Special Steel Co., Ltd.) and Fularji Power Plant (presently Asiapower Xinbao Heating & Power Co., Ltd.). Later on, a great number of key projects such as Heilongjiang Chemical Plant (presently China National Chemical Corporation Heilongjiang Company), Heilongjiang Glass Factory (presently Heilongjiang North Glass Co., Ltd. under Beijiang Group), Fularji No. 2 Power Plant (presently Fularji General Power Plant under China Huadian Corporation), Fularji Textile Factory (presently Heilongjiang Zhongtian Textile Co., Ltd., built to regulate gender imbalance) were kicked of in succession in Fularji. The urban area of Fularji has been expanded by 15 times compared with 1950. Presently, the number of industrial enterprises in the district is 307.

3. Economic Development

In 2005, the national tax payment of the whole district was RMB 3 billion, and local tax was RMB 300 million; the financial revenue was RMB 500 million and GDP of the district was RMB 10.018 billion. In 2003, under the favorable situation of "Rejuvenation of Old Industrial Bases in Northeastern China" and the great visions of "Harbin-Daqing-Qiqihar Industrial Corridor", the principle government of Heilongjiang approved three provincial economic development areas in the "Harbin-Daqing-Qiqihar Industrial Corridor", Qiqihar Nanyuan Hi-tech Development Area, Qiqihar Beiyuan Economic Development Area and Fularji Economic Development Area. Of the three development areas, Fularji Economic Development Area was positioned as development area mainly for developments of machine manufacturing, equipment manufacturing, new type energy-saving and environmental protection building material, heavy chemical industry, deep processing of coal chemical industry, research and development of modern agriculture, etc.

4. Traffic & Communication

Fularji District boasts convenient traffic and communication. The Binzhou Railway, known as the Eurasian Continental Bridge, spans the city proper from east to west. The Fularji Stop, built as early as in 1902, is the first-grade railway stop in China. The railway feeders cover various large and medium enterprises in the district. The railway freight yard takes pride in the highest stock of 13,221.2t of goods at one time, and handles 1.524 million tons at maximum each year. The roads in the district lead to all directions, include seven roads at the county level and above,

and reach a mileage of 342.3km (2001). The Nianbei Road (the Heilongjiang section of 301 State Highway) crosses the district, and leads to Longjiang County, Nianzishan District and Inner Mongolia in the west, and Meilisi District and Qiqihar City in the north.

5. Science, Education, Culture & Health

Fularji District is proud of the robust scientific research strengths. Backed by the heavy industrial enterprises, the industrial science and technology has become the powerhouse for the science and technology sector in the district.

At present, Fularji District has two secondary technical schools; 23 middle schools with a combined enrollment of 14,000 students and 1,359 teachers and administrative workers; and 39 primary schools with a total enrollment of 25,000 students and 1,328 teachers and administrative workers. The district has 93 health institutions with 1,856 beds and 2,328 health professionals. In 2003, Hong'an Stadium was built with an investment of RMB47 million and a capacity to accommodate 12,000 persons.

Ambient Environmental Status

Status Quo of Ambient Environmental Quality in Construction Project Region & Major Environmental Issues (Ambient Air, Surface Water, Underground Water, Sound Environment and Biological Enviorment)

I. Ambient Air

According to the regular monitoring data provided by Fularji District Environment Monitoring Station in 2007, the atmospheric pollutants in the assessment area are mainly PM_{10}, followed by SO_2 and NO_2. PM_{10} is higher than the standard by 17.8% throughout the year, and even by 2.11 times at maximum; SO_2 is higher than the standard by 0.3% throughout the year, and by 0.04 times at maximum; and NO_2 conforms to the standard. Therefore, the ambient atmospheric quality in Fularji District can't comply with the requirement of the type II standard under the Ambient air quality standard (GB3095-1996).

II. Surface Water Environment

According to the water quality monitoring results for the Nenjiang River in 2007, the Fushang section of the Nenjiang River, where the project is located, belongs to the type IV water body. Of the monitoring items, all the monitoring indicators conform to the requirement for the water quality of type IV water body, except that NH-N and total nitrogen fail to meet the standard in the low water season; the monitoring items at the Fuxia section comply with the water quality standard for type IV water body in the high water season; the river bridge section belongs to the type III water body, the COD, NH-N and total nitrogen fail to satisfy the standard in the normal water period, the NH-N and total nitrogen can't fulfill the standard in the low water season; the total nitrogen is below the standard in the high water season, and other monitoring items conform to the water quality requirement for type III water body.

III. Sound Environment

Subject to the requirement for the applicable zone division under the Environmental quality standards for noise (GB3096-2008), this project lies in the applicable region of type III standard, and has no excess noise.

IV. Ecological Environment

This project lies in Fularji District Industrial Zone.

Major Environmental Protection Objectives

There are no rare animal and plant resources, tourist attractions, and key sites for key protection at the national, provincial and municipal levels in the assessment area. In addition, the project itself serves the environmental protection and energy saving purposes. Thus, the environmental protection objectives of this project are identified as follows in line with the environmental characteristics of the project region and the properties of this project:

1. Control the dust emission during the construction period to protect the atmospheric environment;

2. Control the noise emission during the construction period to protect the sound environment;

3. Control the noise emission during the operation period to ensure the noise at the plant boundary meets the type 3 standard;

4. Control the fume emission from the boilers to satisfy the requirements of the three-time-period standard under the Emission standard of air pollutants for thermal power plants (GB13223 - 2003); and

5. Control the emission of solid wastes from boilers like clinker to protect the regional environment.

Applicable Standard for Assessment

Ambient Environmental Standard	1. Grade II standard under the Ambient air quality standard (GB3095-1996): PM_{10} : Annual average value at 0.10mg/m^3, and daily average value at 0.15mg/m^3; SO_2 : Annual average value at 0.06mg/m^3, daily average value at 0.15mg/m^3 and hourly average value at 0.5mg/m^3. 2. Type 3 standard under Environmental quality standards for noise (GB3096 - 2008) Daytime at 65dB（A）and nighttime at 55dB（A）. 3. Grade III and IV standards under Environmental quality standard for surface water (GB3838 - 2002):
Standard for Pollutant Emission	1. Type 3 standard under the Emission standard for industrial enterprises noise at boundary (GB12348-2008): Daytime at 65dB（A）and nighttime at 55dB（A）. 2. 3-time-period standard under the Emission standard of air pollutants for thermal power plants (GB13223-2003): Soot emission density ≤50 mg/m^3, and SO_2 emission density ≤400 mg/m^3. 3. Noise limits for construction site (GB12523 - 90) Noise from bulldozers, diggers, loaders and other machinery at 75dB（A）in the daytime and 55dB(A)in the nighttime; noise from various pile drivers at 85dB(A) in the daytime, and construction forbidden in the nighttime; noise from concrete mixers, vibrators, electric saws and other equipment at 70 dB(A) in the daytime and 55 dB(A) in the nighttime; and noise from cranes and lifts at 65 dB(A) in the daytime and 55 dB(A) in the nighttime.

Aggregate Control Indicators	Aggregate control indicators for Heihua Co., Ltd.: COD：668.1t/a SO_2 ：3174t/a

Engineering Analysis of Construction Project

Process Flow Briefing:

1. Process Flow Chart during Construction Period:

Earthwork → Structural architecture → Equipment installation

2. Introduction of Air Separation System:

The system takes in raw air, and removes dust and other mechanical impurities through the air filter. After filtering, the air will be compressed in the centrifugal air compressor at the pressure of about 0.5Mpa, and then pre-cooled in the air cooling tower. The cooling water enters the cooling tower by sections. The lower section is the circulating cooling water, while the upper section is the low-temperature cooling water from the water cooling tower. The air crosses the air cooling tower from top to bottom to be cleaned while cooling. After cooling in the air cooling tower, the temperature of the air will be reduced to 10 . Then, the air will go to the molecular sieve absorbers, which work in turn and absorbs carbon dioxide, hydrocarbons and remaining vapor. The molecular sieve absorbers work in turn: When one works, the other will be regenerated. The purifier automatically switches at a regular interval of 240min.

After purification, a small proportion of the air will be taken out to serve as the system instrument air, and the remaining will enter the fractionating tower system. There, the air will be divided into two parts: One part will directly enter the main heat exchanger, exchange heat with the return gases (oxygen, nitrogen and waste nitrogen) to reach the air liquefaction temperature at about -172 and then arrive at the bottom of the lower tower. The other part will go to the supercharged turbine expander, and then enter the main heat exchanger. Then, the air will be cooled by the return gases to 165K and extracted into the expander for expansion to generate most of the refrigerating effect required by the device. The expanded air will be sent to the upper tower for rectification.

In the lower tower, the air will be initially separated into nitrogen and oxygen-enriched liquid air. The nitrogen in the upper part will be condensed into liquid in the condensing evaporator, and the liquid oxygen on the low-pressure side of the main cooling tower will be gasified. Part of the liquid nitrogen will act as the reflux liquid of the lower tower. The other will be taken out from the top of the lower tower, sub-cooled by nitrogen and waste nitrogen in the sub-cooler and then sent to the top of the upper tower for rectification. The 99.6% oxygen will be obtained at the bottom of the upper tower, reheated by the main heat exchanger to 12 and taken out of the cold box as the oxygen product.

The waste nitrogen is fetched out of the upper part of the upper tower, reheated in the sub-cooler and the main heat exchanger, and then sent out of the fractionating tower. Part of the nitrogen will become the regenerated gas of the molecular sieve absorber, and the remainder will

enter the water cooling tower as the cold source to cool the circulating water.

The nitrogen is taken out of the upper part upper part of the upper tower, reheated in the sub-cooler and the main heat exchanger, and then sent out of the cold box. Part of the nitrogen will become the product nitrogen and be sent out, and the remainder will enter the water cooling tower as the cold source to cool the circulating water.

Main Pollution-generating Procedures:

1. Construction Period

(1) Noise produced by the machinery and transport vehicles during the construction period.

(2) Construction dust generated during construction, and the tail gas exhausted by the machinery such as transport vehicles.

2. Operation Period

(1) Fume emitted by the coal-burning boilers, containing such major pollutants as soot and SO_2.

(2) Solid wastes generated by the coal-burning boilers such as clinkers.

(3) Noise produced by fans, induced draft fans, compressors and other equipment.

Generation & Expected Emission of Major Pollutants of This Project

Content / Type	Emission Source (No.)	Pollutant Name	Density & Generated Quantity before Treatment (Unit)	Emission Density & Quantity (Unit)
Atmospheric Pollutants	Construction stage: Construction site Operation period: Coal-burning boiler	Dust & flying dust Soot SO_2	10000mg/m^3 , 39255t/a 118mg/m^3 , 463.87t/a	50mg/m^3 , 196.28t/a 118mg/m^3 , 463.87t/a
Water Pollutants				
Solid Wastes	1. Construction period: Construction site Operation stage: Boiler room	Construction waste and rejected soil Slag & clinker	Generates about 72,500t per year	Transported to waste disposal plant for treatment Transported to brick plant for brick production
Noise	Major noise sources in the construction period are the mechanical equipment like cranes, generating the noise at 100 ~ 110 dB (A). Major noise sources in the operation period are fans, induced draft fans and other production equipment, producing the noise at about 80 ~ 100 dB (A).			
Others				
Major ecological impact				

Environmental Impact Analysis

I. Brief Analysis of Environmental Impact in Construction Period:

1. Analysis of Atmospheric Environment Impact

The flying dust from construction will be generated in the construction processes like earthwork, foundation backing with sand, soil covering, storage of rejected soil and truck transportation since the construction team enters the site. To reduce the environmental impact of the flying dust, the construction entity shall carry out the civilized and clean construction practice, and spray water from time to time on the site; and clear the rejected soil from the work out of the site, and spray water to curb dust in the due course. The vehicles transporting rejected soil shall be enclosed to prevent dust from littering and flying during the transportation, and reduce the impact of the flying dust on the surrounding environment.

The major pollutants in the tail gas exhausted by the construction machinery and transport vehicles are CO, CmHn and NOx. The environmental impact of such tail gas may be controlled by strengthening the vehicle management and guaranteeing the good condition of the transport vehicles.

2. Analysis of Water Environment Impact

Mud and wastewater will be produced in such construction procedures as sand & stone flushing and concrete mixing and pouring after the construction team enters the site. Thus, the construction entity shall dig and build a temporary wastewater storage pool on the site so that the mud and wastewater from construction will be settled and clarified. After such treatment, the supernatant may be recycled without drainage, and the mud and rejected soil in the pool shall be dug out at regular intervals, combined with construction waste, and transported to the construction waste yard designated by the government organ for proper piling and treatment.

3. Analysis of Solid Waste Impact

The domestic garbage produced by the construction staff during the construction stage shall be sent to the garbage treatment plant for treatment, thereby not influencing the environment in the assessment area.

The construction wastes, such as steel bars, steel plates, timber and other scraps, shall first be recycled by sorts, and sold to salvage stations. Construction wastes, such as waste concrete and soil containing bricks, stones and sand, shall be concentrated and piled, cleared at regular intervals, and delivered to the exclusive construction residue yard.

4. Analysis of Noise Environment Impact

This project will use various types of construction machinery during the construction period, such as excavators, bulldozers and lifts. In addition, the equipment transportation will also produce certain noise. To reduce the impact of the construction noise on the surrounding environment and prevent noise from disturbing the local community, the construction entity shall strengthen the construction management through the following measures:

(1) Use the low-noise machinery wherever possible; perform the noise test before the construction equipment enters the site; all the equipment must conform to the noise control requirement of the project; maintain the construction equipment at regular intervals so as to keep the mechanical equipment at the optimal working status and minimize the scope of noise impact; and reasonably arrange the working procedures in line with relevant provisions;

(2) Provide the vibration reduction and sound insulation measures for the construction equipment that produces noise;

(3) Arrange the construction plane layout reasonably so as to keep the construction equipment producing noise far away from the environment-sensitive targets and reduce the

disturbance on the local community;

(4) The construction entity shall reinforce the management of the noise sources in the daytime, and forbid the operation with the noise at 85dB(A) and above in the nighttime in strict compliance with the Noise limits for construction site (GB12523-90). Where the continuous construction with strong noise is unavoidable, the consent from the local environmental protection authority shall be obtained in advance;

(5) The wireless interphones shall be used for communication during the construction process to control the artificial noise.

II. Analysis of Environmental Impact during Operation Period

1. Analysis of Atmospheric Environment Impact

The original thermal power plant of the enterprise burns roughly 500,000 tons each year. Under this project, the three old 40t/h chain boilers will be dismantled (the four 75t/h fluidized bed boilers will be reserved) and replaced by two 75t/h circulating fluidized bed boilers to increase the combustion thermal efficiency of the boilers and save fuel coal by 137,600 tons each year.

After the technical reconstruction, the boilers of the thermal power plant will consume 362,400t of fuel coal each year. In addition, all the boilers are of the circulating fluidized bed type, and equipped with the efficient static dust catcher. As a result, the boiler may deliver a desulphurization efficiency of at least 80% and a dust removal efficiency of no less than 99.5%, thereby ensuring the soot emission from coal burning and fulfilling the three-time-period standard under the Emission standard of air pollutants for thermal power plants (GB13223-2003). The boilers emit the following atmospheric pollutants: 196.28t of soot and 463.87t of SO_2 each year. After the technical reconstruction, the boilers save 137,600t of fuel coal each year, thereby reducing the soot emission by 481.6t and SO_2 emission by 880.64t each year.

The construction of this project is feasible from the perspective of the atmospheric environment impact.

2. Analysis of Water Environment Impact

This project itself will not produce wastewater, and the cooling water of the air separation system is all circulated. Thus, the construction of this project will not influence the wastewater emission of the entire plant.

The construction of this project is feasible from the perspective of the water environment impact.

3. Analysis Solid Waste Impact

After this project is completed, the major solid waste is the clinker generated by the coal-burning boilers of the thermal power plant, about 72,500t each year. All of such clinker is transported to the brick factor for brick production, and thus will cause no hazardous impact on the environment.

The construction of this project is feasible from the perspective of the solid waste impact.

4. Analysis of Noise Environment Impact

The major noise sources of this project during the operation period come from the mechanical noise and aerodynamic noise generated by such equipment as fans, induced draft fans and compressors. Such noise may have a maximum strength of 100dB(A). To address such

noise sources, the equipment foundation shall be provided with the measures to reduce vibration, insulate noise and cut down noise. It is recommenced to use sound absorbing materials for the inner walls of the fan chamber, provide flexible elements between the fan and the floor, and adopt the double-layer sound-insulating doors and windows. These measures may reduce the noise from the noise sources by ≥45dB (A), and enable the noise of the plant at boundary to comply with the type 3 standard under the Emission standard for industrial enterprises noise at boundary (GB12348 - 2008) (daytime 65dB(A) and nighttime 55dB(A). As a result, the noise impact on the external environment is acceptable.

The construction of this project is feasible from the perspective of the sound environment impact.

5. Environmental Protection Investment Estimate

The environmental protection investment of this project is roughly RMB1.30 million, 1.0% of the total investment. The investment mainly includes the cost of RMB1.20 million for the efficient electronic dust catcher and the cost of RMB100,000 for noise prevention.

Proposed Preventive Measures & Expected Treatment Effect of This Project

Contents / Type	Pollutant Source (No.)	Pollutant Name	Preventive Measure	Expected Treatment Effect
Atmospheric Pollutant	1. Construction period: Construction site 2. Operation period: Coal-burning boiler	Dust, flying dust Soot, SO_2	Reinforce construction management, build temporary walls along the boundary, and conduct the enclosed construction. Strictly cover the vehicle. Efficient electronic dust catcher	Dust density at monitoring point ≤1.0mg/m^3 Compliant emission
Water Pollutant				
Solid Waste	1. Construction Period: Construction site 2. Operation period: Boiler room	Domestic waste and refused soil from dredging Clinker	Clear and transport to waste disposal plant for treatment in time All transported to brick factory for brick production	Have no obvious impact on environment Disposal rate at 100%

Noise	1. Strictly control the construction time, and forbid the construction at night (from 10:00PM to 6:00AM next day) without approval. Provide the noise & vibration reduction facility for the high-noise construction machinery during the construction period, and strengthen the supervision and management during the construction period. 2. The fans, induced draft fans, compressors and other equipment producing noise shall have the noise & vibration reduction measures to fulfill the noise emission in compliance with the standard.
Biological protection measures & expected effect After completion, this project shall reinforce the in-plant construction and landscaping to prevent soil erosion and protect the environment.	

Conclusion & Suggestion

I. This construction project must take the following environmental protection measures:

1. The site shall be shielded at the construction stage to ensure the safety construction and prevent the dust from dispersing, thereby worsening the atmospheric pollution. Water must be sprayed on the construction site and roads to reduce the flying dust. To prevent the generation of a large quantity of dust during construction, the tank lorries shall be used to transport cement, the mixer shall be provided with the semi-enclosure measure, and the management shall be strengthened.

2. The noise producing mechanical equipment shall have the measures to reduce vibration and noise. The Noise Limits for Construction Site (GB12523 - 90) shall be strictly observed at the construction stage. When the construction noise fails to fulfill the aforesaid standard, construction shall stop.

3. Construction waste, domestic waste and rejected soil from dredging shall be cleared and transported in time to the garbage disposal plant for treatment.

4. The newly built boilers must be equipped with the dust removal system to ensure the smoke emission in line with the standard.

5. The fans, induced draft fans, compressors and other equipment producing noise shall have the noise & vibration reduction measures to fulfill the noise emission in compliance with the standard.

6. The solid wastes shall be collected for proper concentrated treatment to prevent the pollution to the environment.

7. Landscaping and management shall be reinforced after completion to prevent soil erosion and protect the environment.

II. Conclusion of Environmental Impact Assessment

1. Conclusion of Environmental Air Impact Assessment

After this project finishes and comes into production, the atmospheric pollutants generated by the boilers can be emitted subject to the standard after purification with the efficient electric dust catcher, and reduced compared to that before the technical reconstruction. This project is feasible from the perspective of the environmental air impact assessment.

2. Conclusion of Water Environment Impact Assessment

This project does not produce wastewater, thereby delivering no impact on the wastewater emission of the entire plant. This project is feasible from the perspective of the water environment air impact assessment.

3. Conclusion of Solid Waste Impact Assessment

After this project is operational, the solid waste produced is mainly the clinker generated by the coal-burning boiler. After the clinker is treated with the measures provided in this report and recycled, it will not deliver a major impact on the surrounding environment, and be applicable to the environment. This project is feasible from the perspective of the solid waste impact assessment.

4. Conclusion of Noise Environment Impact Assessment

After this project takes the measures to reduce the vibration and noise for the foundations of such equipment as fans, induced draft fans and compressors, the noise in the plant area can conform to the type 3 standard under the Emission standard for industrial enterprises noise at

boundary (GB12348 - 2008), that is, daytime ≤65dB (A) and nighttime ≤55dB (A).This project is feasible from the perspective of the environmental noise impact assessment.

III. General Conclusion of Environmental Impact Assessment

This project belongs to an environmental protection & energy saving one, and serves as an important means to treat the environmental pollution. This project is feasible from the angle of environmental protection, if it strictly complies with the provisions and standards of the state concerning environmental protection during the construction period and the operation period, and implements the pollution prevention & treatment measures provided in this report.

Opinion of Preliminary Review:

Seal:

Handled by: Date:

Review opinion of lower-level environmental protection authority:

Seal:

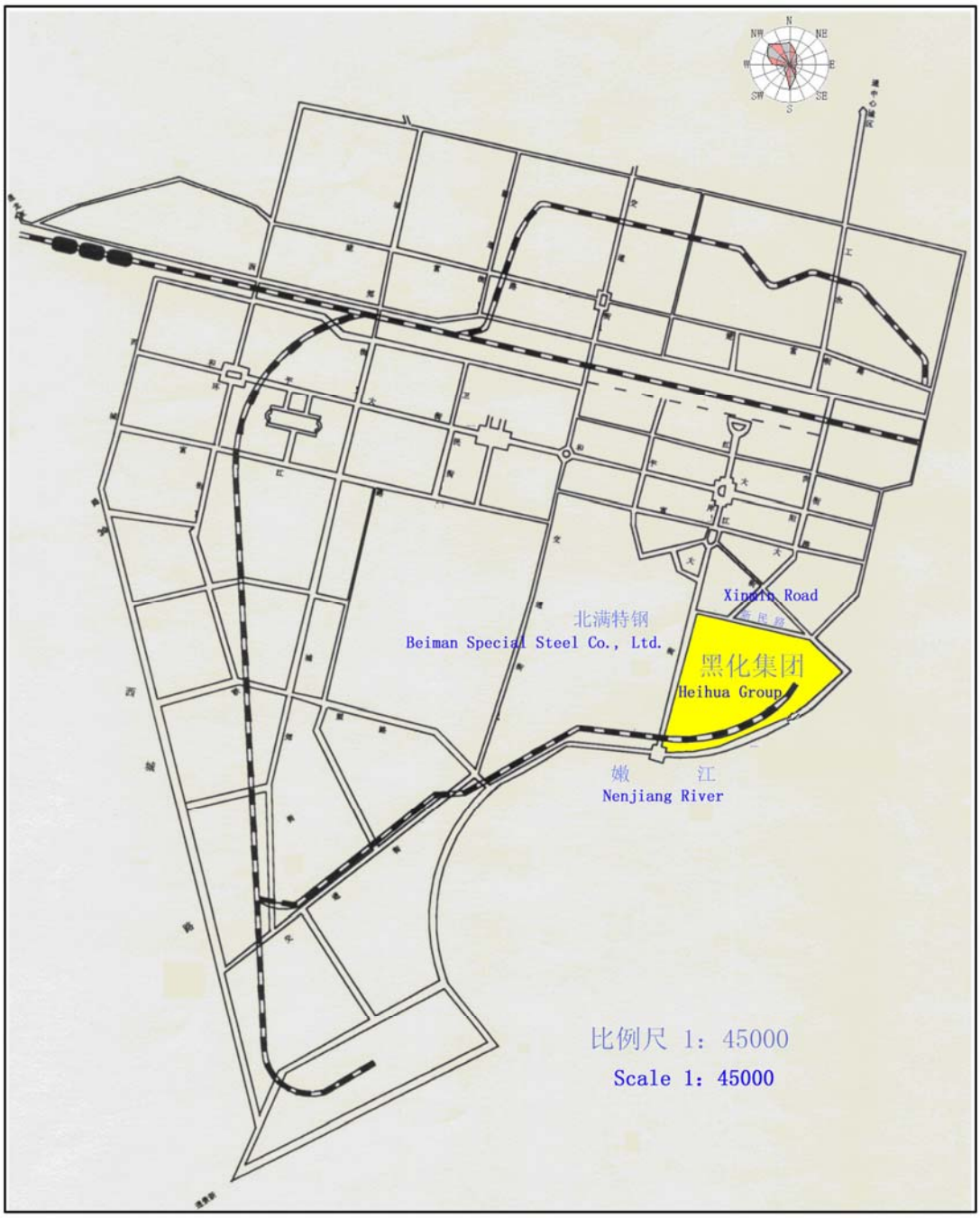
Handled by: Date:

Review Opinion:

Seal:

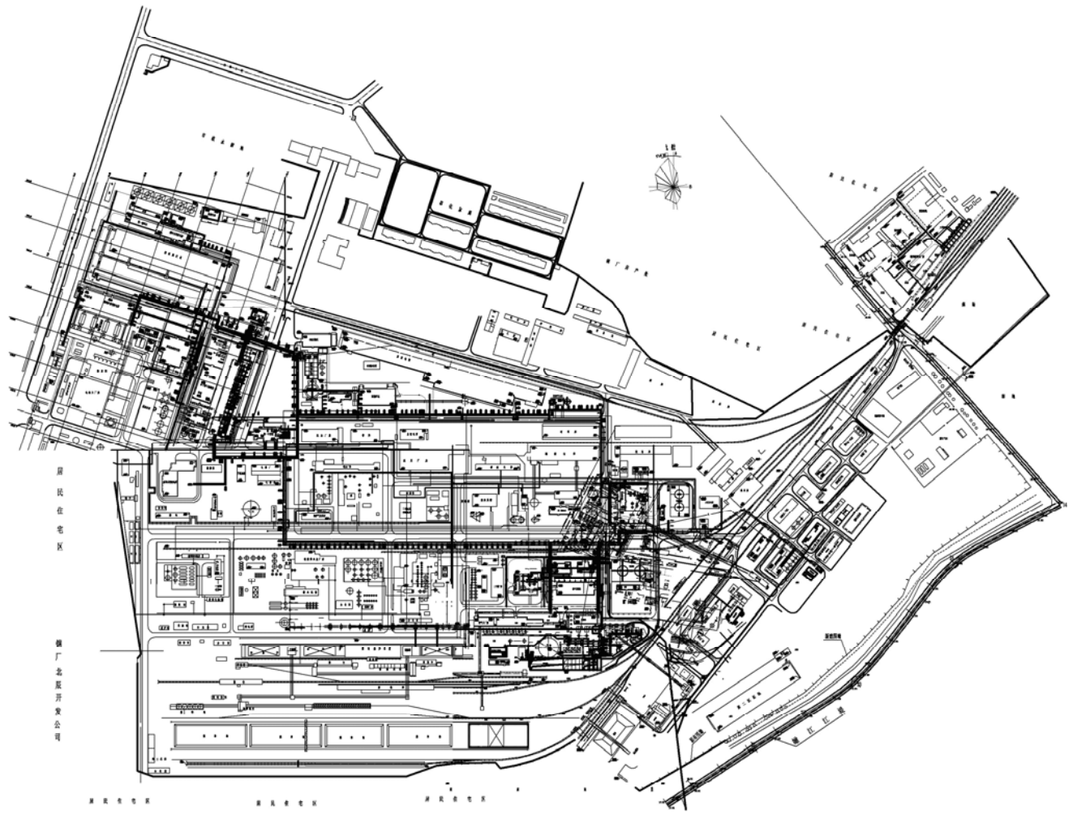
Handled by: Date:

Sketch Map for Location of Project Site – Fularji District of Qiqihar City



Project Location in Fularji District

专业	签名	日期



Master Plan Layout of Heihua Co., Ltd. 1:5000

Haohua Engineering Co., Ltd.		Qualification Grade	A	Certificate No.	010015-aj
Designed by		Energy System Optimization (Energy Saving) Project for 150,000t/a Synthetic Ammonia & 30,000t/a Methanol Facility of Heilongjiang Heihua Co., Ltd.		Design Project	
Proofread by				Design Stage	Feasibility study
Reviewed by		Master Layout Plan		Drawing No.	
Approved by				Scale	
February, 2009 Beijing				Page 2/5	Version 1

Register for Examination & Approval of Environmental Protection of Construction Project

Prepared by the Entity (Seal): Environmental Impact Assessment Lab of Qiqihar University Prepared by the Person (Signature): Project Handled by the person (Signature):

Construction Project	Project Title	Energy System Optimization (Energy Saving) Project for 150,000t/a Synthetic Ammonia & 30,000t/a Methanol Facility of Heilongjiang Heihua Co., Ltd.					Construction Site	Heilongjiang Heihua Co., Ltd.								
	Content & Size	Energy system optimization for coal-burning boilers, air separators and Nordex gasification furnaces					Construction Nature	Technical reconstruction								
	Industry	Chemical					Environmental Impact Assessment Management Type	Report compilation								
	Total Investment (RMB10,000)	12919					Environmental Protection Investment (RMB10,000)	130					Proportion (%)	1.0		
Owner	Name	Heilongjiang Heihua Co., Ltd.		Contact Phone	15946503620		Assessed by: Name	Environmental Impact Assessment Lab of Qiqihar University					Contact Phone	2742570		
	Correspondence Address	2 Xiangyang Street, Fularji District, Qiqihar City, Heilongjiang Province		Zip Code	161041		Correspondence Address	30 Wenhua Street, Qiqihar City					Zip Code	161000		
	Legal Representative	Wang Hongwei		Contact	Wang Xiaodong		Certificate No.	State Environmental Assessment Certificate B Document No. 170					Assessment Cost (RMB10,000)			
Status Quo of Environment on Project Site	Environmental Quality Grade	Ambient Air		Surface Water	,	Underground Water	Ambient Noise	3	Seawater		Soil		Others			
	Environmental Sensitivity Property															

Pollutant Emission Compliance & Aggregate Control (Applicable to Industrial Construction Project)	Emission & Major Pollutants	Existing Project (Built + In Progress)				This Project (Proposed or Adjusted)						Overall Project (Built + In Progress + Proposed or Adjusted)				
		Actual Emission Density (1)	Allowed Emission Density (2)	Actual Total Emission (3)	Approved Total Emission (4)	Forecasted Emission Density (5)	Allowed Emission Density (6)	Quantity Generated	Inherent Reduction (8)	Forecasted Total Emission (9)	Approved Total Emission (10)	"New-for-old" Reduction (11)	Reduction under Regional Balance Substitution (12)	Forecasted Total Emission (13)	Approved Total Emission (14)	Emission Change (15)
	Wastewater	——	——			——	——									
	COD*															
	NH-N*															
	Oil															
	Waste Gas	——	——			——	——									
	Sulfur Dioxide*	427	1200	1344.51		118	400	154.62	0	154.62		1035.26		463.87		-880.64
	Soot *	147	150	677.88		50	50	13086	13020.57	65.43		547.03		196.28		-481.6
	Industrial Dust*															
	NOx															
	Industrial Solid Waste			0				7.25	7.25	0				0		0
	Other Characteristic Pollutants Relating to Project															

Note: 1. Emission change: (+) for increase, and (-) for decrease

2. (12): Means the emission reduction under this project in the project region through the regional balance program

3. (9)=(7)-(8)，(15)=(9)-(11)-(12)，(13)=(3)-(11)+(9)

4. Measuring units: Wastewater emission, 10,000t/a; waste gas emission, 10,000m^3/t; emission of industrial solid waste, 10,000t/a; emission density of water pollutant, mg/l; emission density of atmospheric pollutant, mg/m^3; water pollutant emission, t/a; and atmospheric pollutant emission, t/a.

Main Ecological Damage Control Indicators

Impact & Main Measures / Ecological Protection Target	Name	Grade, Type or Qty.	Extent of Impact (Serious, Common, Low)	(Mode of Impact (Occupation, Isolation or Both)	Quantity of Reducing & Reducing Impact or Type & Quantity of Protection Measures	Project Avoidance Investment (RMB10,000)	Rebuilding & Functional Zoning Adjustment Investment (RMB10,000)	Relocation Appreciation Protection Investment (RMB10,000)	Engineering Protection & Treatment Investment (RMB10,000)	Others
Natural Reserve										
Water Source Reserve								——		
Important Wetland		——						——		
Tourist Attraction								——		
World Natural & Cultural Heritage		——						——		
Race & Unique Animal							——			
Rare & Unique Plant							——			

Type & Form / Land Occupation (hm^2)	Basic Farmland		Forest Land		Grassland		Others	Number of Migrants & Relocated Population	Relocated Population from Occupied Land	The relocated population due to the environmental impact	Relocation to Other Place	Evacuation	Others
	Temporary Occupation	Permanent Occupation	Temporary Occupation	Permanent Occupation	Temporary Occupation	Permanent Occupation	Permanent Occupation						
Area													

Area Reduced & Recovered after Environmental Assessment								Area of Soil Erosion Treated				
Noise Treatment	Project Avoidance (RMB10,000)	Sound Insulating Barrier (RMB10,000)	Sound Insulating Window (RMB10,000)	Landscaping for Noise Reduction (RMB10,000)	Low-noise Equipment & Process (RMB10,000)	Others			Engineering Treatment (Km^2)	Biological Treatment (Km^2)	Soil Erosion Reduced (t)	Soil Erosion Treatment Rate (%)