



Social Monitoring Report

Project Number: 36507
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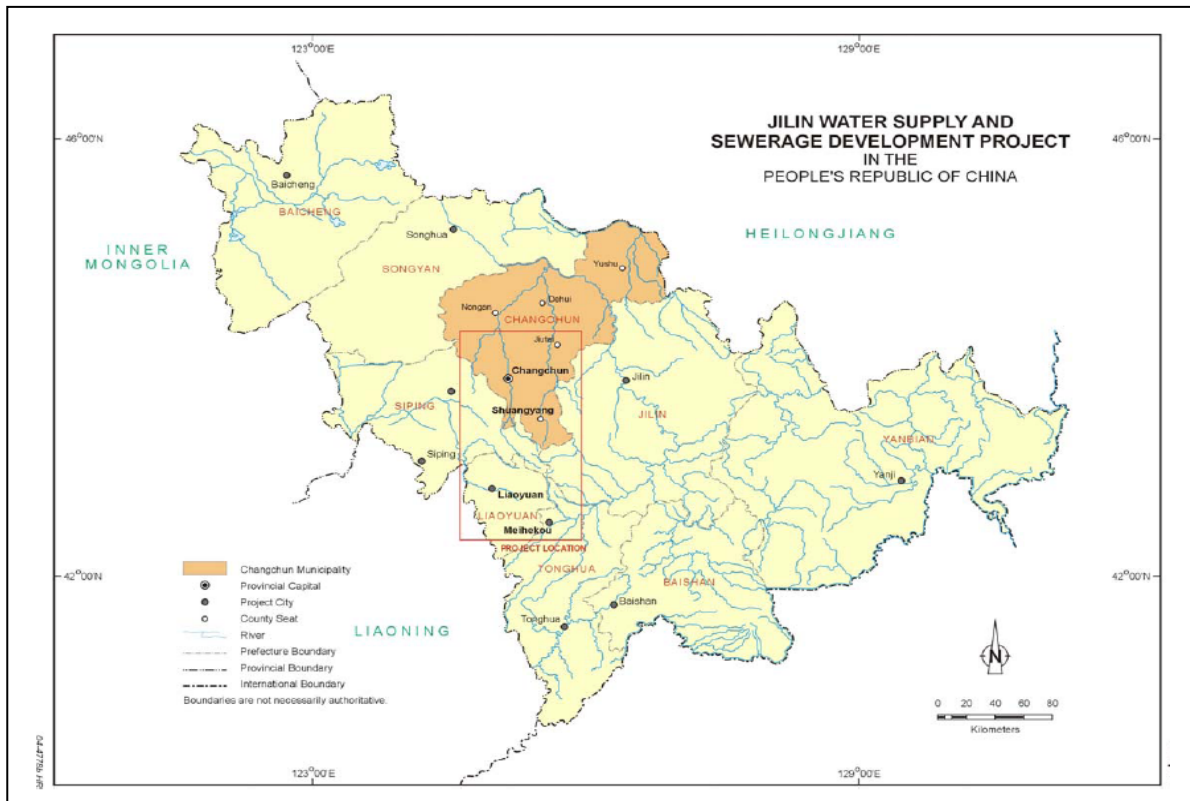
PRC: Jilin Water Supply and Sewerage Development Project

Prepared by Jilin Project Management Office
With the assistance of Sogreah Consultants/NREM
PRC

For Jilin Provincial Government
Changchun Water Group Urban Drainage Company Limited
Changchun Shuangyang Water Supply Company Limited
Changchun Hi-Tech Industry Development General Company
Liaoyuan Water Company Limited
Meihekou Water Supply Company

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Asian Development Bank



JILIN WATER SUPPLY AND SEWERAGE DEVELOPMENT PROJECT

LOAN N° 2175-PRC

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT OF YEAR 2009

JANUARY 2010
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**JILIN WATER SUPPLY AND SEWERAGE
 DEVELOPMENT PROJECT LOAN 2175 PRC**

**ANNUAL ENVIRONMENTAL MANAGEMENT REPORT OF
 YEAR 2009**

IDENTIFICATION N°: 1350227. R37

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1. INTRODUCTION

The Songhua River Basin (SRB) forms one of the seven major river basins of China and is the third largest. The Songhua River is seriously polluted and is now acknowledged as being one of the four most polluted river basins in the PRC; levels of pollution are recognized as impairing both natural resources and economic development within the region.

Changchun, the capital of Jilin Province, is located in the upstream area of the SRB. The Yitong and Yongchun Rivers flow through the Changchun region into the Songhua River. They are seriously polluted because of low sewage collection rates and inadequate treatment of wastewater. Therefore Jilin province has a very significant environmental impact on the upstream part of the river basin. Besides the deficiency in wastewater collection and treatment, the urban areas also face shortages of current and future drinking water supply and inadequate service capacity. Shuangyang, a district of Changchun Municipality, and Meihekou City use ground water as their main drinking water sources. The over abstraction of ground water has led to land subsidence. In Liaoyuan City, water shortages occur throughout the non-flood periods during each year. Two existing reservoirs, used as urban drinking water sources, are usually below dead storage levels owing to successive years of drought. Moreover, the aging water distribution networks result in a large amount of water leakage and the poor ground water quality further aggravate water shortages.

The Jilin Water Supply and Sewerage Development Project was created by the Jilin provincial government to help solve these problems. A PPTA project was carried out in 2004 and the final report completed in 2005, it analyzed the feasibility studies and the social and environmental impacts. The ADB approved a loan of \$100 million USD on 18 July, 2005 and the loan effectiveness date was December 13, 2005. With counterpart funding the project estimated cost will be \$232 million USD.

The project objectives are to enhance the urban environment and public health through better wastewater management and increased supply of high-quality water, and to improve the quality of surface-and groundwater resources in and downstream of the project cities. Related objectives include (i) contributing to reducing the discharge of untreated wastewater upstream of the SRB, and achieving the goal of 70% wastewater treatment rate by 2010; (ii) addressing water shortage through effluent reuse; (iii) increasing water supply reliability and meeting water demand through 2010; (iv) establishing water supply companies, and making them efficient and commercially managed; (v) supporting integrated approaches to basin-wide pollution prevention and control; and (vi) improving cost recovery from users through an improved tariff structure, with gradual increases to achieve full cost recovery.

The Project will benefit more than 4 million urban residents. The Changchun subcomponents include (i) upgrading the existing Beijiao primary wastewater treatment works (WWTW) to secondary treatment with a capacity of 130,000 m³/day including recycling 100,000m³/day of treated wastewater; (ii) constructing sewerage pipelines of 216 km, three pumping stations and six maintenance and management stations to improve the sewerage network of the Beijiao WWTW; (iii) constructing a 150,000m³/day WWTW including 50,000m³/day tertiary treatment to recycle the treated wastewater; (iv) improving the drainage and preventing flooding to the Changchun National Hi-Tech Industries Development Zone by widening 4.8km of the Yongchun River together with improvements to the dam and spillway of the Sanjia Reservoir on the river, and constructing 7 new box culverts; and (v) constructing a water treatment work (WTW) with a capacity of 36,000 m³/day in the Shuangyang District, with a related water pumping station to extract surface water from the Shuangyang Reservoir, and two 2.4km of pipelines to convey treated water from the WTW to the district's distribution network.

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The Liaoyuan subcomponents include (i) upgrading the existing Longshan and Hebing WTWs to enable full utilization of their design capacity of 30,000m³/day and 80,000 m³/day, respectively; (ii) improving the water distribution network by constructing 17 booster pumping stations rehabilitating 2.0km of existing water supply networks and laying 53.1 km of new water supply pipelines; (iii) upgrading the drainage-sewerage network to separate the drainage and sewerage systems ,including constructing 12 km of sewerage pipelines; and (iv) constructing 4.0 km of storm-water open channels and 4.3 km of box culverts to collect mountain terrain runoff for flood mitigation.

The Meihekou subcomponents include (i)constructing a WTW with a capacity of 100,000m³/day; (ii)constructing a 40 km raw-water transmission pipeline to convey surface water from the Hailong Reservoir to the WTW; and (iii) upgrading 55.5 km of existing water distribution network.

Based on SEIA and MEMORANDUM OF UNDERSTANDING LOAN 2175-PRC: JILIN WATER SUPPLY AND SEWERAGE DEVELOPMENT PROJECT LOAN REVIEW MISSION, environmental monitoring data, internal monitoring sheet prepared by IAs and on-site inspection by environment specialist, Annual Environmental Management Report of year 2009 for Jilin Water Supply and Sewerage Development Project was prepared. According to Rules for Environmental Protection Management of Construction Project(document No.253) issued by the State Council and Management of Environmental Protection Acceptance for Construction Completion issued by SEPA(Doc.13), Jilin Province Environment Protection Bureau asked Jilin Province Environment Protection Monitoring Centre Station conducted environmental monitoring for Beijiao and Nanjiao WWTs completion. Based on the environmental monitoring data, environmental specialist developed respectively Monitoring and Assessment Report on Beijiao WWTW completion and Monitoring and Assessment Report on Nanjiao WWTW completion, and will submit them to ADB, annual environmental management report of year 2009 covers only Shuangyang, Liaoyuan and Meihekou WTWs.

The annual report of year 2009 including:

- (1) Project Description
- (2) Summary Environmental Management Plan
- (3) Environmental Management Activities
- (4) Conclusions and recommendations

2. SUMMARY ENVIRONMENTAL MANAGEMENT PLAN

A key objective of the Impact Assessment process is to identify the potential impacts on the environment of the activities anticipated and to develop a set of mitigation measures technically appropriate, financially acceptable and practically implementable in the concerned regions. These mitigation measures are usually identified during the EIA or IEE stage and then set out in a practical and co-ordinated way in the EMP.

The role of the EMP is to outline the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or control adverse environmental impacts, and the actions needed to implement these measures. The EMP provides the crucial link between alternative mitigation measures evaluated and described in the IEEs and ensuring that such measures are effectively implemented.

The EMPs is an important tool to ensure that the Project will be implemented in an environmentally acceptable manner. The EMP describes the procedures and plans to ensure that the mitigation measures and monitoring requirements will actually be carried out during subsequent stages of the Project. the EMP covers identified the environmental impacts and measures required to mitigate these impacts, institutional arrangements, environmental monitoring requirements, public participation and etc.

2.1. ENVIRONMENTAL MANAGEMENT INSTITUTION

the Environmental Management Institution of Jilin Water Supply and Sewerage Development Project(JWSSDP) in the construction period is seen in the Fig. 2-1.

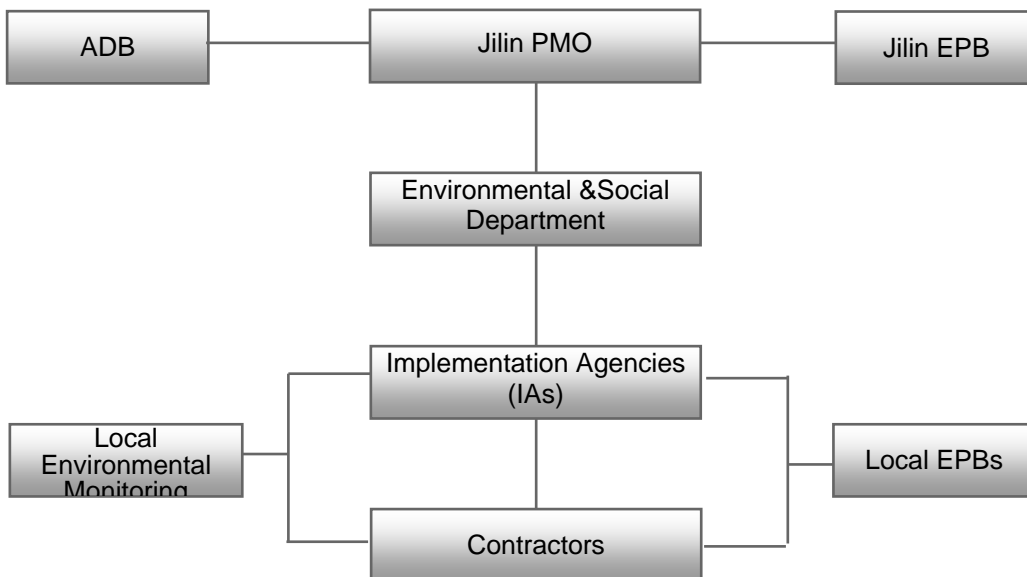


FIG 2-1 ENVIRONMENTAL MANAGEMENT INSTITUTION IN THE CONSTRUCTION PERIOD

2.2. ENVIRONMENTAL RESPONSIBILITIES

The Environmental responsibilities of JWSSDP is seen the table2-1.

TABLE 2-1 ENVIRONMENTAL RESPONSIBILITIES OF JWSSDP

Phase	Responsible Institutions	Environmental Responsibilities
Feasibility Study	SEPA, JPEPB	Review and approve EIA reports and environmental protection measures
Sign	Design Institutes	Incorporate mitigation measures in engineering designs and tender documents
Tendering	Contractors	Incorporate the environmental management program into the bids
Construction	Contractors	Implement ADB's environmental policies and requirements, Chinese laws and regulations about environment protection, and mitigation measures in EIAs.
	SWSC, LWG, MWSC	Ensure the implementation of the environmental management plan
	SEMS, LEMS, MEMS	Conduct environmental monitoring and periodic site inspections
	JPEPB	Review and approve environmental monitoring reports
Operation	SWSC, LWG, MWSC	Implement ADB's environmental policies and requirements, Chinese laws and regulations about environment protection, and mitigation measures in EIAs.
	SEMS, HTZEMS, LEMS, MEMS	Periodical conduct of operational phase environmental monitoring
	JPEPB, CEPB, SEPB, LEPB, MEPB	implement environmental supervision management

JPEPB = Jilin Province Environmental Protection Bureau, LEMS = Liaoyuan Environmental Monitoring Station, LEPB = Liaoyuan Environmental Protection Bureau, LWG = Liaoyuan Water Group, MEMS = Meihekou Environmental Monitoring Station, MEPB = Meihekou Environmental Protection Bureau, MWSC = Meihekou Water Supply Company, SEMS = Shuanyang Environmental Monitoring Station, SEPA = State Environmental Protection Administration, SEPB = Shuanyang Environmental Protection Bureau, SWSC = Shuanyang Water Supply Company.

2.3. ENVIRONMENTAL MITIGATION MEASURES

The Identified environmental mitigation measures of JWSSDP is seen the table 2-2.

TABLE 2-2 ENVIRONMENTAL MITIGATION MEASURES OF JWSSDP

Parameter	Environmental Impacts	Mitigation Measures
Construction Stage		
Air	Dust from construction sites due to stockpiles, construction vehicles idling on unpaved haul roads.	<ul style="list-style-type: none"> - Pave frequently used haul roads - Water unpaved areas and haul frequently - Control vehicle speeds on construction sites - Cover stockpiles and trucks carrying dusty materials - Minimize on-site storage time of construction and demolition wastes - Restore disturbed land timely
Noise	Noise from powered mechanical equipment	<ul style="list-style-type: none"> - Use quiet equipment - Maintain construction machinery regularly - Use temporary hoarding/screen to shield off noise source - Stop work from 2200 hr to 0600 hr when near residential areas
Water	Wastewater from the work force and uncontrolled muddy water runoff from construction site	<ul style="list-style-type: none"> - Provide portable chemical toilets or small package wastewater treatment plants on-site - Install interim holding tanks and pipelines to convey sewage to nearby sewers if sewers are nearby

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		<ul style="list-style-type: none"> - Install sedimentation tanks to treat process wastewater with high concentrations of SS - Maintain and monitor efficient sanitation - Provide health services on-site
Solid Wastes	Refuse from the work force and construction and demolition wastes	<ul style="list-style-type: none"> - Provide closed containers for storing on-site refuse - Transport refuse for proper off-site disposal regularly - carrying dumped materials to appointed dumping site. - Explore opportunities to reuse excavated soil for backfilling
Traffic	Construction traffic may cause traffic congestion on nearby roads	<ul style="list-style-type: none"> - Design temporary traffic management schemes and carry out these schemes during construction - Divert of schedule construction traffic to avoid morning and afternoon peak traffic hours - Build interim roads if necessary - Select alternative transport routes to reduce disturbance to regular traffic
Labour camps & Worker Health Management:	If inappropriately managed, workforce may cause serious threat to the social stability of surrounding villages. If inappropriately equipped, labour camps may become unhealthy and be the cause of epidemic spread out to workers and surrounding population.	Strict clauses imposed to the contractor for the organisation and the management of labour force and camps. Recruitment of a significant part of the workforce among local population will directly benefit local communities.
Operational Stage		
Air	Emissions from boilers	<ul style="list-style-type: none"> - Design and install air pollution control systems with TSP removal efficiency of 96% and SO₂ removal efficiency of 40-60%
Noise	Noise from fixed sources such as machineries and pumping stations	<ul style="list-style-type: none"> - Design the buildings that house these fixed noise sources properly, with adequate wall thicknesses, double-glazed windows and soundproof doors, etc. - Provide landscape to these buildings for aesthetics
Chlorine	Accidental spillage could pose health risks to workers and nearby residents	<ul style="list-style-type: none"> - Design the chlorine storage buildings properly, and equip them with chlorine gas detector, alarm system, and automatic chlorine gas collection system that will collect as well as neutralize the chlorine gas - Regularly inspect and maintain the above equipment - Store only 500 kg chlorine bottles - Limit the quantity of chlorines stored on-site to no more than a 20-day supply - Prepare a safety plan and an emergency response plan - Train workers regularly on the proper and safe handling of chlorine and on response procedures during an emergency
Solid Waster	Refuse from the workforce, boiler ash and sludge	According to state provisions related to systematic management for solid castoff, solid castoff such as sludge produced during operation should be carried to appointed disposal site.
Water	Wastewater from the workforce and the treatment process	<ul style="list-style-type: none"> - Discharge wastewater to public sewers - If there is no public sewer nearby, install septic tanks to treat the wastewater before disposal - Explore opportunities to reuse wastewater from backwashing

2.4. SUMMARY ENVIRONMENTAL MONITORING PROGRAMS

The summary environmental monitoring programs of JWSSDP is seen the table 2-3.

TABLE 2-3 SUMMARY ENVIRONMENTAL MONITORING PROGRAMS

Item	Location	Parameters	Time And Frequency
Shuanyang WTW and Pipelines Construction (SEMS)			
Air	Construction site and nearby SR	TSP	Once per month for 3 consecutive days

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Noise	Construction site and nearby SR	Noise	Once per month for 2 consecutive days, including once during day time and once at night
Shuanyang WTW and Pipelines – Operation(SWSC or SEMS)			
Air	Stack	TSP, SO ₂ , NO ₂	Once per year
Noise	1 m outside plant boundary		Once per year
Water	One station at intake pumping station WTWs wastewater discharge point	All parameters in [CJ3020-1993] COD, BOD, SS	Once per month Once per year
Liaoyuan WTW, Pumping Stations, Sewerage Network and Flood Control – Construction Phase (LEMS)			
Air	Construction site and nearby SR	TSP	Two times per month
Noise		Noise	Two times per month
Water	At the barrage intake	COD, BOD, SS	Once per season
Liaoyuan WTW, Pumping Stations, Sewerage Network and Flood Control – Operational Phase (LWG or LEMS))			
Air	Stacks at the Longshan and Hebing WTWs	TSP, SO ₂ , NO ₂	Two times per year
Noise	Plant boundaries of the Longshan and Hebing WTWs, and each of the 17 pumping stations	Noise	Two times per year
Chlorine	Chlorine storage buildings of the Longshan and Hebing WTWs	Inspection	Two times per year
Water	Wastewater from the Longshan and Hebing WTWs	COD, BOD, SS	Two times per year
Meihekou WTW and Pipelines – Construction Stage(MEMS)			
Air	Construction site and concrete batching site	TSP	Once per month for 3 consecutive days
Noise	Residents neat the pipeline construction route	Noise	Once per season
Water	One station upstream of intake and one station downstream of intake	SS, COD, total Coliform bacteria	Once per month for 3 consecutive days
Ecology	Construction site	inspection for loss of soil and habitat	Every time on-site doing air monitoring
Meihekou WTW and Pipelines			
Water	One station at intake in Hailong Reservoir WTWs wastewater discharge point	All parameters in [CJ3020-1993] SS, COD	Once per wet, dry, and transitional seasons Once in Jan and once in Jul
Noise	Noise sources inside plant Plant boundary	Noise Noise	Once per year Once per year in the summer season

3. ENVIRONMENTAL MANAGEMENT ACTIVITIES

3.1. ENVIRONMENTAL MANAGEMENT

The annual report on environmental management of Jilin water supply and wastewater development project of year 2009 is prepared based on environmental monitoring data provided by local environment monitoring stations, the on-site visiting, examining internal monitoring sheet, discussing with the IAs, contractors, engineering supervision agencies, local environmental protection departments.

3.1.1. CAPACITY OF PROVINCIAL ENVIRONMENTAL AND SOCIAL DIVISION (ESD)

Jilin PMO established Environmental & Social Division(ESD), had a leader and a staff, and the ESD in Jilin PMO took responsibilities for communicating and coordinating with the ESD in IAs. The local environmental specialist visited IAs was all under coordination and arrangement of the ESD in Jilin PMO. The high coordinating effectiveness of the ESD in Jilin PMO was acknowledged.

3.1.2. CAPACITY BUILDING OF IAS' ENVIRONMENTAL AND SOCIAL DIVISION (ESD)

In the light of site investigation and discussion, the personnel of ESD of the IAs is fixed. From the interview with environmental inspectors, it is found that the environmental inspectors know clearly the environmental problems due to construction activities, and mitigation measures taken. IAs can contact local environmental protection bureaus(EPBs), and carry out environmental management through their participation, include environmental monitoring of construction sites in the second half year of year 2009. It is obvious that through the construction of Jilin water supply and sewerage development project, the IAs, the contractors and the engineering supervisors all have improved their consciousness and capacities for the environmental management of domestic construction projects.

A environmental training was conducted at construction site of Shuangyang WTW, agencies participated in environmental training covered IA (Shuangyang Water Supply Company), Contractor(Changchun Huanyu Construction Company), and Changchun Shuangyang Construction Engineering Supervision Company. Environmental training involved ADB's profile and environmental policies, Chinese laws and regulations for environment protection, environment management procedure, environmental impact and mitigation measures for Shuangyang WTW & Pipeline Engineering, and environmental inspection sheets for contractors.

In a word, this environmental training achieved good effects

3.1.3. ENVIRONMENTAL MANAGEMENT ARCHIVES

The environmental management archives of Shuangyang WTW, Meihekou WTW and Liaoyuan WTW, include the environmental impact reports and the approval documents by related to EPBs, the environmental management plans, the internal environmental monitoring sheet, etc. the environmental inspectors can persist in filling in the internal environmental monitoring sheet.

3.2. ENVIRONMENTAL MANAGEMENT DURING CONSTRUCTION

3.2.1. SHUANGYANG WATER TREATMENT WORKS

3.2.1.1. MANAGEMENT OF SOLID WASTE AND DOMESTIC GARBAGE

Shuangyang Water Treatment Works started construction on April 25, 2009, now 75% civil workload has been completed, earthwork volume is 42,000m³, of which excavation volume is 22,600m³, backfilling volume is 8,600m³, the amount of waste residues is 19,600m³. The construction site of Shuangyang Water Treatment Works does not exceed the land acquisition plan, planned plant area is 2.14ha, the planned greening area in the plant area is 0.7ha, greening rate is 32.7%. the Construction site of Shuangyang WTW is seen in Photo 3.2-1.

In the construction site there are two temporary piling up yards, one(east near to clear pond) is for temporarily piling up building materials, which is managed by a special person, the other is for temporarily piling up waste residues and backfilling earth, which is enclosed with bricks, and piled up materials are covered with covering cloth, to prevent effectively downward sliding of earth due to raining. Garden departments are purchasing the waste soil produced by excavation (originally it is partial earthwork of farmland).

The construction site of Shuangyang WTW is located in urban area, all 187 construction workers and office clerks are natives, so it is not necessary to set up temporary construction living camps, without domestic sewage to produce, there are 2 outdoor lavatories housing 20 people and production wastewater amount is little. Little temporary living garbage to produce is thrown into fixed garbage boxes.



PHOTO3.2- 1 CONSTRUCTION SITE OF SHUANGYANG WTW

3.2.1.2. NOISE MITIGATION MEASURES

Based on the noise monitoring data during the construction provided by Changchun shuangyang Environmental Monitoring Station in the second half of 2009, the noise in the daytime in the construction site boundary conformed to GB12523-90 'Noise limits for construction site', see the table3.2-1. But in the adjacent residential area in the north of the construction site, the noise produced from construction machinery had some influence on the surrounding residents.

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TABLE 3.2-1 MONITORING DATA AND NOISE LIMIT VALUE

Stage	Main Noise Sources	Daytime Sound-level dB (A)	Noise Limit Value dB (A)	
			Daytime	Night
work	Bulldozer, grab, loading machine	72.7	75	55
Piling	Various pile driver	80.2	85	Stop construction
Structure	Concrete stirrer, rammer, electric saw	65.3	70	55
Fitment	Crane, lifter	57.4	65	55

the IA and the contractor have limited strictly construction time, not constructing from 06:30 in the evening to 06:00 in the morning, in order to avoid influencing residents' life. From the on-site visit and the discussion with the local environmental protection bureau, we know that in the construction site set up a complaint box, the IA has communicated well with the local residents, the residents think that this project is the people's livelihood project, they support this project construction very much, and hope to drink clean tap water as soon as possible, and they express some understanding of the noise produced in the project construction, and don't think that the influence of noise on them is big, and can accept it.

3.2.1.3. FLOATING DUST MITIGATION MEASURES

There is not much flying dust produced in the construction site, the contractors can reduce dust through sprinkling water according to the requirements of flying dust mitigation measures, the vehicles to transport earth, stones and cement are covered with covering cloth. The construction machinery produces a certain noise, which has a certain influence on surrounding residential areas.

In order to supervise effectively environmental air management during the construction, Changchun shuangyang Environmental Monitoring Station carried out the monitoring of present ambient air monitoring in July 1-5, 2009, August 10-14, 2009 respectively, monitoring parameters are TSP, PM₁₀, SO₂ and NO₂. For ambient air monitoring data, see the table 3.2-2. Present monitoring results and statistical results are given in the table 3.2-3 to 3.2-8. Environmental air assessment executed the Class II standard in GB3095-1996 'Ambient air quality standard'(See 3.2-9). The monitoring results show that during the construction, the ambient air quality was good in the construction site of Shuangyang Water Treatment Works and its surrounding environment, the construction activities had not magnificent influence on the air in the construction site and its surrounding environment.

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TABLE 3.2-2 AMBIENT AIR MONITORING DATA FOR SHUANGYANG WTW

Sampling Point	Date	SO ₂ (mg/m ³)				NO ₂ (mg/m ³)				TSP (mg/m ³)				PM10 (mg/m ³)			
		08h	12h	18h	Day mean value	08h	12h	18h	Day mean value	08h	12h	18h	Day mean value	08h	12h	18h	Day mean value
At Yard of Drinking Water Plant	2009.6.24	0.028	0.024	0.029	0.027	0.021	0.018	0.025	0.021	0.042	0.038	0.034	0.038	0.034	0.030	0.027	0.030
	2009.6.25	0.031	0.026	0.030	0.029	0.022	0.019	0.023	0.021	0.047	0.040	0.047	0.045	0.038	0.032	0.038	0.036
	2009.6.26	0.029	0.024	0.028	0.027	0.021	0.019	0.023	0.021	0.046	0.040	0.044	0.043	0.037	0.032	0.035	0.035
	2009.6.27	0.029	0.026	0.030	0.028	0.022	0.020	0.024	0.022	0.044	0.038	0.045	0.042	0.035	0.030	0.036	0.034
	2009.6.28	0.030	0.027	0.029	0.029	0.021	0.017	0.023	0.020	0.045	0.038	0.044	0.042	0.036	0.030	0.035	0.034
	5-day Mean Value				0.028				0.021				0.042				0.034
Ground of Quyu High School	2009.7.1	0.032	0.028	0.034	0.031	0.023	0.019	0.024	0.022	0.085	0.079	0.084	0.082	0.066	0.063	0.067	0.065
	2009.7.2	0.035	0.029	0.036	0.033	0.024	0.021	0.029	0.025	0.085	0.076	0.081	0.081	0.068	0.061	0.065	0.065
	2009.7.3	0.033	0.030	0.034	0.032	0.023	0.0196	0.026	0.023	0.081	0.077	0.083	0.080	0.065	0.062	0.066	0.064
	2009.7.4	0.033	0.024	0.030	0.029	0.024	0.021	0.025	0.023	0.084	0.080	0.085	0.083	0.067	0.064	0.069	0.067
	2009.7.5	0.029	0.026	0.031	0.029	0.023	0.020	0.024	0.022	0.081	0.081	0.085	0.082	0.065	0.065	0.068	0.066
	5-day Mean Value				0.030				0.023				0.082				0.065
South Bus Station	2009.8.10	0.034	0.027	0.031	0.031	0.028	0.024	0.029	0.027	0.086	0.082	0.085	0.084	0.069	0.066	0.068	0.067
	2009.8.11	0.035	0.030	0.032	0.032	0.028	0.020	0.026	0.025	0.086	0.082	0.085	0.084	0.069	0.066	0.068	0.067
	2009.8.12	0.033	0.026	0.034	0.031	0.026	0.021	0.025	0.024	0.083	0.079	0.084	0.082	0.066	0.063	0.067	0.066
	2009.8.13	0.030	0.032	0.035	0.032	0.027	0.019	0.026	0.024	0.085	0.081	0.086	0.084	0.068	0.065	0.069	0.067
	2009.8.14	0.031	0.028	0.034	0.031	0.028	0.021	0.024	0.024	0.084	0.080	0.086	0.083	0.067	0.064	0.069	0.067
	5-day Mean Value				0.031				0.024				0.084				0.067

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TABLE 3.2-3 DAY MEAN CONCENTRATION (JUNE 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	5	0.027-0.029	0.028	0.0
NO ₂	5	0.02-0.022	0.021	0.0
TSP	5	0.038-0.045	0.042	0.0
PM ₁₀	5	0.03-0.036	0.034	0.0

TABLE3.2-4 1H MEAN CONCENTRATION(JUNE 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	15	0.024-0.031	0.028	0.0
NO ₂	15	0.017-0.025	0.021	0.0

TABLE3.2-5 DAY MEAN CONCENTRATION (JULY 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	5	0.029-0.033	0.03	0.0
NO ₂	5	0.022-0.025	0.023	0.0
TSP	5	0.08-0.083	0.082	0.0
PM ₁₀	5	0.064-0.067	0.065	0.0

TABLE 3.2-6 1H MEAN CONCENTRATION(JULY 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	15	0.024-0.036	0.03	0.0
NO ₂	15	0.019-0.029	0.023	0.0

TABLE 3.2-7 DAY MEAN CONCENTRATION(AUGUST 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	5	0.031-0.032	0.031	0.0
NO ₂	5	0.024-0.027	0.024	0.0
TSP	5	0.082-0.084	0.084	0.0
PM ₁₀	5	0.066-0.067	0.067	0.0

TABLE 3.2-8 1H MEAN CONCENTRATION(AUGUST 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	15	0.026-0.035	0.031	0.0
NO ₂	15	0.019-0.029	0.024	0.0

TABLE3.2-9 AMBIENT AIR QUALITY STANDARD UNIT: MG/M³

Name of Pollutant	Date of Value	Concentration Limit	
		Class I	Class II
SO ₂	Day Mean	0.05	0.15
	1h Mean	0.15	0.50
TSP	Day Mean	0.12	0.3
PM ₁₀	Day Mean	0.05	0.15
NO ₂	Day Mean	0.08	0.08
	1h Mean1h	0.12	0.12

3.2.1.4. SUMMARY OF ENVIRONMENTAL MANAGEMENT ACTIVITIES

The activities of environmental management of Shuangyang WTW in 2009 are seen in table 3.2-10.

TABLE 3.2-10 ENVIRONMENTAL MANAGEMENT OF SHUANGYANG WTW IN 2009

	Shuangyang WTW
Noise	Stop construction from 18:30hr to 06:00 hr next morning, the noises produced by construction equipment have some small impacts on the local people around the construction site in the daytime, but this impact is accepted.
Land acquisition	Planned land is not exceeded, and land acquisition has been approved.
Environmental air	In dry and windy days, water to reduce dust, transport vehicles are covered with tarpaulin, and vehicles are washed regularly.
Waste soil and residue	he responsibility of cleaning up waste soil and residue has been incorporated into the contractor's contract. They are piled up in designated temporary dump, used for land leveling, a part of waste soil is being transported to municipal afforestation site.
Soil erosion	Waste soil and residue are piled up in the designated temporary dump, contractor is compacting, enveloping and obstructing soil pile.
Drinking water	Urban tap water
Wastewater production	Production wastewater has a small amount, can neither form surface runoff, and nor enter into water body.
Domestic sewage	No domestic sewage production
Accommodation	All worker and officers live in Shuangyang
Sanitation	Go home for dining.
Garbage	There a waste bin in the site, garbage is cleaned and transported regularly.
Traffic & safety	There is a safety warning board in the access road, each vehicle has a fire extinguisher, the vehicles are carried out safety inspection regularly, and slowdown in downtown area, and there are enough fire extinguishers within the works area.
Public participation	Environmental inspectors and IA visited local people near construction site, the local people support ADB loaned Shuangyang WTW and thought noise from site is able to accepted.
Environment Monitoring	Local environment monitoring station conducted environmental monitoring, environmental quality is better.
Environmental archives	Better

3.2.2. LIAOYUAN WATER TREATMENT WORKS

3.2.2.1. SOLID WASTE AND GARBAGE MANAGEMENT

The construction of both Liaoyuan Hebin Water Treatment Works and Longshan Water Treatment Works has been completed entirely; earthwork and stonework will be produced no longer. Hebin WTW is under good operation condition and Longshan WTW enter into overall debugging stage. There are totally 17 pump station construction projects, at present the construction of 14 pump stations have been completed, and the installation of 13 pump stations has been completed, and 40.5-km water distribution pipe network, 36-km water supply pipe network and 15.6-km drainage pipe network have been completed. From start working to present, Liaoyuan Water Treatment Works has complete stonework of 4630m³, excavation of 195,730 m³, backfilling of 170,965 m³, waste residues of 24,765 m³. See tables 3.2-11 for details. Waste soil of 24,765 m³ was transported to the construction site of Xinghe Wanyuan residential area, for leveling up the construction site.

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TABLE 3.2-11 SOIL & STONE VOLUME BALANCE OF LIAOYUAN WTW

No	Name of Works	Stone (m ³)	Excavation (m ³)	Backfill (m ³)	Waste soil (m ³)
1	Hebin WTW	1,295	345		345
	Longshan WTW	737	1,325	442	883
2	Pumping Station Works	1,350	11,000	3,692	7,308
	Water distribution network	185	72,000	65,705	6,295
3	Water supply pipe network	432	71,280	66,754	4,526
4	Sewerage pipe networks	631	39,780	34,372	5,408
Total		4,630	195,730	170,965	24,765



PHOTO3.2-2 DISCARD EARTH YARD OF LIAOYUAN WTW(ORIGINAL LOW BOTTOMLAND)

3.2.2.2. LIVING CAMPS MANAGEMENT

For the conditions of temporary living camps for construction in the first half year of 2009 see table3.2-12. There are 238 construction workers, they live in hired nearby residential buildings, meals are ordered in restaurants, and delivered to the construction site. The construction workers go to public places in Liaoyuan City for shower and recreation. So the domestic wastewater from the construction workers is discharged into public drainage facilities to be treated in the municipal sewage treatment plant. They do not basically discharge outward living sewage, and their dwelling, sanitation and recreation are guaranteed. The construction in present phase hardly produced domestic sewage.

TABLE 3.2-12 CONDITIONS OF TEMPORARY LIVING CAMPS FOR CONSTRUCTION

No.	Name of project	Construction Workers	Dwelling place	Office clerks	Shower, recreation	Meal	Remarks
1	Longshan WTW	53	Hire 3 places in nearby residential	9	Go to public places	Order meals near	29 persons are natives

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			building, 8 persons for each				
2	Hebin WTW	63	Hire 3 places in nearby residential building, 8 persons for each	9	Go to public places	Order meals near	41 persons are natives
3	Pumping station	122		20		Order meals near	This city's construction team

From the on-site visit, we can see that Hebin Water Treatment Plant and Longshan Water Treatment Plant has completed land leveling of the plant areas, greening is over soon, Hebin Water Treatment Plant completed 98% of planned greenbelt area of the plant area, Longshan Water Treatment Plant completed 97%. See table 3.2-13, photo3.2-3 to Photo 3.2-4.

TABLE3.2-13 STATUS OF PLANT AREA GREENING COMPLETION

No.	Item	Hebin WTW	Longshan WTW	Total
1	Planned Greening Area (m ²)	32,589	15580	48,169
2	Plant green hedge (m)	3,240	1,345	4585
3	Cultivate lawn (m ²)	23,953	11,335	35,288
4	Tree Area (m ²)	7984	3,778	11,762
5	Total Greening Area	31,937	15,113	47,050
6	Greening Area/ Planned Area (%)	98.00	97.00	97.68



PHOTO 3.2-3 VIEW OF HEBIN WTW



PHOTO 3.2-4 GREENING OF LONGSHAN WTW

3.2.2.3. PRODUCTION WASTEWATER

The wastewater discharged from Longshan Water Treatment Works includes wastewater and domestic sewage, its total wastewater discharge quantity is 322m³/d, that is, 117482 m³/a; that of Hebin Water Treatment Works is 3.36m³/d, that is, 1226m³/a. The wastewater from Longshan and Hebin water treatment plants is discharged into the municipal network, and through the treatment of Liaoyuan Water Treatment Works, reaches the Class I B standard of 'Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant' (GB 18918-2002), then into

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East Liao River. In the second half of 2009 Liaoyuan City Environmental Monitoring Station monitored the wastewater discharge of Longshan Water Treatment Works and Hebin Water Treatment Works. For the Wastewater and pollutants discharge amount before the wastewater of Longshan Water Treatment Plant and Hebin Water Treatment Plant is discharged into the municipal network, refer to the table 3.2-14 to 3.2-15.

TABLE 3.2-14 WASTEWATER AND POLLUTANT DISCHARGE QUANTITY OF LONGSHAN WTW

WW Discharge (m ³ /d)	Concentration (mg/l)			Pollution Discharge (t/a)		
	COD	BOD	SS	COD	BOD	SS
322	75.91	32.65	68.00	8.92	3.84	7.99

TABLE 3.2-15 WASTEWATER AND POLLUTANT DISCHARGE QUANTITY OF HEBIN WTW

WW Discharge (m ³ /d)	Pollutant Concentration (mg/l)			Pollutant Discharge (t/a)		
	COD	BOD	SS	COD	BOD	SS
3.36	83.30	33.61	62.00	0.10	0.04	0.08

3.2.2.4. NOISE

In the second half of 2009 Liaoyuan City Environmental Monitoring Station monitored the noise of Liaoyuan WTW and Pump stations, monitoring data is seen in table 3.2-16. The noise assessment implement GB3096-2008 'Environmental quality standard for noise' Hebin and Longshan WTWs carry out category I, and the Pump stations as Qiaoxi, Shoushan, Nankang, Xinxing, and Lianxin enforce category II. The noise standard value is seen in table 3.2-17.

TABLE 3.2-16 NOISE MONITORING DATA OF LIAOYUAN WTW AND PUMP STATIONS

No.	Monitoring point	Monitoring Value dB (A)	
		Daytime	At night
1	Longshan WTW	46.5	41.4
2	Hebin WTW	48.2	42.8
3	Qiaoxi Pump Station	48.8	42.1
4	Shoushan Pump Station	43.2	40.8
5	Nankang Pump Station	51.6	40.0
6	Xinxing Pump Station	50.1	42.7
7	Lianxi Pump Station	52.7	45.3

TABLE 3.2-17 ENVIRONMENTAL QUALITY FOR NOISE UNIT: dB (A)

Category	Suitable scope	Standard Value	
		Daytime	Night
0	stand for the area needing quiet particularly such as healing recuperation area	50	40
1	stand for the area which need to keep quiet, taking resident's house, medical treatment and health, culture and education, scientific research and design,	55	45

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	and administration and handling official business as the main functions.		
2	stand for the area taking business and finance, fair and trade as the main functions, or intermixing residence, business and industry, needing to maintain residence quiet.	60	50
3	Stand for the area taking industrial production and storage and logistics as the main functions, needing to prevent industrial noise influencing seriously surrounding environment.	65	55

From the results of noise environment monitoring, Hebin and Longshan WTWs, Qiaoxi, Shoushan, Nankang, Xinxing and Lianxin pump stations reached the standard in the daytime and at night, having a small influence on the sensitive sites such as surrounding residential area, school and hospital. Indoor equipment debugging did not pose a threat to surrounding environment in 2009.

3.2.2.5. AMBIENT AIR

In order to supervise effectively environmental air management during the construction, Liaoyuan City Environmental Monitoring Station carried out the monitoring of present ambient air monitoring in September 15-17, 2009, October 9-11, and November 1-3 2009 respectively in Longshan WTW site and its surroundings, monitoring parameters are TSP, PM₁₀, SO₂ and NO₂. For environmental air monitoring data, see the table 3.2-18. Present monitoring results and statistical results are given in the table 3.2-19 to 3.2-24. Ambient air assessment executed the class II standard in GB3095-1996 'Ambient air quality standard' (See 3.2-9). The monitoring results show that the ambient air quality was good in the construction site of Liaoyuan Water Treatment Works and its surrounding environment, the construction and production activities had not magnificent influence on the air in Longshan WTW site and its surrounding environment.

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TABLE3.2-18 AMBIENT AIR MONITORING DATA FOR LONGSHAN WTW

Date	SO ₂ (mg/m ³)				NO ₂ (mg/m ³)				TSP (mg/m ³)				PM ₁₀ (mg/m ³)			
	08h	12h	18h	Day mean value	08h	12h	18h	Day mean value	08h	12h	18h	Day mean value	08h	12h	18h	Day mean value
2009.9.15	0.032	0.027	0.031	0.030	0.022	0.018	0.023	0.021	0.043	0.039	0.036	0.039	0.035	0.032	0.036	0.034
2009.9.16	0.033	0.028	0.032	0.031	0.021	0.019	0.024	0.021	0.046	0.040	0.040	0.042	0.036	0.031	0.034	0.034
2009.9.17	0.028	0.026	0.029	0.028	0.023	0.020	0.023	0.022	0.047	0.039	0.044	0.043	0.034	0.030	0.035	0.033
3-day Mean Value				0.030				0.021				0.042				0.034
2009.10.9	0.026	0.028	0.030	0.028	0.023	0.021	0.024	0.023	0.079	0.076	0.084	0.080	0.065	0.063	0.067	0.065
2009.10.10	0.029	0.026	0.031	0.029	0.024	0.020	0.023	0.022	0.081	0.077	0.083	0.080	0.068	0.062	0.065	0.065
2009.10.11	0.031	0.028	0.033	0.031	0.023	0.021	0.025	0.023	0.084	0.080	0.083	0.082	0.067	0.063	0.066	0.065
3-day Mean Value				0.029				0.023				0.081				0.065
2009.11.1	0.034	0.028	0.031	0.031	0.026	0.021	0.027	0.025	0.086	0.082	0.085	0.084	0.068	0.064	0.069	0.067
2009.11.2	0.032	0.026	0.029	0.029	0.027	0.022	0.025	0.025	0.083	0.079	0.085	0.082	0.067	0.065	0.069	0.067
2009.11.3	0.031	0.029	0.033	0.031	0.026	0.020	0.024	0.023	0.085	0.082	0.086	0.084	0.068	0.064	0.068	0.067
3-day Mean Value				0.030				0.024				0.084				0.067

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TABLE 3.2-19 DAY MEAN CONCENTRATION (SEPTEMBER 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	3	0.028-0.031	0.03	0.0
NO ₂	3	0.021-0.022	0.021	0.0
TSP	3	0.039-0.043	0.042	0.0
PM ₁₀	3	0.033-0.034	0.034	0.0

TABLE 3.2-20 1H MEAN CONCENTRATION (SEPTEMBER 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	9	0.026-0.033	0.03	0.0
NO ₂	9	0.018-0.024	0.021	0.0

TABLE 3.2-21 DAY MEAN CONCENTRATION (OCTOBER 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	3	0.028-0.031	0.029	0.0
NO ₂	3	0.022-0.023	0.023	0.0
TSP	3	0.08-0.082	0.081	0.0
PM ₁₀	3	0.065	0.065	0.0

TABLE 3.2-22 1H MEAN CONCENTRATION (OCTOBER 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	9	0.026-0.033	0.029	0.0
NO ₂	9	0.02-0.025	0.023	0.0

TABLE 3.2-23 DAY MEAN CONCENTRATION (NOVEMBER 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	3	0.029-0.031	0.03	0.0
NO ₂	3	0.023-0.025	0.024	0.0
TSP	3	0.082-0.084	0.084	0.0
PM ₁₀	3	0.067	0.067	0.0

TABLE 3.2-24 1H MEAN CONCENTRATION (NOVEMBER 2009)

Parameter	Num. of Sampling	Concentration Scope (mg/m ³)	Mean Value (mg/m ³)	Exceed standard ratio(%)
SO ₂	9	0.026-0.034	0.03	0.0
NO ₂	9	0.02-0.027	0.024	0.0

3.2.3. MEIHEKOU WATER TREATMENT WORKS

3.2.3.1. GREENING OF WORKS AREA

Heihekou WTW was under good operation status. There are no temporary dump yard and waste residues sites in the works area. the works area was levelled off, roads were hardened, the greening area of the works area is 30,300m² with 40.2% greening rate, 472 trees were planted, and the environment of works area is beautiful and neat. See photo 3.2-5.



PHOTO 3.2-5 LANDSCAPE OF MEIHEKOU WTW

3.2.3.2. WASTEWATER MANAGEMENT

Total discharge amount of Meihekou Water Treatment Works is 762.3 t/d. The domestic sewage after treatment through underground buried trough, together with production wastewater after settling treatment, are discharged into the municipal network, then through Meihekou city wastewater treatment plant, reaches Class I B standard of 'Discharge standard of pollutants for municipal wastewater treatment plant' (GB 18918-2002), finally into the Huifa River. In the second half of 2009 Meihekou Environmental Monitoring Station monitored the wastewater discharge of the water treatment plant, For the wastewater discharge amount and discharged pollutants concentrations before the wastewater of Meihekou Water Treatment Plant is discharged into the municipal network, refer to Table3.2-25.

TABLE 3.2-25 DISCHARGE AMOUNT OF WASTEWATER AND POLLUTANTS

WW Discharge (m ³ /d)	Concentration (mg/l)			Pollution Discharge (t/a)		
	COD	BOD	SS	COD	BOD	SS
762.3	31.04	10.51	63.0	8.64	2.92	17.52

3.2.3.3. NOISE

Meihekou City Environmental Monitoring Station monitored noise within the works area and its surrounds during 16-17 December, 2009, monitoring data is seen in table 3.2-26. Noise assessment is based on category 1 in GB3096-2008'Environmental Quality Standard for Noise'. During Meihekou WTW operation, the influence of the works area noise on sound environment quality of its surrounds is very small.

TABLE 3.2-26 NOISE MONITORING VALUE OF MEIHEKOU WTW

	Standard Value	East	South	West	North
Daytime dB (A)	55	37.5	37.5	41.5	54.5
Night dB (A)	45	34.5	34.5	37.5	34.5

3.2.3.4. AMBIENT AIR

The waste gas from Meihekou Water Treatment Works in the operation period is the smoke emitted from 2t/h hot water furnace burning coal during the heating in winter. Chimney is 30m high, boiler smoke adopts wet dedusting and desulfurization, dedusting rate is 97%, and desulfurization rate is 50%. The main pollutant emission amount of smoke pollution source conforms the national requirements. See table3.2-27.

TABLE3.2-27 POLLUTANT EMISSION AMOUNT OF SMOKE POLLUTION SOURCE OF MEIHEKOU WTW

Pollution source	smoke amount (m ³ /a)	chimney height/inner diameter (m/m)	TSP		SO ₂		burning coal (t/a)
			concentration (mg/m ³)	Emission amount (t/a)	concentration (mg/m ³)	Emission amount (t/a)	
2t/h hot water furnace	5,000,000	30/0.36	136	0.68	560	2.8	500

During 3 days from 15 to 17 December 2009, Meihekou City Environmental Monitoring Station monitored ambient air within the works area and its surrounds, the monitoring data is seen in table 3.2-28. The monitoring result shows that ambient air quality of Heihekou WTW area and its surrounds meets the demands of class II of 'Ambient Air Quality Standard'(GB3095-1996). During the operation the smoke emitted from 2t/h hot water furnace burning coal for the heating of Meihekou Water Treatment Works in winter has not magnificent influence on ambient air quality.

TABLE3.2-28 AMBIENT AIR MONITORING RESULT STATISTICS OF MEIHEKOU WTW

Monitoring Point	Parameter	TSP	SO ₂	NO ₂
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PEOPLE'S REPUBLIC OF CHINA – THE ASIAN DEVELOPMENT BANK
 JILIN WATER SUPPLY AND SEWERAGE DEVELOPMENT PROJECT – LOAN 2175-PRC
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Meihekou Daoban	1h concentration	Scope(mg/m ³)	-	0.002~0.011	0.018~0.064
		Exceed standard ratio(%)	-	0	0
		multiple of maximum exceed standard	-	0	0
	Daily Mean Concentration	Scope(mg/m ³)	0.130~0.190	0.006~0.007	0.022~0.058
		Exceed standard ratio(%)	-	0	0
		multiple of maximum exceed standard	0	0	0
	3-day Mean Concentration	Concentration value(mg/m ³)	0.167	0.006	0.038
		Standard index	0.56	0.04	0.32
	Works Area	1h concentration	Scope(mg/m ³)		
Exceed standard ratio(%)			-	-	0
multiple of maximum exceed standard			-	-	
Daily Mean Concentration		Scope(mg/m ³)	0.178~0.266		0.029~0.038
		Exceed standard ratio(%)	0	-	0
		multiple of maximum exceed standard	0	0	0
3-day Mean Concentration		Concentration value(mg/m ³)	0.193	0.006	0.035
		Standard index	0.64	0.04	0.29
Beiyao		1h concentration	Scope(mg/m ³)	-	0.002~0.007
	Exceed standard ratio(%)		-	0	0
	multiple of maximum exceed standard		-	0	0
	Daily Mean Concentration	Scope(mg/m ³)	0.174~0.235	0.002~0.005	0.004~0.015
		Exceed standard ratio(%)	0	0	0
		multiple of maximum exceed standard	0	0	0
	3-day Mean Concentration	Concentration value(mg/m ³)	0.217	0.004	0.009
		Standard index	0.72	0.03	0.08
	Railway Hospital	1h concentration	Scope(mg/m ³)	-	0.002~0.006
Exceed standard ratio(%)			-	0	0
multiple of maximum exceed standard			-	0	0
Daily Mean Concentration		Scope(mg/m ³)	0.196~0.220	0.003~0.005	0.003~0.014
		Exceed standard ratio(%)	0	0	0
		multiple of maximum exceed standard	-	-	-
3-day Mean Concentration		Concentration value(mg/m ³)	0.203	0.003	0.008
		Standard index	0.68	0.02	0.07

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. CONCLUSIONS

The land requisition of all subprojects are approved by land administrative departments, all of them do not exceed planned land use ranges. The noise from the Water treatment works has a small influence on sensitive protection goals such as residential areas. Shuangyang Water Treatment Works stop construction at night in order to avoid interfering residents' life. The noise produced in daytime has a certain impact on residential areas and office buildings. The local residents who are visited randomly express the understanding of the certain impact due to noise. They think that the project construction is the project to benefit the people of this city, and the project for public service that they welcome and hope very much, and the impact is short-term and acceptable.

Transport vehicles for Shuangyang WTW are all covered with covering cloth, and decelerate in important traffic roads, which are consistent with the urban traffic management regulations, and also avoid flying dust occurrence. The contractors of all subprojects stop construction and transportation in rainy days, to prevent soil erosion.

The mitigation measures in the environmental impact assessment report are carried out, the waste soil and residues of all subprojects are piled up in the designated places in the construction area, and transported to municipal designated waste residues grounds in time.

In the first half year of 2009 the operation of the environmental management of all subprojects of Jilin water supply and wastewater development project is better; the environmental management work is fruitful; the ability of Environmental and social division is promoted; the environmental management that the contractors, project supervisors and the personnel of local environmental protection departments jointly participate in construction period is strengthened and continued; the influence of construction and debugging activities on environment is small and in an acceptable range; there is no public complaint occurrence; the local public think that ADB loan Jilin water supply pollution development project is the important project and the people-benefiting project of Jilin Province and the cities that benefit from it. The governments of Changchun, Liaoyuan and Meihekou cities attach importance to the project construction of water treatment works. The local environmental protection bureaus often go to the construction sites to carry out inspection and guidance, which plays a part in promoting the environmental management of all subprojects.

The environmental events to breach the laws and regulations related to Chinese environmental protection and the ADB environmental policies are not found in 2009.

4.2. RECOMMENDATIONS

Since the subprojects budgets approved did not include environmental monitoring outlay, the environmental monitoring during the construction period was not implemented, the environmental quality status in the construction sites, whether the construction activities compliance to the relevant environmental quality standards about environmental air, acoustic environment and water environment, and pollutant discharge standards cannot be evaluated quantitatively, it is a pity. According to the requirements of ADB officials, with the coordination of Jilin Province ADB, in 2009 Shuangyang, Liaoyuan and Meihekou subprojects PMOs all entrusted local environmental monitoring organizations to carry out the environmental

monitoring for the plant areas and their surrounding environment. The monitoring results show that except for Shuangyang Water Treatment Works near to residential area, the noise produced in its construction in the daytime conforms to GB12523-90 'Noise limits for construction site', but the noise has some influence on adjacent residents, the construction stops at night, no influence on the residential area. The wastewater treatment and pollutant discharge, ambient air and noise of Liaoyuan Water Treatment Works and Meihekou Water Treatment Works conform to the national environmental standard requirements.

In the light of the construction processes of Shuangyang Water Treatment Works, as long as strengthening the environmental management, implementing carefully environmental mitigation measures, the influence of the flying dust, noise and waste soil produced in the construction activities on environment and surrounding sensitive spots is little and acceptable. Liaoyuan Water Treatment Works was now carrying out indoor debugging, have not outdoor construction activities; these activities have almost no influence on environment.

Whereas Shuangyang Water Treatment Works is carrying out civil construction activities, and the activities are near residential areas, Shuangyang Water Treatment Works shall strengthen further the flying dust, noise and waste soil management, and implement carefully environmental mitigation measures.

(1) Waste residues management

Waste residues (mainly waste soil) should be put in the designated waste yards at the east and south sides of the construction site, levelled up and compacted, and will be backfilled immediately after the completion of the civil engineering, over waste residues should be transported to the designated waste residues site; the trucks transporting the soil should be covered with covering cloth, and stop construction in raining days.

(2) Ambient air mitigation measures

During the construction period, the transport vehicles need to install exhaust purifiers, to guarantee exhaust emission to reach relevant standard.

Select the construction machinery, vehicles with low energy consumption, low pollution emission, and select clean fuel as far as possible. Strengthen the management and maintenance of the machinery and vehicles, to reduce the air pollution caused by bad machinery and vehicles status. In dry days sprinkling to reduce dust should be often done.

Cement and other fine particle discrete materials should be stored in a storeroom or covered strictly. The materials should be piled up orderly to reduce windage area, and wetted properly or covered with covering cloth.

Transportation should be in a good seal status, to reduce the flying dust amount in transporting process. When loading and unloading the materials workers should take lightly to put lightly, to reduce flying dust.

When machine vehicles pass residential areas, they shall run at a limited speed (not exceed 15km/h), to prevent much flying dust.

In the place with seriously spreading dust, provide cleaning vehicles to clean up dropped dust, to protect air environment quality.

Make the rules of sprinkling to reduce dust, provide sprinkling equipment and designate special persons to take charge of it, and sprinkle water to reduce dust in the season easy to produce flying dust.

In construction site, provide sprinkling equipment and designate one to two persons responsible for it, sprinkle water regularly to reduce dust, and restrain flying dust pollution.

(3) Acoustic environmental protection measures

Select the equipment with low noise as far as possible. During construction period the maintenance and service of machines and equipment shall be strengthened, reduce noise as far as possible.

Avoid construction in lunch break, stop construction from 22:00 at night to 06:00 in the morning.

Except Shuangyang Water Treatment Works, other subprojects are all at the ending stage, the monitoring data of now environmental monitoring cannot reflect the impact of the construction activities on environment. We suggest starting up contingencies of Shuangyang Water Treatment Works, used for the environmental monitoring during construction period, and looking for an external dependent monitoring organ to carry out environment monitoring.

In addition, we suggest that the project supervisor of Shuangyang Water Treatment Works is also responsible for environmental supervision, and the project supervisor shall be carried out a short-term environmental supervision training, to strengthen the environmental management during construction period, and supervise the implementation of environmental mitigation measures. The implementation agency desires the local environmental protection bureau to strengthen the environmental supervision and management during construction period.