World Bank Loan Project Beijing Environment II

Action plan of environmental management

Beijing Municipal Research Institute of Environmental Protection

November 1999
Action plan of environmental management

Beijing Municipal Research Institute of Environmental Protection

November 1999
Compile Unit:
Beijing Municipal Research Institute of Environmental Protection
Grade of Certification: A
No. of Certificate : No.0921(A)

Institute Director : Shen Lixian

Chief Engineer: Wang Shaotang

Project Director: Wang Junling

Zhao Tongrun
Index

1. Environment policy .................................................................................. 1
2. Environment factor .................................................................................. 2
3. Law, statute and other requirement .......................................................... 4
4. Scheme of environment management ......................................................... 5
   4.1 Construction period ............................................................................ 5
      4.1.1 Control of air environment .......................................................... 5
      4.1.2 Control of noise environment ....................................................... 6
      4.1.3 Control of solid waste ................................................................. 7
      4.1.4 Control of desilting of sludge in Qinghe River ............................... 7
   4.2 Operation period ................................................................................. 8
      4.2.1 Environment management of the riverway and pipe system .......... 8
      4.2.2 Environment management of wastewater treatment plant ............ 14
      4.2.3 Scheme of environment management of boiler room .................... 16
5. Organizations and duty ............................................................................. 24
   5.1 Organisations ...................................................................................... 24
      5.1.1 Liangshuihe valley and Qinghe valley ......................................... 24
   5.2 Responsibility and right of environment management ............................ 27
      5.2.1 Liangshuihe valley and Qinghe river .......................................... 27
      5.2.2 Responsibilities of environment management organization for the item
         of replacing natural gas for burning coal ........................................... 28
6. Monitoring plan .......................................................................................... 29
   6.1 Liangshuihe valley and Qinghe sewer .................................................. 29
      6.1.1 Implement of the monitoring ......................................................... 29
      6.1.2 Startup level, proceeding level and target level ............................... 30
      6.1.3 Monitoring scheme ...................................................................... 31
   6.2 Gas boiler ............................................................................................ 40
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2.1</td>
<td>Construction period</td>
<td>40</td>
</tr>
<tr>
<td>6.2.2</td>
<td>Environmental monitoring plan in boiler running period</td>
<td>40</td>
</tr>
<tr>
<td>7.</td>
<td>Personnel training</td>
<td>42</td>
</tr>
<tr>
<td>8.</td>
<td>Information intercommunication</td>
<td>43</td>
</tr>
<tr>
<td>9.</td>
<td>Record</td>
<td>43</td>
</tr>
<tr>
<td>10.</td>
<td>Target of improving continually</td>
<td>44</td>
</tr>
</tbody>
</table>
After the Environment & Development Conference of the UN, the attention to the problem of the environment management is being paid in many countries increasingly. Today, strengthening the environment management has been the tide all over the world. The Implement of the environment management and the monitoring plan can provide the assessment program about the action which causes the bad impact on environment and the safeguard on the prevention of environment pollution in technology, method and resource, and rectify the windage in the environment management in time to make it have more validity and pertinency, and realize the aim of environmental protection. As far as the second Beijing environment project of the World Bank is concerned, its environment management and monitoring plan should be cubic and versatile. The environment management of the projects including the Liangshuihe water system municipal sewage integral prevention and treatment, the sewer project of Qinghe WWTP, the project of reforming the coal burning boiler into gas-fired are divided time into two parts: construction period and operation period.

1. Environmental policy

Beijing, the capital of China, is the center of polity, science, technology, culture and communication. Since reform and opening, all projects have developed quickly. The degree of urbanization has pricked up step by step; The scale of the city has increased; the population of the city has led. The following is caused: The amount of the industrial wastewater, sewage and coal has added year by year. Because the municipal construction is absent badly, the pollution of the river, especially reaching in the city area such as Liangshuihe River and Qinghe River, is caused. The air
pollution has become the hot spot to which the people pay attention. According to the account of the air quality weekly report in 52 weeks of 1998, the air quality in only 8 weeks meets the requirement of environment quality. The environmental pollution impacts badly on the report of the country and the development of the capital. In order to protect the body and heart health of the people and adapt to the need of the reform and opening and economic construction, the Beijing Government plans to accelerate the municipal wastewater prevention and treatment and the regulation of fuel structure, which can improve the environment, utilizing the loan of the World Bank at the aim of improving the environment.

(1) The execution of engineering of the project should meet The Beijing Master Plan and the Beijing Environment Master Plan.

(2) The executive unit of the project should observe the relative regulation and lawful rule, not destroying the environment and disturbing the residents.

(3) During the operation period of the wastewater treatment plant and the boiler room, every pollution index should meet the relative standards.

(4) A series of the management measures is adopted to prevent expansion of the pollution in Liangshuihe valley and Qinghe valley. The operation technology criterion of boiler should be complied with strictly to avoid the pollution accident.

(5) By the execution of various environment management measures, the water quality in Liangshuihe valley and Qinghe valley and the odor in both sides is improved continuously.

2. Environment factor

The environment factors of the second Beijing environment project of the World Bank are shown in Table 1.
<table>
<thead>
<tr>
<th>Action</th>
<th>Environment factor</th>
<th>Environmental impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Construction period</td>
<td>(1) Dig of earthwork</td>
<td>Soil and air pollution</td>
</tr>
<tr>
<td></td>
<td>(2) Material square of construction</td>
<td>Soil and air pollution</td>
</tr>
<tr>
<td></td>
<td>(3) Operation of construction machine</td>
<td>Noise and air pollution</td>
</tr>
<tr>
<td></td>
<td>(4) Riverway desilting</td>
<td>Air and underwater pollution</td>
</tr>
<tr>
<td>2. Operation of the wastewater treatment</td>
<td>(1) Odor emitted from construction</td>
<td>Air pollution</td>
</tr>
<tr>
<td>plant</td>
<td>(2) Deposit of the pile of sludge</td>
<td>Soil, underground water and air pollution</td>
</tr>
<tr>
<td></td>
<td>(3) Discharged water from WWTP</td>
<td>Surface water pollution</td>
</tr>
<tr>
<td></td>
<td>(4) Emitting smoke from the boiler of WWTP</td>
<td>Air pollution</td>
</tr>
<tr>
<td>3. Pipe transportation of sewage</td>
<td>(1) Leakage of sewer</td>
<td>Soil and underground water pollution</td>
</tr>
<tr>
<td></td>
<td>(2) New sewage</td>
<td>Treatment effect of WWTP</td>
</tr>
<tr>
<td>4. Coastwise of Liangshuihe River, Qinghe</td>
<td>New wastewater discharge</td>
<td>Surface water pollution</td>
</tr>
<tr>
<td>River</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Pipe transportation of natural gas or</td>
<td>(1) Latent leakage accident</td>
<td>Soil and water pollution</td>
</tr>
<tr>
<td>man-made coal gas</td>
<td>(2) Explosion event</td>
<td>Air, soil and water pollution</td>
</tr>
<tr>
<td></td>
<td>(3) Condensate water</td>
<td>Water pollution</td>
</tr>
<tr>
<td></td>
<td>(4) Ground dig of maintain</td>
<td>Soil and air pollution</td>
</tr>
<tr>
<td>6. Burning operation of boiler</td>
<td>(1) Emission of smoke</td>
<td>Air pollution</td>
</tr>
<tr>
<td></td>
<td>(2) Pump, air-blower</td>
<td>Noise impact</td>
</tr>
<tr>
<td></td>
<td>(3) Discharge of circle water</td>
<td>Municipal wastewater treatment system</td>
</tr>
<tr>
<td></td>
<td>(4) Explosion event</td>
<td>Air, soil and water</td>
</tr>
<tr>
<td></td>
<td>(5) Wash and clear of equipment on the ground</td>
<td>WWTP, surface water</td>
</tr>
<tr>
<td>7. Blow and sweep of pipe</td>
<td>(1) Emission of gas</td>
<td>Air, flammability</td>
</tr>
<tr>
<td></td>
<td>(2) Mud dregs, rust and other impurity</td>
<td>Soil and water</td>
</tr>
<tr>
<td>8. Daily life of personnel</td>
<td>(1) Washroom</td>
<td>WWTP, surface water</td>
</tr>
<tr>
<td></td>
<td>(2) Living rubbish</td>
<td>Garbage Fill-inter factory</td>
</tr>
<tr>
<td>9. Equipment maintain and improve on</td>
<td>(1) Reduction of fuel consumption</td>
<td>Decrease of resource consumption Mitigation of air pollution Lessening of environment noise</td>
</tr>
<tr>
<td>technology</td>
<td>(2) Lessening of the emission of waste gas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3) Alleviation of the source strength of noise</td>
<td></td>
</tr>
</tbody>
</table>
3. Law, statute and other requirement

The environment action of the project must observe the relative national, industry, Beijing municipal law, statute and other requirement, including industrial criterion, operation rules and so on. Of these, the special stress is as follows:

(1) *Law of Environmental Protection of the People's Republic of China*
(2) *Law of Air Pollution Prevention of the People's Republic of China*
(3) *Law of Water Pollution Control of the People's Republic of China*
(4) *Law of Noise Pollution Prevention of the People's Republic of China*
(5) *Law of Solid Wastes Pollution Prevention of the People's Republic of China*
(6) *Discharge Standard of Water Pollutants of Beijing (Proposed)*
(7) *Emission standard of air pollutant from boiler of Beijing*
(8) *Ambient Air Quality Standard (GB3095-1996)*
(9) *Emission Standard for Odor Pollutants (GB14554-93)*
(10) *Environmental Quality Standard for Surface Water (GB3838-88)*
(11) *Water Quality Standard for Scenery and Recreation Area (GB12941-91)*
(12) *Groundwater Quality Standard (GB/T14848-93)*
(13) *Integrated Wastewater Discharge Standard (GB8978-96)*
(14) *Standard of Noise at Boundary Industrial Enterprises (GB12348-90)*
(15) *Standard of Environmental Noise Urban Area (GB3096-93)*
(16) *Noise Limits for Construction Site (GB12523-90)*
(17) *Function division of air environment quality of Beijing*
(18) *Function division of environment noise of Beijing*
(19) *Beijing municipal master plan*
(20) *Design criterion of boiler house (GB50041-92)*

Besides, various standards will be revised and updated aperiodically with
strengthening environment management work in China. So, the relative standards must be searched and replaced every year and the new standard with the duty scale of personnel the scale must be given to all missionary in time.

4. Scheme of environment management

4.1 Construction period

4.1.1 Control of air environment

During construction period, the impact on air environment mainly includes rising dust, toss of transporting vehicle on the way. The life of ambient residents is affected intuitively. The followings should be noticed especially:

A. Carry out the measure on preventing dust rise in accordance with construction plan:

a. Sprinkle periodically: two times everyday in Summer and Autumn. One time is completed before working start in the morning and the other time after launch and before working start. Sprinkling should be done four times, once every four hours, in Winter and Spring. The amount of sprinkled water should be proper. Sprinkling not only prevents the dust from rising but also avoids having influence on action and carrying the earth out of the locale because of more water.

b. Sweep periodically: the construction locale should be clear up before knocking off every noon and evening.

c. Wash the tire: the tire should be washed before leaving off the site according to the conditions that time. If construction is executed after rain, the tire of vehicle must be washed before the vehicle runs on the road.
Moreover, baffle should be installed additionally. Redundant earthwork is transported and settled in time. The over loading of vehicle transportation is prohibited. In the season when gales often appear, the tarpaulin should be covered to prevent the dust rise on the way.

B. The setting is checked up periodically. The execution of the management measures is promoted and the times of sweep and sprinkling is added on the factual condition.

C. The TSP monitoring of the sensitive setting and the rectification should be finished during a limited period once exceeding the standard.

D. Administration and economy sanction should be adopted if construction violates the rules of operation or the problem is not revised in time.

4.1.2 Control of noise environment

The noise impact during construction period includes equipment noise, man-made noise and vehicle noise. Thereby the attention is as follows:

A. Arrange the construction time in reason and furthest avoid that many equipment making high noise work at the same time.

B. In the choice of equipment type, the low noise equipment should be adopted

C. The relative regulation of Beijing municipal should be observed if there are some sensitive site, especially residents region, near the construction site. The construction is prohibited from 22 o'clock to 6 o'clock next day.

D. Adopt all kinds of noise-damping and noise-descending measures to low the noise of equipment, make the equipment good by strengthening their maintenance and set up sound insulation barrier.

E. Operate the machine by the rules, lessen the sound of collision and decrease the times of using whistle which can be used to command the executions of the task.
F. Large-scale load vehicle should steer at the limited speed properly, cut down and try to stop sing the flute to lighten the communication noise.

G. Monitor the level of noise on the sensitive spot and take out the dealing step of the site where the noise exceeds the standard.

4.1.3 Control of solid waste

The solid waste during construction period includes the living garbage of workers and superfluous earthwork, which could have bad influence on air environment and water quality in watercourse if their management is not prefect.

A. The living garbage should have a uniform piling and deposit site and be clear and transported periodically.

B. Clearing and transporting the earthwork, the surrounding block should be installed to prevent the water into watercourse except avoiding the rise of dust.

C. The measures should be adopted to prevent rainwater into watercourse or municipal rain sewer by rain washing, especially in the rainy season.

4.1.4 Control of dredging of sludge in Qinghe River.

Qinghe River has been the river accommodating wastewater for a long time. The sludge at the bottom of Qinghe River has been polluted seriously. The sludge emits the odor besides containing a large amount of pollutants. The new environment problems will be aroused if the sludge is not treated properly.

A. Waste sludge square could antiseep in a certain extent to avoid that extravasate pollutes the underground water.

B. When dredging, the silt and the clear earthwork are stacked respectively to cut down the quantity of the sludge.

C. In the course of the transportation, toss and leakage should be avoided not to
pollute the environment on the way.

D. Drainage ditch should be constructed around the waste sludge spot to collect and discharge the surface runoff and prevent scouring the soil.

E. The discharge of extravasate of the sludge should be controlled strictly.

F. The waste polluted sludge should be covered by the sanitary material.

4.2 Operation period

4.2.1 Scheme of Environment management of the riverway and pipe system

4.2.1.1 Control of pipe quality

In order to ensure the sewer not to leak out, the followings should be assured:

A. The base of the sewer and the interface of the pipe are construction on the criterion.

B. Tubing and plumbing accord with the requirement of design and the products are provided with the certificate of qualification.

4.2.1.2 Liangshuihe valley

A. Control the additional wastewater discharged into river.

At first, draining the raw sewage into the surface watercourse directly is stopped entirely in order to avoid that the water quality in Liangshuihe River gets worse. The followings need to be done:

a. Notify, which tells the requirements of discharging sewage to the units within
Liangshuihe valley, is issued. The sewage from those units is drained into sewage interceptor or the surface watercourse respectively in term of the different discharge standards.

b. Check in the drains in Liangshuihe valley and inspect them periodically.

c. Establish the punishment system and sanction the units from which the sewage doesn't reach the standards.

d. Discharge the sewage meeting the standards after being collected and treated in the limited time.

B. Control the additional sewage discharging into the interceptor

All the sewage from the interceptor will flow into the WWTP. But the WWTP has some requirement of water quality of influent, especially the sewage containing some special pollutants which have a shock on the treatment effect. A set of integral declaration, examination and approval system should be established by cooperating with the environmental protection department. The sewage which doesn't meet the requirement should be pretreat and the degree of pretreatment and the discharge water quality (material control index) should be put forward. On the side, the monitoring of water quality which includes going on a tour of inspection and verification of the water quantity should be done periodically. The charge system should be constituted and the enterprise which violates the requirement should be punished strictly.

In order to expand these works effectively and avoid the unnecessary repetition, the information intercommunion should be held with the environmental protection department once at least every year.

C. The discharge demand of the sewage out of the wastewater treatment system

The sewage quantity in Liangshuihe valley is 0.8332 million $m^3/d$, of which the sewage into the interceptor is 0.7772 million $m^3/d$ and 56000 $m^3/d$, 6.7% of total discharge quantity, can not flow into the wastewater treatment system. This part will
be brought into the wastewater treatment system step by step. The requirements are as follows:

a. Table the detail executive schedule.

b. Confirm the concrete executive unit and person.

c. Estimate the budget of cost and confirm the source of fund.

d. Establish the sanction rules on which the units or person who can't execute on schedule will be punished.

D. Control the quality of the wastewater into the interceptor

The special pollutants in the industrial wastewater may shock at the WWTP and affect the treatment effect. Wherefore the keystone of the monitoring and controlling drainage units should be ascertained after some choices, be signed and be spot-checked periodically. The sewage from these units must meet Class B of Beijing Municipal Discharge Standard of Water Pollutants. The reason of exceeding the standard should be found out and the countermeasure should be made out. The settlement should be finished in the limited time.

E. Environment management of both sides of the river

Both sides of the river are often weak segment. It is very serious that the solid waste is tossed in both sides of the river. The solid waste is washed into watercourse by rain or wind and the sight is affected. Hence the management of solid waste storage in both sides of the river is executed.

a. Issue the notify that it is prohibitive that the solid waste is poured within the scale of 100m far from two banks of the river.

b. Go on a tour of inspection of the solid waste and father the solid waste along both sides of the river periodically. If discovering the tossed solid waste, its source should be found out and the alarm and the necessary economy sanction should be given.
c. Gain and clear the floating thing blown into the river by the wind periodically.

F. Control air environment along both sides of the river

The impact of watercourse of the ground on the air environment is mainly the scent emitting from the watercourse, of which controlling index is odor. In order to lessen the incidence of odor, the followings need doing:

a. Green along the sides of the river and select the trees which can cleanse the odor well

b. Visit the resident living along the river and hear the suggestion of them periodically.

c. Monitor the level of odor around the typical reach of the river periodically.

4.2.1.3 Qinghe valley

A. Control the additional wastewater discharging into river.

At first, draining the raw sewage into Wanquan River, Xiaoyue Rive and Qinghe River directly is stopped entirely.

The followings need to be done:

a. Notify, which tells the requirements of discharging sewage to the units within valleys of these three rivers, is issued. The sewage from those units is drained into sewage interceptor or the surface watercourse respectively in term of the different discharge standards.

b. Check in the drains in Qinghe valley and inspect them periodically.

c. Establish the punishment system and sanction the units from which the sewage doesn't reach the standards.

d. Discharge the sewage meeting the standards after fathering in the limited time.

B. Solute of the lack of the capacity of the wastewater treatment plant

Today, the drainage quantity of Qinghe River is 487,600 m$^3$/d. But the capacity of
Qinghe WWTP in the first stage is only 200,000 m$^3$/d, 400,000 m$^3$/d in the second stage, which can not match all the sewage quantity of Qinghe River. If the interceptor reaches the designed capacity, the gap will get bigger. In order to clean Qinghe River really, the suggestion is as follows:

a. Execute the project of Xiaojiahe WWTP and Qinghe WWTP as quickly as possible.

b. Adjust the capacity of the wastewater treatment plant to make all cut-off sewage be treated.

C. Control the additional sewage discharging into the interceptor

All the sewage from the interceptor will flow into the WWTP. But the WWTP has some requirement of water quality of influent, especially the sewage containing some special pollutants which have a shock on the treatment effect. A set of integral declaration, examination and approval system should be established by cooperating with the environmental protection department. The sewage which doesn't meet the requirement should be pretre at and the degree of pretreatment and the discharge water quality (material control index) should be put forward. On the side, the monitoring of water quality which includes going on a tour of inspection and verification of the water quantity should be done periodically. The charge system should be constituted and the enterprise which violates the requirement should be punished strictly.

In order to expand these works effectively and avoid the unnecessary repetition, the information intercommunion should be held with the environmental protection department once at least every year.

D. Control the sewage from Tsinghua University

The sewage from Tsinghua University, 5901 m$^3$/d, can not flow into the interceptor. Although these sewage accounts for 1.2% of total sewage quantity, the
disadvantageous affection will be brought out on the river way. The advice is as followings:

a. The sewage from Tsinghua University should be brought into the interceptor as quickly as possible or Tsinghua University builds a wastewater treatment plant herself to discharge the sewage meeting the standard.

b. Table the detail executive schedule.

c. Confirm the concrete executive unit and person.

d. Estimate the budget of cost and confirm the source of fund.

E. Control the quality of the wastewater into the interceptor

The special pollutants in the industrial wastewater may shock at the WWTP and affect the treatment effect. Therefore the keystone of the monitoring and controlling drainage units should be ascertained after some choices, be signed and be spot-checked periodically. The sewage from these units must meet Class B of Beijing Municipal Discharge Standard of Water Pollutants. The reason of exceeding the standard should be found out and the countermeasure should be made out. The settlement should be finished in the limited time.

F. Environment management of both sides of the river

The establishment along river, such as park, will be built after Qinghe River is renovated. But both sides of the river are often weak segment. It is very serious that the solid waste is tossed in both sides of the river. The solid waste is washed into watercourse by rain or wind and the sight is affected. Hence the management of solid waste storage in both sides of the river is executed.

a. Issue the notification that it is prohibitive that the solid waste is poured within the scale of 100m far from two banks of the river.

b. Go on a tour of inspection of the solid waste and father the solid waste along both sides of the river periodically. If discovering the tossed solid waste, its source
should be found out and the alarm and the necessary economy sanction should be
given.

c. Gain and clear the floating thing blown into the river by the wind periodically.

G. Control of air environment along both sides of the river

The impact of watercourse on the ground on the air environment is mainly the
scent emitting from the watercourse, of which controlling index is odor. In order to
lessen the incidence of odor, the followings need doing:

a. Green along the sides of the river and select the trees which can cleanse the
odor well

b. Visit the resident living along the river and hear the suggestion of them
periodically.

c. Monitor the level of odor around the typical reach of the river periodically.

4.2.2 Scheme of Environment management of wastewater
treatment plant

4.2.2.1 Control of influent

A. The water quality of influent should be monitored entirely to find the source of
the special pollutant needing controlling. The special pollutants should be measured
periodically to prevent the shock on the wastewater treatment plant. The reason of
abnormal concentration of the special pollutant and frequency of the emergence of the
special pollutant should be found out and the solution should be put forward.

B. The water quality of influent is monitored normally everyday.
4.2.2.2 Control of effluent

A. The water quality of influent is monitored normally everyday.

B. If the water quality of effluent is abnormal or exceeds the discharge standard, the track investigation should be done to find out the reason.

a. If the problem is about the operation system, the relative person should be notified in time to check the equipment.

b. If the problem is about the influent, the pollutant and its source should be found out and the solution should be brought forward.

4.2.2.3 Control of fume of boiler

The emission of SO$_2$ is mainly controlled for the oil-burning boiler. To make the sulfur rate of the soil less than 0.3%, the sulfur rate of every batch of light diesel oil should be sampled and analyzed.

4.2.2.4 Control of odor

a. Green along the sides of the river and select the tree which can cleanse the odor well.

b. Visit the resident living along the river and hear the suggestion of them periodically.

c. Monitor the level of odor around the typical reach of the river periodically. If the level of odor exceeds the standard, the dealing step must be adopted.

4.2.2.5 Control of noise

A. The level of noise of the plant boundary and ambient sensitive spot is
monitored periodically. If that of noise overruns the standards, the reason should be found out.

B. The necessary damper denoise measure is adopted to the main noise source causing the overrun.

C. Hear the suggestion of ambient resident periodically.

4.2.2.6 Control of solid waste

During operation period, the solid waste of the wastewater treatment plant mainly includes sanitary rubbish, the big suspend solid and the waste sludge.

A. The living garbage must be piled in fixed-point and cleared and transported by environment sanitation department.

B. The big suspend solid must have the fixed piled point, corresponding management measure, receiving site because it have wastewater and odor. The big suspend solid needs to wipe off the superfluous water and cover the cloth before being transporting out to prevent leakage, toss on the way and pollution of environment.

C. The quantity of the waste sludge of wastewater treatment plant is large and have thick smell. So the treatment and disposal scheme must be existing. It doesn't fit for being stored in the plant and should be transported out in time. To prevent the sludge not to carry secretly, the tire of the vehicle should be washed when the waste sludge is transported out. Moreover, the sludge on the surface of the vehicle could be treated into non-smell one if the vehicle passes the region where dense resident live.

4.2.3 Scheme of environment management of boiler room

The main aim of the scheme is to assure the boiler to operate safely, to lessen the emission of pollutants and to prevent the environment pollution caused by the
explosion event.

4.2.3.1 Declaration and approval

The procedure of declaration and approval must be fulfilled and the declaration and approval form of Beijing environment impact of construction engineering before the boiler room is rebuilt.

4.2.3.2 Environment management during design period

The scheme of environment management during the period of designing the boiler room is as follows:

A. Retain the unit which possesses national and Beijing municipal design qualification of relative gas-burning boiler to design.

B. Select the production with identification made by the boiler factory which takes on the corresponding making license issued by national or provincial quality & technology supervision bureau.

C. The design of the boiler room must fit for the requirement of environment protection.
   a. The design of boiler room should meet the relate regulation in Design criterion of electric power device under danger of explosion and fire, Building anti-fire design criterion and multilayer civilian construction anti-fire design criterion. The anti-explosion design must be considered.
   b. The principle of layout of boiler room location is to lessen the impact of noise on the ambient environment as possible.
d. The boiler needs to meet the demand of heating and safe economic operation of boiler. The boiler must be equipment with mount-burning system and measuring instrument, interlock protection and automatic device, ignition program control and flameout protection device.

e. The design of gas supply engineering should assure the safe, stable gas-supply of boiler and meet urgent opening and shut.

D. The following requirement needs to consideration when designing the pipe:

a. The least distance of gas pipe far from building should fit for the requirement.

b. The gas pipe can't be laid together with other pipe (such as cable, etc.) in the same ditch and not be laid under the permanent building or incentive, explosive and erosive material pile.

c. The least depth of gas pipe under the ground should meet the following requirements:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Depth Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under vehicle road</td>
<td>&lt;0.8</td>
</tr>
<tr>
<td>Under non-vehicle road</td>
<td>&lt;0.6m</td>
</tr>
<tr>
<td>In yard</td>
<td>&lt;0.3m</td>
</tr>
</tbody>
</table>

d. The pipe should not lay aboard the greening region because the boot will mangle it.

e. The pipe should be laid on the appropriate base and the anti-earthquake should be considered.

E. Design requirement of accessory equipment

The design of the accessory equipment includes blower, water pump, adapter. The accessory equipment includes safety valve, anti-explosion door, all kinds of valve and controller and power-supply device. The scheme of environment management of the design of the equipment is as follows:

a. Select the production with identification made by the boiler factory who takes
on the corresponding making license issued by national or provincial quality &
technology supervision bureau.

b. The type and ability of all kinds of equipment must match the capacity of
boiler.

c. The intensity of noise of the blower and pump should make the noise in the
boiler room not overrun the requirement of Noise standard of boundary of industry
(GB12348-90).

d. The pressure of inlet and outlet of the gas press regulator should meet the
requirement of boiler and city network to ensure that boiler can inflame safely and
steadily.

e. There are many kinds of valve, especially safety valve of pressure regulating
system, in the boiler room. When choosing the valve, the shut velocity and ponderable
pressure should pay attention to. The copper-containing valve should not be selected
(in the hepatic gas system) and the manual valve should be configured.

f. The design of pressure regulating station should meet the design criterion of
pressure regulating station.

F. Design of the sweeping pipe and scattering pipe is as follows:

a. Sweeping point should be set at the facility, accessories or elbow where the
impurity assembles easily.

b. The scattering pipe should be led to outdoor and its emission let should be
much higher 2m than the ridge of the house. The distance of the let far from the
ground should more than 4m. The distance of the let far from the ambient building
should meet safe requirement.

4.2.3.3 Environment management of equipment installation

A. Retain the unit possessing the license of boiler installation ratified by Beijing
municipal labor bureau and meets the requirement of the temporal rules of examination and approval management of Beijing boiler installation license. At the same time, the installation is reported to Beijing municipal labor bureau.

B. Installation of boiler reality equipment

a. The base of boiler and material of steel frame should accord with the design requirement to decrease the noise during operation period and eliminate hidden trouble of safety.

b. Boiler tub, header, heating surface pipe, valve and burner, etc., should be checked and cleaned. After reading the manual book earnestly, the equipment are installed according to the criterion.

c. Workers for boiler welding must have the passed certificate of Examination rules for boiler pressures welder. Welding seam must be checked according to the rules.

d. Welding quality must be checked at any time during welding and recorded.

e. Installation and performance of materials fire-enduring, heat preservation must meet the requirement of design and building quality must strictly be checked according to work criterion.

C. Installation of boiler pipeline.

a. Pipes, pipe piece, pipelines and valves must be checked with the designed requirements before being installed. It can be installed only when it meet the design requirements.

b. Pipes, pipe pieces, pipelines and valves must be checked before installed. It can be installed only when it meet the quality requirements.

c. The pipeline is installed according to the criterion and design requirements.

D. Installation of accessory machines

The accessory machines include fan, water supplying treatment machines, heat
engineering instruments, electric equipment, which are installed according to design criterion.

4.2.3.4 Environment management of boiler equipment debugging.

A. The enterprises with the boiler installation license which is issued by province-grade laboring department and accordant to installation type are retained to debug.

B. Environment managers should emphasize on checking the rating outlet pressure (or water pressure) and the rating evaporation volume (or heat power) for the boiler, completion of safe valves, debugging of equipment and instruments, debugging of alarming equipment during debugging.

C. whether the concentration of soot pollution and noise can meet the requirement of environment quality must be checked during debugging.

4.2.3.5 Environment management of the boiler during operation period

A. The enterprises in which boilers are working must have the capacity of organizing and leading the normal working and maintenance of boilers and treatment of accidents.

B. Stoker must have operation certificate and work with certificate.

C. The following rules must be drawn up during the operation of boilers:

   a. post duty
   b. shift regulation
   c. safe operation regulations
   d. maintain regulations
   e. environment cleanness regulations
f. scouting examination regulations

g. operation log regulations

h. register regulations of machines objection

D. All machines must be checked to see whether they are in state of ignition, especially whether safe valves, alarming equipment, accident buttons interlock protection machines are in use before ignition.

E. Ignition for boiler, increasing pressure, operation of boiler must be normal according to operation regulations and management regulations. Operation records are well made.

F. Save fuel, electric power, water resource to reduce the wastage of resource.

G. Wastewater from the boiler room is brought into the wastewater treatment and discharge system in the enterprise.

H. The living waste is cleaned and transported in time.

4.2.3.6 Treatment of main accidents

A. Accident of water lack

a. When water level gauge fails or is damaged or low water alarming many times and water is not supplied in time and cease of boiler water supplying pump, circulating pump and not restored in time, boiler short of water is brought about.

b. When water level gauge can not show water level, "calling water" is adopted to call water. It proves that there is a slight lacking of water when water is low or low water alarming equipment rings occasionally, ceases occasionally after calling water. At that time, water can be supplied into the boiler until the water level is normal. If water can not be seen after calling water, boiler should be ceased in no time. It is banned to supply water to boiler.

B. Water filling accident
a. When water level gauge exceeds the highest water level (visible water level), the boiler is full of water. When water is filled, water level gauge should be washed after that to observe its veracity. If visible water level is still not seen after calling water, it is judged that water is seriously full according to the variation of operation parameters and boiler should be stopped instantly.

b. If visible water level is seen by calling water after washing water level gauge, water is slightly full and the following measures are adopted:

- Cut down baffler of delivering fan and reduce fuel supplied and weaken the burning.
- Stop supplying water and turning on discharging system to discharge water until water level is restored.

C. There is serious leakage for the main pipeline due to the accident of breakage of heating surface pipe.

When heating surface pipe breaks or there is serious leaking for the main pipeline, or normal water level or air pressure can't be maintained, the related department should be inform to stop boiler. If pressure, water level can not be maintained, boiler should be stopped right now.

D. Urgent stop of boiler

Boiler should be stopped instantly at the following moment:

a. Burning gas system is leaking or alarming reason is not found.
b. Boiler pressure and temperature of outlet water exceeds the limit and is going up.
c. Water is seriously full or lack.
d. All pressure water level gauges fail.
e. Feedwater pump, circulate pump are stopped due to accident.
f. Electrical power system fails.
g. Boiler components are seriously damaged. Boiler wall is seriously broke. Steel structure is seriously deformed.

h. Other things influence safe operation.

E. Report to environmental protection department and monitor the accident's influence on ambient environment when accident happens.

5. Organizations and duty

5.1. Organizations

There is much difference of the environment management contents between construction time and operating time and some difference of provisionality and long-term. So singled organizations and grading responsibility should be adopted. Corresponding management organizations should be removed in no time and it is agreed to have some intercross in some period of time according to detailed working condition when the management organization begins to operate in the operation time.

5.1.1 Liangshuihe valley and Qinghe valley

5.1.1.1 Environment management organization during construction period

Environment management organization independent of construction department and no conflict of interest with the project should be established and workers for the machines should have certain longevity and experience in order to assure the validity and justness of work of environment management organization. It is suggested the
organization be composed of the following personnel:

A. Liangshuihe river
- Group leader 1
- Loudness monitor 2
- Noise monitor 2
- Solid castoff monitor 1
- Indicting-hotline worker 1 (part-time job agreed)

B. Qinghe river
- Group leader 1
- Loudness monitor 2
- Noise monitor 2
- Solid castoff monitor 2
- Indicting-hotline worker 1

5.1.1.2 Environment management organization during operation period

The environment management during operation period is long-term and complicated job. So the environment management organization should be mainly composed of environment management delegates who are authorized by the highest management of the construction enterprise. The function of the environment organization is to be responsible for the daily environment management in the Liangshuihe valley and Qinghe River. It is suggested the organization be composed of the following personnel:

A. Liangshuihe river
- Group leader 1
- Air monitor 1
The implement of the detailed work is completed by the assistance of every department.

5.1.2 Environment management organization for replacing natural gas for coal burning

A. The tiptop leader responsible for the boiler alteration item in parent company is also the tiptop leader of the environment management for the item and he(or she) should appoint a environment management delegate to be responsible for the implement of the environment management scheme.

B. The tiptop leader of the enterprise which boiler room is belonged to is also the tiptop leader of environment management for boiler room. He (or She) is responsible for the environment management for boiler room and appoints a environment management delegate to be responsible for the daily work.

The construction enterprise for boiler room is responsible the environment management during construction.
5.2 Responsibility and right of environment management

5.2.1 Liangshuihe valley and Qinghe river

5.2.1.1 During construction period

The environment management group should make out detailed management plan and check the plan monthly according to the construction plan for the project in order to revise the plan necessarily.

The group leader should report to the project leader and report the result of environment management at fixed period monthly and put forward the solving measures for the potential problem found in the check.

Air, noise, solid castoff waste monitors should scout to check the executive condition of environment protection measures during construction according to the plan and are responsible for the measures timely and at certain point and report the checked, monitored result and treatment opinions on spot to the group leader.

Hot line workers are responsible for the record, trim of the complaint telephone and report to the group leader and are responsible for answering the problem produced by public.

5.2.1.2 During operation period

Environment management group is responsible for the establishment, revise and execution of environment management system.

The group leader is responsible for ordinary work of environment management and report the environment management result checked to the environment manage
delegate timely monthly and put forward the solving opinion on the potential environment problem found.

The environment monitor is responsible for the checking of environment elements, the implement of monitoring plan, putting forward protection measures and reports the result to the group leader weekly.

The tiptop manager of the organization is responsible for the drawing of environment guideline and management, appraising and administration delegates to monitor the work of environment management system. The environment department leaders are responsible for the observance of environment regulation. The management personnel are responsible for continuous improvement of environment behavior. The common works observe the operation regulation.

Moreover, environment management for Liangshuihe drainage area and Qinghe river covers a large area and some environment problems can not be controlled by Beijing municipal drain corporation and the management must be completed by Environmental protection bureau, water conservancy bureau, environment healthy bureau. The group leaders should be responsible for the harmony, communication of multi-departments and through the government organization more higher to intervene if necessary.

5.2.2 Responsibilities of environment management organization for the item of replacing natural gas for burning coal

A. Responsibilities of environment management organization responsible for the item:

a. Complete the examining program of the related environment management for the item and instruct the environment management examination from loaning side.

b. Observe and collect all laws, statute and some regulations related to the item.
c. Carry out the environment management plan

B. Responsibilities of environment management organization for the boiler room
   a. Make out the detailed environment management system including environment guideline, environment aim and index, environment management scheme and implement plan.
   b. Supervise the chimney soot discharge
   c. Supervise the operation status of noise source in boiler room.
   d. Supervise the normal working of boiler and its pertain machines and the sensitivity of emergency machines to avoid accident.
   e. Supervise gas quality and harmony with related departments when some problem is found.
   f. Entrust enterprises which have been authorized to have the right for monitoring boiler soot by state and Beijing city to measure pollutant from boiler chimney and noise timely and make out the monitoring plan.

6. Monitoring plan

6.1 Liangshuihehe valley and Qinghe sewer

6.1.1 Implement of the monitoring

The environment monitoring to the Liangshuihe River during the period of the construction and operation involves many facts including atmosphere, effluvium, noise and water. The equipment and the supervisor is very complicated. There will be a expense to staff and equipment for some low supervising frequence and some kinds of periodical supervising project if all would fulfilled by our own department. So it is
suggested that the supervising of the atmosphere and the effluvium could entrust the units having the qualification of supervising but the supervising of the water quality is the routine supervision and the monitoring of the noise is relatively simple so that could be autonomously fulfilled according to the requirement by employing necessary staff and equipment.

6.1.2 Startup level, proceeding level and target level

6.1.2.1 Definition

The routine method for reflecting environment supervising result and necessary action requirements is dividing the degree of the environmental influence into startup level, proceeding level and target level, the definition is as follows:

Startup: startup level express the deteriorate of the quality of the surrounding environment.

Proceeding: proceeding level expresses that remedy action should be taken to prevent the excess target level of the environment quality.

Target: target level is ascertained by environment supervising department or according to the related statute.

The target level must accord with the practical instance and related statute but must be practical. The local statute must be taken into account when setting the level. If the level is set too low, the continual incident of the exceeding will depress the efficiency of the audit. But the level can not be set too high either because which can't indicate the raw sample probably take revive method to control the environment deteriorate.

The upwards three level usually can be taken during the construction period of
the environmental supervising but the requirement of the local statute must be implemented during the period of the proceeding.

6.1.2.2 Confirmation of the TAT level during the construction period

A. Atmosphere

The startup, proceeding and target level is based on the percent number computed by unilateral t-distribution. Generally 95 percent is adopted as startup level, 99 percent as target level, the medium number between the two as proceeding level. But the target level should not be set more than the limitation of the environment standard for maintaining the quality goal of the environment.

B. Noise

It is suggested that the TAT level should base on the limited value of the daytime construction noise, 75dB(A), and the indicting. There are no needs to take action unless the noise level exceeds 75dB(A) or having received indict.

6.1.3 Monitoring scheme

6.1.3.1 Construction period

A. Atmosphere

a. Measured parameter

Total suspend particle (TSP) and wind speed

b. Location of the measuring spot

Setting 12 measuring spot can be suggested during the construction period including 5 measuring spot along Liangshuihe River river way and 4 measuring spot along Qinghe River channel and one measuring spot around every sewage plant, the
specified location is shown as Figure 1.

The measuring location should be set on the ground and far from obstacles or potential fresh air entrance if the condition of the spot permitted. c. Monitoring frequency and duration.

c. Monitoring frequency and

Monitor once for the 24-hours average TSP every 15 days on each monitoring spot and record the wind direction and speed information at the same time.

d. Equipment configuration

Recommend using the following equipment and the similar apparatus

- Use MWL-2000 large volume atmosphere sampling system to measure the 24 hour's average TSP
- Hand power and ash measuring apparatus
- Analytical balance with the delicacy of 0.1 mg
- Drying meter
- Hand-hold wind direction and wind speed meter

The upwards apparatus must be calibrated and operated according to the regulation

e. Action plan

The environmental supervising group and project principal and contractor should take action on the table when the results of the supervising exceeds the controlling levels.
<table>
<thead>
<tr>
<th>Level</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. The environment supervising group inform the project principal, appraising the pollution source and inspecting the working ways of the contractor</td>
</tr>
<tr>
<td></td>
<td>2. The environment supervising group confirms the necessary appending revive method and make suggestion to the project principal</td>
</tr>
<tr>
<td></td>
<td>3. The project principal conveys the appending revive request to the contractor</td>
</tr>
<tr>
<td></td>
<td>4. The contractor implements the appending revive method</td>
</tr>
<tr>
<td></td>
<td>5. After resolving the problem the environment, supervising group inform the project principal</td>
</tr>
<tr>
<td></td>
<td>1. The environment supervising group informs project principal and supervises frequency increases to 3 days per week.</td>
</tr>
<tr>
<td></td>
<td>2. The environment supervising group contacts with the project principal and discusses the revive action taken by the project principal and the contractor</td>
</tr>
<tr>
<td></td>
<td>3. The environment supervising group inform the project principal after solving the problem</td>
</tr>
<tr>
<td></td>
<td>1. The environment supervising group informs the project principal, supervising frequency increase to once a day and confirms the pollution source and checks the construction method</td>
</tr>
<tr>
<td></td>
<td>2. The environment supervising group analyzes the construction program to determine and implement the appending revive measure provided by the contractor and submit the report</td>
</tr>
<tr>
<td></td>
<td>3. It should stop relative construction if the project principal thinks it necessary</td>
</tr>
<tr>
<td></td>
<td>4. The environment supervising group informs the project principal after solving the problem</td>
</tr>
</tbody>
</table>

B. Noise
a. Measured parameter

Measure $\text{Leq}_{30\text{min}}$ of daytime construction noise and $\text{Leq}_{5\text{min}}$ of the night construction noise.

b. Measuring location

It is suggested that 8 measuring spots at the boundary of the Liangshuihe River and 5 measuring spots along the Qinghe River are set, of which the location is shown in Figure 14-1. The measuring spot should be located at the minimum distance from the acute acceptor.

c. Supervising frequency and duration

Measure $\text{Leq}_{30\text{min}}$ noise level once per week for each supervising spot and $\text{Leq}_{5\text{min}}$ noise level if there are construction actions in the night.

If having exceeded the action level and determined which was caused by construction, the supervising frequency should be increased to three times per week until the Leq falls back under the action level.

If having exceeded the target level and determined that the overrunning was caused by construction, the supervising frequency should be increased to three times per week until the Leq falls back under the action level.

d. Equipment configuration

Supervising equipment should adopt the tone-class measurement apparatus with the function of state and analyzer and be adjusted according to principles.

f. Action plan

It is suggested that the TAT level should base on the limited value of the daytime construction noise, 75dB(A), and take the indicting into account. There are no needs to take action unless the noise level exceeds 75dB(A) or having received indict. The action is shown in Table 3.
<table>
<thead>
<tr>
<th>Level and standard</th>
<th>Actions</th>
</tr>
</thead>
</table>
| **Startup: having received a case of indict** | 1. The environment supervising group informs the project principal, appraising the pollution source and inspecting the working ways of the contractor.  
2. The environment supervising group confirms the necessary appending revive method and make suggestion to the project principal.  
3. The project principal conveys the appending revive request to the contractor.  
4. The contractor adopts the appending revive method.  
5. After resolving the problem, the environment supervising group informs the project principal. |
| **Action: received 3 indict about the same noise source within a week** | 1. The environment supervising group informs the project principal and supervises frequency increases to 3 days per week.  
2. The contractor takes further revive method.  
3. The environment supervising group informs the project principal after solving the problem. |
| **Target: received indict above 4 times about the same noise source within a week** | 1. The environment supervising group informs the project principal, supervising frequency increase to once a day.  
2. The environment supervising group analyzes the construction program to determine and implement the appending revive measure provided by the contractor and submit the report.  
3. The environment supervising group reports the result of taking the method to the project principal.  
4. The environment supervising group informs the project principal after solving the problem. |

The noise level 75dB(A) refers to the accumulative noise of all noise sources. If
the measure value exceeds the level, the noise source must found out so as to ensure
the responsibility of the construction. The standard acoustics principles should be
applied to ascertain the source. The contractor must analyze the working method and
the equipment immediately and revive the noise problem.

C. The survey on the spot and special supervising

To control the environment impact caused by the construction effectively, the
environment supervising group should take effective method to identify the possible
problem before occurring not but reply on the monitoring material reflecting the
existing.

a. Audit the construction program of the contractor

The specific construction action is very difficult to predict a few months before
the construction according to experience. It is very important to get and check the
working program next month of the contractor and makes the environment supervising group know the general situation of the working place and the equipment
and the project of using the equipment and the location and pays attention to the
potential problems and mentions the project principal of the potential problems and
the possible resolving method, for example revising the equipment using project and
decrease the potential noise effect.

Moreover, supervising audit program should be flexible enough to make the
supervising time and location adjustable to adapt to the construction needs.

b. The survey on the spot

The environmental supervising group should investigate on spot without
declaration to auditing if contractor complies with the environmental regulations and
to find out the environmental questions and to identify the latent environmental
questions. The group must write down the observation results on spot, and take photos
if necessary. They should notice the principal of the project if there are any acts
against the contract, any latent or existing environmental questions, or any settling means

c. Special monitoring

The environmental supervising group should take the special monitor on spot with portable dust and noise measuring meter. This special monitor will be helpful for the pollution identification on spot, which is useful for searching proper solving means. All the special monitor data must be recorded

6.1.3 Operation Period

A. Water quality monitoring

a. Monitoring spot

i. Liangshuihe River valley

• Determine the monitor spot of draining special pollutant after selection

• Influent of wastewater treatment plant

• Drain of wastewater treatment plant

• There are three monitor spots for stream channel water quality that lie in the location where the drain of the waste plant blend completely with the water in the river.

ii. Qinghe River valley

• Determine the monitor spot of draining special pollutant after selection

There are four monitor spots for stream channel water quality that lie in location where the water in the Wanquan River, Xiaoyu River, Qinghe River and the drain of the wastewater plant blend completely with the water in the river.

b. Monitoring items

Traditional items: COD、BOD₅、SS、pH、油、NH₃-N、TP、TN

Special items: Determine after investigation and comparision
c. Monitoring frequency

- Special monitoring spot: once every season or irregular monitor, but more than three times a year.
- Influent and effluent of wastewater treatment plant: monitor at the same time. Details is in Table 4
- Riverway: once a month

Table 4 Water quality of the wastewater treatment plant and the monitoring items

<table>
<thead>
<tr>
<th>Items</th>
<th>pH</th>
<th>Suspend matter</th>
<th>COD</th>
<th>Oil</th>
<th>NH₄⁺-N</th>
<th>BOD₅</th>
<th>TP</th>
<th>TN</th>
</tr>
</thead>
<tbody>
<tr>
<td>The general drain spot of inlet and drain</td>
<td>4/per group</td>
<td>once/ per day</td>
<td>once/ group</td>
<td>once/ per day</td>
<td>once/ per month</td>
<td>once/ two days</td>
<td>once/ per day</td>
<td>once/ per day</td>
</tr>
</tbody>
</table>

Note: three groups per day

d. Equipment configuration

The basic analytic instruments for water quality are in table 5.

Table 5 The configuration of analytic instrument for water quality

<table>
<thead>
<tr>
<th>No.</th>
<th>Instrument</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pH meter</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>bio-chemical incubator</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>blowing dryer</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Oil meter</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Hexad electric furnace</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>refrigerator</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Environmental monitor car</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Computer (including printer and so on)</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Analytical balance</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Spectrometer (Model:72)</td>
<td>1</td>
</tr>
</tbody>
</table>
B. Odor Monitoring

a. Monitoring parameter

Monitor the concentration of foul gas around the riverside and the plant boundary (No dimension)

b. Monitoring spot

Monitor four spots in the East, the West, the South, and the North boundaries of the plant. Set up four monitor spots at Liangshuihe River and Qinghe River respectively (equal to current monitor spot of the environmental assessment). There are total 20 monitor spots.

c. Monitoring frequency

Once per quarter, twice per week if there are indictment.

d. Equipment configuration

Had better entrust others to complete it because of it's complexity of testing

C. Noise monitor

a. Monitoring parameter

Equivalent A sound level $\text{Leq}_{30min}$

b. Monitoring spots

There are 12 monitor spots at the East, the West, the South and the North boundary of the plant.

c. Monitoring frequency

Monitor once per quarter; Once per day if there are complaints until determine the pollution sources.

d. Apparatus configuration

The monitor instrument should adopt the noise meter equipped the noise meter statistic analyzer.
6.2 Gas boiler

6.2.1 Construction period

6.2.1.1 Air environmental monitor

A. The items of air environmental monitor
The monitor items are the TSP and the wind velocity during construction period

B. The distribution of monitor spots
The distribution of monitor spots in construction period is concerned with the size of the construction square. There are one monitoring spot for little boiler house, two or three for large boiler house.

C. Monitoring frequency
Once a month during construction period

6.2.1.2 Noise monitor

A. The distribution of noise monitor spots
There are at least four spots in construction square, and should set up monitor spots at the sensitive areas around the construction square.

B. Monitoring frequency
Once a week during construction period.

6.2.2 Environmental monitoring plan in boiler operation period

6.2.2.1 Air pollutant monitoring plan

A. Monitoring items
Monitor items of gas boiler: \( SO_2 \), \( NO_x \), \( CO \), dust.

B. Monitoring spots

Set up sample spots in every chimney for the draining fume from the chimney

C. Monitoring frequency

a. Monitor the chimney every year at the beginning and the middle of heating period every year

b. Monitor chimney at the first fire after the boiler's large repair

6.2.2.2 Noise monitoring plan

A. Monitoring items

Monitor the \( \text{Leq}_{30\text{min}} \) in daytime and the \( \text{Leq}_{30\text{min}} \) at night.

B. The distribution of monitoring spots

There are 12 monitoring spots at the East, the West, the South and the North boundary of the boiler house

C. Monitoring frequency

a. Measure the noise every year at the beginning and the middle of heating period every year

b. Measure the noise at the first fire after the large maintain of the instrument.

c. Measure the noise once a month if the underground boiler house is integrated with the construction and add the monitor to the vibration.

6.2.2.3 Execution of monitor

It is not necessary to set up independent chemical laboratory and its monitoring organization for the single boiler house because there are not a big boiler house.

A. The boiler house monitoring plan can be added to the general monitoring plan
of the plant if the plant have the monitoring ability. The items that the plant can not to monitor can be entrusted to other qualified monitoring organizations.

B. The plant without the monitoring ability can entrust other qualified monitor organization to monitor

7. Personnel training

In order to ensure the trouble-free and efficient operation of the environment administration, it is important to train the enterprise personnel with knowledge and skills and let them know the importance and the significance of the project. It is also important to train workers with different skills in different posts. The details are in Table 6.

<table>
<thead>
<tr>
<th>Post</th>
<th>Object of train</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior administrator</td>
<td>Increase the understanding to strategic significance of environmental administration</td>
</tr>
<tr>
<td>Worker responsible for environment</td>
<td>Increase the skills to improve the behavior of environment</td>
</tr>
<tr>
<td>Worker who are likely to make serious effect on regulations and polices</td>
<td>The importance and requirement of regulations and polices</td>
</tr>
<tr>
<td>Ordinary worker</td>
<td>Increase the environmental consciousness, the post skill train</td>
</tr>
</tbody>
</table>

The train is proceeded in the means of school teaching and checked for the effect by the answer sheet.

At last, the entire process of train should be recorded, and all the letter material should be stored as archive to look up in the future.
The gas boiler worker must get the special train and pass the strict examination and get the qualification certificate for his post

8. **Information intercommunication**

It is necessary to transfer different information of different organizations and posts and announce relative information (relatives and social people and so on) for the environmental administration.

The inner information communication can be processed in different types, such as meeting, inner brief reports, etc. But it is necessary to hold formal meetings every month and all the communicated information should be documented.

The outer information communication should be held every year or half a year. The information communicated with other organizations also should be filed.

9. **Record**

For the efficiently operation of the environmental management system, a perfect record system must be set up, and the following records is written down.

1. Law and regulations
2. Permission
3. Environmental factor and its effects
4. Training
5. Check, verification, and maintenance
6. Monitoring data;
7. Inconsistent
8. Validity of correction and prevention
(9) Relative information
(10) Auditing
(11) Assessment and examination

Moreover, the forwards kinds of record must be controlled including sign, collection, catalog, archive, store, administration, maintenance, query, store period and procession of the record.

10. Target of improving continually

A. The reliable compensation water source for the Liangshuihe River as the city water system is the output of the sewage plant. All of the three sewage treatment plant belonging to the secondary treatment, of which the effluent can meet the discharge standard but not reach the environment quality standard of the surface water, especially the scenery water. So it is suggested that the secondary treatment can only be look on as the fist stage target and adding the third processing and implement wiping off the mud is necessary for improving the water quality completely in the long term.

B. The sides of the Qinghe River have changed from village to urban along with the north extension of the Zhongguanchun science and technology garden. There are still further improvements for the construction of the interception of the sewage. In order to improve completely and maintain the quality of the Qinghe river, the things needing to do id as follows:

a. The sewage drained from Qinghua University must be treated as soon as possible;

b. Build Maxiao river sewage plant quickly;

c. Implement Qinghe sewage plant quickly;
d. Adjust the scale of the two sewage plant to the same drainage quantity if possible;

e. Supply more and more fresh water if possible.
Figure 1 Distribution of monitoring stations on groundwater environmental quality.
Figure 2 Locations of monitoring site of atmosphere and noise during the construction of Tsinghe WWTP