



Environmental Management Plan
of
Kunming KongGang Municipal Solid Waste Incineration Power Plant

Kunming KongGang Municipal Solid Waste Incineration Power Plant
July 2014

Abbreviations

APC	air pollution control
Bank	World Bank
BAT	best available techniques
BEP	best environmental practices
CFB	circulating fluidized bed
DongJiao	DongJiao MSW Power Plant
EA	environmental assessment
EHS Guidelines	World Bank Group Environmental, Health and Safety Guidelines
EPB	environmental protection bureau
EMP	environmental management plan
FECO	Foreign Economic Cooperation Office, Ministry of Environmental Protection
KongGang	KongGang MSW Power Plant
MEP	Ministry of Environmental Protection, PRC
MSW	municipal solid wastes
NIP	National Implementation Plan
POPs	persistent organic pollutants
Stockholm Convention	SC
UMB	urban management bureau
WuHua	WuHua MSW Power Plant
XiShan	XiShan MSW Power Plant

Content

Abbreviations	ii
1 Introduction.....	1
1.1 Project background.....	1
1.2 Project profile	2
1.2.1 Project location.....	2
1.2.2 Project owner	2
1.2.3 Technical Considerations for BAT/BEP application	2
1.3 Environmental law and Regulatory Framework.....	4
1.3.1 Domestic environmental protection laws, regulations & policies	4
1.3.2 Environmental and social policies of the Work Bank:.....	5
1.3.4 Stockholm Convention BAT/BEP	6
1.3.5 Domestic technical documents	7
1.4 Relevant pollutant emission standards	8
1.5 Important environmentally sensitive targets	1
2 Mitigation Measures.....	2
2.1 Construction period	2
2.2 Pollution control during the operation period	5
3 Responsibilities of Environmental Management.....	9
3.1 Management organization and responsibilities assignment.....	9
3.2 Environmental management	10
4 Environmental Monitoring Plan.....	12
4.1 Environmental monitoring plan	12
4.1.1 Environmental monitoring during construction period	12
4.1.2 Environmental monitoring during operation period	12
4.1.3 Standardize sampling location	13
4.1.4 Plant monitoring staff	14
4.2 Environmental Monitoring Enhancement	14
4.2.1 Operational and environmental performance monitoring	14

4.2.2	Improved monitoring of MSW incinerators during operation.....	14
5	Risk control and emergency management.....	16
5.1	Major risk factors.....	16
5.2	Environmental risk accidents.....	18
5.2.1	Fire and explosion.....	18
5.2.2	Environmental risk monitoring and preventive measures	18
5.2.3	Monitoring method.....	18
5.2.4	Preventive measures	19
5.3	Accident response plan	19
5.3.1	Early warning procedure	19
5.3.2	Emergency plan initiation procedure	20
5.3.3	Organization & responsibilities.....	20
5.3.4	Reporting and notification.....	23
5.4	Emergency responses and salvage measures.....	23
5.4.1	Responding procedure.....	23
5.4.2	Emergency measures	24
5.4.3	Emergency monitoring.....	25
5.4.4	Termination of emergency.....	25
6	Environmental training plan	26
6.1	Goal and content of training	26
6.2	Regular training plan.....	26
6.2.1	Emergency drill and training.....	27
6.2.2	Special trainings on environmental laws and regulation as well as related environmental knowledge	27
6.2.3	Environmental risk identification	27
6.2.4	Budget for training expenditure	27
6.3	Enhanced training for incinerator managers and operators.....	27
7	Environmental reporting.....	29
7.1	Reporting.....	29
7.2	Record filing	29
8	Public Engagement Plan.....	31

8.1	Information Disclosure and Public Participation Strategy	31
8.1.1	Information Disclosure and Public Participation Program	31
8.2	Grievance Redress Mechanism	35
8.3	Other Public Engagement Programs	35
9	Legal implication of environmental management plan	37
10	EMP Budget.....	39

1 Introduction

1.1 Project background

The National Implementation Plan of the People's Republic of China for the Stockholm Convention on Persistent Organic Pollutants (POPs) lists the municipal solid waste (MSW) disposal sector as one of the country's six priority industries for POPs reduction. In order to help China implement its responsibility under the Convention, achieve reduction of dioxin emissions from MSW incineration, the Ministry of Environmental Protection (MEP) and the World Bank work together to promote best available techniques (BAT) and best environmental practices (BEP) in accordance with the Stockholm Convention (SC). Four existing MSW incinerators in Kunming City were identified as candidates for the demonstration of BAT and BEP. With grant financing from the Global Environmental Facility (GEF) complemented with own resources, selected MSW incinerators would improve operations and install necessary equipment to demonstrate operations that are in line with SC BAT and BEP.

With the support of the Foreign Economic Cooperation Office (FECO) of MEP, each of the four incinerators prepared an environmental audit report. Based on the findings and recommendations of the environmental audit, a standalone EMP was also prepared for each incinerator. During project preparation, a social assessment and public consultations were carried out and integrated with the environmental assessment process.

The project implementation, by design, will consist two phases. In the first phase an intensive operating and environmental performance audit at the four candidate incinerators will be carried out in the first year of project implementation. Based on the audit, an operational improvement program will be designed for each incinerator. Incinerators that commit to implementing these programs and fulfill financial eligibility conditions would be supported during the remainder of the project, including through grant funding for necessary upgrades of equipment relevant for dioxin emission reduction. The project will aim at achieving the operational improvements at least three of the four incinerators in Kunming.

During the project appraisal, Ministry of Environmental Protection (MEP) issued *Standard for Pollution Control on the MSW Incineration (GB18485-2014)*, which is an amendment to existing GB18485-2001. The new national standard has considerably tightened air emission limits of MSW incineration to the level of EU and US standards that are referenced by WBG EHS Guidelines. According to this new national standard, by Jan 1st, 2016, all existing MSW incinerators in China, including the four candidate MSW incinerators in Kunming, must meet the new standard.

This Environment Management Plan (EMP) has incorporated applicable domestic requirements, Stockholm Convention Best Available Techniques and Best Environmental Practices (BAT/BEP), and World Bank Group Environmental, Health and Safety Guidelines (WBG EHS Guidelines). The EMP is expected to remain valid upon completion of the said intensive operating and environmental performance audit to be carried out in the first year

of project implementation. The EMP will be updated and costed once the operational and performance audit during the first year of project implementation is completed and that the EMP will be part of the Operational Improvement Program for each incinerator.

1.2 Project profile

1.2.1 Project location

Kunming KongGang Municipal Solid Waste Incineration Power Plant (Konggang Incinerator) is located in northwestern rural area of Kunming city (see figure 1-1)

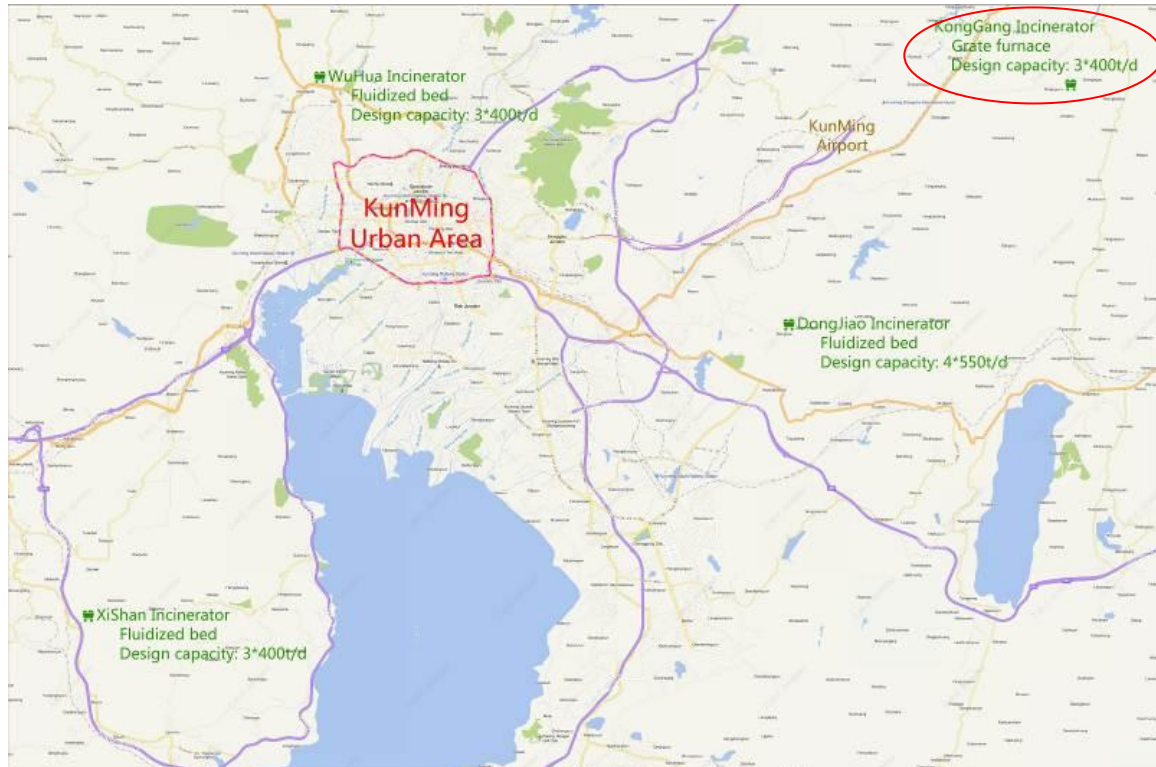


Figure 1-1 Location of 4 candidate incinerators – Konggang – northeastern Kunming

1.2.2 Project owner

Kunming KongGang Incinerator will be responsible for implementation of the EMP. The Konggang Incinerator was built in June 2011, and entered into official operation in August 2013 after obtaining environmental acceptance issued by Yunnan Provincial Environmental Protection Department.

1.2.3 Findings and Recommendations of Environmental Audit

According to an expert evaluation made during project preparation, The Konggang facility comprises 2 combustion trains each of 500 TPD (550 maximum) for total of 1,000TPD. The facility utilizes grate (mass burn) technology and has been in operation since 2012. Electricity is generated using one turbine generator with a total generating capacity of 18 megawatts. Municipal solid waste, pre-processed at the transfer stations by fermentation (reported to effect 15% weight reduction as "leachate") for water removal is delivered to the plant, stored in their pit and, over a period of time, additional water is drained off

(reported as an additional 15%). Waste is fed to the furnace using a conventional bridge crane, clamshell bucket and chute. If combustion temperatures fall below 850°C, diesel is used as an auxiliary fuel. After leaving the economizer, acidic flue gases are removed using a slurry of Ca(OH)₂ (slaked lime) in a semi-dry scrubber. Activated carbon is added for dioxin and mercury control. Particulate collection is effected using a bag house with Teflon bags with Teflon membrane technology. Bag house integrity is monitored using a laser optical system on the combined flue gas. Dioxin monitoring have been carried out 1 times since the incinerator was built and 0.011 ng TEQ/m³ in stack emissions. 3 of the 12 results exceeded 0.1 ng TEQ/m³.

Overall, the environmental audit and technical evaluation of the Konggang incineration plant concluded that the plant is new, well maintained, has fundamental control systems, qualified staff in place. It has also established a sound environmental management system. These conditions allow the incinerator for readily adaption of an operating and environmental performance enhancement program.

The main issues include: 1) the incinerator's instrumentation and automatic control system may not be adequate to address poor quality feedstock wastes and may result in unsteady operations cause considerable likelihood of uncertain emissions; 2) environmental monitoring seems to be inadequate due to technical and capacity constraints. The online monitoring equipment does not function properly at all times. Some monitoring results seem unreliable; 3) incinerator operators' knowledge of process control, comprehensive application of BAT/BEP and environmental compliance need to be further enhanced.

Accordingly the following suggestions on operational improvement are suggested, including:

- Targeted investments in monitoring equipment for plant performance and environmental performance, such as temperature meters in furnaces, and a certain level of integration of environmental performance monitoring and process control. These would be helpful for maintain optimal and flexible combustion conditions according to design parameters and emission levels.
- Identified mechanical and maintenance issues shall be fixed as well. These include:
 - Furnace outlet dust removal device
 - Lime slurry injection device valve
 - Measurement device of activated carbon injection
 - Bag house dust outlet and breakage detection device
- Capacity building for operator skills.

1.3 Environmental law and Regulatory Framework

1.3.1 Domestic environmental protection laws, regulations & policies

Ever since the year of 1979 when the *Environmental Protection Law of the People's Republic of China (Trial)* was issued, multiple environmental protection laws and regulations have ensued, including the *Water Pollution Prevention and Control Law of the People's Republic of China*, the *Atmospheric Pollution Prevention Law of the People's Republic of China* and the *Marine Environment Protection Law of the People's Republic of China*, etc. An environmental protection legislation system has taking shape by integrating the components of comprehensive laws, pollution control laws, and resource and eco-protection laws, etc. Currently an environmental law system has been derived from the *Environmental Protection Law of the People's Republic of China* on basis of the *Constitution of the People's Republic of China*. The legislation efforts on environmental protection have provided power thrusts to the development of environmental protection in China.

The environmental protection laws and regulation concerning this project include:

- (1) The Environmental Protection Law of the People's Republic of China issued on December 26, 1989;
- (2) The Noise Pollution Prevention Law of the People's Republic of China revised on October 29, 1996;
- (3) The Atmospheric Pollution Prevention Law of the People's Republic of China revised on April 29, 2000;
- (4) The Solid Waste Pollution Prevention Law of the People's Republic of China revised on December 29, 2004;
- (5) The Water Pollution Prevention Law of the People's Republic of China effective on June 1 2008;
- (6) The Cleaner Production Promotion Law of the People's Republic of China effective on July 1, 2012;
- (7) The *National Hazardous Waste Inventory* issued by *Instruction No.1* of the Ministry of Environmental Protection and the National Development and Reform Commission, taking effect on August 1, 2008;
- (8) The Renewable Energy Law of the People's Republic of China (February 28, 2005);
- (9) The Circular Economy Promotion Law of the People's Republic of China (August 29, 2008);
- (10) CZ [2000] No.120 *Technical Policy on Urban Domestic Waste Disposal and Pollution Prevention* jointly issued by the Ministry of Construction, the Ministry of Science and Technology and the State Environmental Protection Administration;
- (11) HF (2008) No.82 Circular on Improving the Environmental Impact Assessing Management for Biomass Power Generation Projects issued on September 4, 2008;

(12) The *Technical Guidance on Domestic Waste Disposal* jointly issued by the Ministry of Housing and Urban-Rural Construction, the National Development and Reform Commission and the Ministry of Environmental Protection on April 22, 2010;

(13) HF [2010] No. 123 Guidance on Strengthening Dioxin Pollution Prevention;

1.3.2 Environmental and social policies of the Work Bank:

Table 1-2 Compliance with the Bank's safeguards policies

Table 1-2 Compliance with the Bank's safeguards policies

Safeguard Policies	Applicability	Compliance
OP/BP 4.01 Environmental assessment	Yes	Category A project, full assessment, and environmental audit report and environmental management plan prepared. Public participation and information disclosure carried out.
OP/BP 4.04 Natural habitat	No	The Project does not involve any natural habitats
OP 4.09 Pest management	No	The project would incur neither purchase of any pesticide nor additional pesticide application. No action is required according to the Policy.
OP 4.37 Dam safety	No	There are no dams in the project area.
OP4.11 Physical cultural resources	No	Not any cultural heritage or other physical cultural resource has been found.
OP/BP4.36 Forest	No	This project will not result in material changes or deterioration of important forest areas or relevant natural habitats as defined in such policies.
OP/BP 4.12 Involuntary resettlement	No	This project will out activities in existing waste Incineration Power Plant, so no land acquisition and resettlement are involved.
OD 4.20 Indigenous Peoples	No	There're no indigenous residents living in the project area or no indigenous residents will be affected by the project.
OP 7.50 International Waterways	No	There are no international waterways in the project area.
OP/BP 7.60 Disputed area	No	There're no international waterways in the project area.

1.3.3 World Bank Group Environmental Health and Safety Guidelines

The World Bank Group Guidelines applicable to this project include the applicable guidelines of General Guidelines and sub-guidelines related to municipal solid waste incineration.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them.

The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines

are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

The *Environment, Health and Safety Guidelines for Waste Management Facilities* includes measures and performance levels relevant to MSW incineration, including management of air emissions, ash and other residuals, water effluents, noise, occupational health and safety, etc. These measures have been incorporated into the project EMP. The Waste Management Facilities guidelines also make reference to emissions standards for MSW incinerators from European and the United States for this sector.

1.3.4 Stockholm Convention BAT/BEP

The key relevant articles in Stockholm Convention and the BAT/BEP Guidelines on POPs are as the followings

(1) Best Environmental Practices

- Reducing the overall mass of wastes that have to be disposed of by any means serves to reduce both the releases and residues from incinerators. Diversion of biodegradables to composting and initiatives to reduce the amount of packaging materials entering the waste stream can significantly affect waste volumes. Responsibility for waste minimization lies only to a minor extent with the operator of a waste incineration plant. However, coordination and harmonization of relevant activities on different organizational levels (e.g. operator, local, regional or national level) is of major importance for protection of the environment as a whole.
- Kerbside or centralized sorting and collection of recyclable materials (for example, aluminum and other metals, glass, paper, recyclable plastics, and construction and demolition waste) also reduces waste volume, saves valuable resources and removes some non-combustibles. Responsibility for these activities must be coordinated between relevant levels.
- Operators must be able to accurately predict the heating value and other attributes of the waste being combusted in order to ensure that the design parameters of the incinerator are being met. This can be done using the results from a feed monitoring programme of key contaminants and parameters where sampling and analysis frequencies and rigour would increase as feed variability increases.
- To achieve optimal prevention of formation, and capture, of chemicals listed in Annex C, proper care and control of both burn and exhaust parameters are necessary. In continuous feed units, the timing of waste introduction, control of burn conditions and post-burn management are important considerations
- These events are normally characterized by poor combustion, and consequently create the conditions for formation of chemicals listed in Annex C. For smaller, modular incinerators operating in batch mode, start-up and shutdown may be daily occurrences. Preheating the incinerator and initial co-firing with a clean fossil fuel will

allow efficient combustion temperatures to be reached more quickly. Wherever possible, however, continuous operation should be the practice of choice. Independent of the operation mode waste should be fed into the combustion system only when the required temperature (e.g. above 850°C) is reached. Upsets can be minimized through periodic inspection and preventive maintenance. Incinerator operators should not feed the waste during filter bypass ("dump stack") operations or during severe combustion upsets.

- Routine inspections by the operator and periodic inspections by the relevant authority of the furnace and air pollution control devices should be conducted to ensure system integrity and the proper performance of the incinerator and its components.
- High-efficiency combustion is facilitated by establishing a monitoring regime of key operating parameters, such as carbon monoxide (CO), volumetric flow rate, temperature and oxygen content.
- Carbon monoxide, oxygen in the flue gas, particulate matter, hydrogen chloride (HCl), sulphur dioxide (SO₂), nitrogen oxides (NO_x), hydrogen fluoride (HF), airflows and temperatures, pressure drops, and pH in the flue gas should all be routinely monitored.
- Bottom and fly ash from the incinerator must be handled, transported and disposed of in an environmentally sound manner.
- Regular training of personnel is essential for good operation of waste incinerators. Creating and maintaining public goodwill towards a waste incineration project is critical to the success of the venture.

(2) Best Available Techniques

- Environmental concerning location is the most important for a new MSW incinerator.
- Proper management of time, temperature and turbulence (the "3 Ts"), as well as oxygen (airflow), by means of incinerator design and operation will help to ensure the above conditions. The type and order of treatment processes applied to the flue gases once they leave the incineration chamber is important, both for optimal operation of the devices and for the overall cost-effectiveness of the installation. Best available techniques involve applying the most suitable combination of flue gas cleaning systems, including the dust (particulate matter) removal techniques, acid gas removal techniques, fuel gas polishing techniques, NO_x removal techniques, etc.

1.3.5 Domestic technical documents

(1) Reply to the approval of waste incineration power plant project in Kunming Airport Economic Zone by Yunnan Development and Transform Commission, YFGNY [2010] No. 2426

(2) Review comments of the government-invested project review center of Yunnan Province on *Feasibility Study Report on Waste Incineration Power Plant Project in Kunming Airport Economic Zone*, YTSF [2010] No. 514

- (3) Environmental impact statement of waste incineration treatment plant (power plant) project in Kunming Airport Economic Zone, Yunnan Green Environmental Engineering Technology Co., Ltd.
- (4) Reply to environmental impact statement of waste incineration treatment plant (power plant) project in Kunming Airport Economic Zone by Yunnan Environmental Protection Department, YHS [2011] No. 26
- (5) Reply letter on adjustment of auxiliary fuels of waste incineration treatment plant project in Kunming Airport Economic Zone by Yunnan Environmental Protection Department, YHH [2011] No. 48
- (6) Reply letter on adjustment of treatment methods of water drainage and demineralization system of boiler in the waste incineration treatment plant in Kunming Airport Economic Zone by Yunnan Environmental Protection Department, YHH [2013] No. 30
- (7) Reply to *Application for Commissioning of Waste Incineration Treatment Plant (Power Plant) Project in Kunming Airport Economic Zone* by Yunnan Environmental Protection Department, KHBF [2012] No. 369
- (8) *Approval form on Application for Commissioning Delay of Waste Incineration Treatment Plant (Power Plant) Project in Kunming Airport Economic Zone* by Kunming Environmental Protection Bureau, SPB [2013] No. 049
- (9) Planning permit of construction engineering of the People's Republic of China, JZ No. 530101201100255
- (10) State-owned Land Use Certificate of the People's Republic of China, KGY (2012) No. 00398
- (11) Reply to *Acceptance of Completion and Environmental Protection of Waste Incineration Treatment Plant (Power Plant) Project in Kunming Airport Economic Zone* by Yunnan Environmental Protection Department, YHY [2013] No. 48

1.4 Relevant pollutant emission standards

(1) Air emission standards

GB18485-2001 *Standard for Pollution Control on Municipal Solid Waste Incineration* is existing national standard for MSW incineration. In 2008, MEP issued *Circular on Strengthening the Environmental Impact Assessing Management in Biomass Power Projects* stipulates new MSW incinerator must meet 0.1 ng TEQ/m³. Since Xishan incineration plant's EIA was approved after issuance of this document, the requirement on dioxin emission limit applies to Konggang incineration plant.

In May 2014, MEP issued amendment to this standard, i.e. *Standard for Pollution Control on the MSW Incineration (GB18485-2014)*. The new national standard has considerably tightened air emission limits of MSW incineration to the level of EU and US standards that are referenced by WBG EHS Guidelines. According to this new national standard, by Jan 1st, 2016, Konggang incineration plant must meet the new national standard.

Table 1-1 shows Chinese national standards, EU and US standards for air emissions of MSW incinerators.

(2) Boundary standards for unorganized emission of odor pollutants

The concentration of the odor pollutants emitted by the Project is governed by the secondary expansion and transformation standards in GB14554-93 *Emission Standard for Odor Pollutants*.

(3) Sewage water emission standard

Wastewater emission shall be incorporated into the municipal wastewater pipe network in the Kunming Airport Economic Zone after it reaches the level-3 standard in Table 4 in *Integrated Wastewater Emission Standard* (GB8978-1996) and the water quality standard of wastewater emission into the urban sewer (CJ3082-1999).

(4) Standards on Noise Emission & Control

Noise at *Emission Standards for Boundary of Industrial Companies* (GB12348-2008) Class II shall be applied to the noise pollution at boundary of industrial enterprises.

Table 1-1 Chinese national standards, EU and US standards for air emissions of MSW incinerators

Parameter			National Standard, GB18485-2001	National Standard, GB18485-2014	EHS Guidelines (expanded)		
Ref.	Pollutants	Time	mg/m3	mg/m3	EU mg/m3	USA	USA converted (mg/m3)
1	Total Suspended Particulates	1-hr average	80	30	30	20	20
		24-hr average		20	10	n/a	
2	Carbon Monoxide (CO)	1-hr average	150	100	50-150	50-150ppmv	62.5-187.5
		24-hr average		80			
3	Nitrogen Oxides (NOx)	1-hr average	400	300	400	n/a	n/a
		24-hr average		250	200-400	150ppmv	Not Convertible
4	Sulfur Dioxides (SO2)	1-hr average	260	100	200	30ppmv or 80% reduction, whichever is less stringent	85.7 or 80% reduction, whichever is less stringent
		24-hr average		80	50		
5	Hydrochloric Acid (HCl)	1-hr average	75	60	60	25ppm or 95% reduction, whichever is less stringent	40.7 or 95% reduction, whichever is less stringent
		24-hr average		50	10		
6	Mercury (Hg)	Test Average	0.2	0.05	0.05-0.1	0.05 mg/dscm or 80% reduction, whichever is less stringent	0.05 or 80% reduction, whichever is less stringent
7	Lead (Pb)	Test Average	1.6	See below Ref. 11	See below	0.14	0.14

Environmental Management Plan of Kunming KongGang Municipal Solid Waste Incineration Power Plant

					Ref. 10		
8	Cadmium (Cd)	Test Average	0.1	See below Ref. 9	0.05-0.1 (0.5-8 hr average)	0.01	0.01
9	Tl+Cd	Test Average	n/a	0.1			
10	Total Metals	/	n/a	n/a	0.5-1 (0.5-8 hr average)	n/a	n/a
11	Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V	Test Average	n/a	1.0	n/a	n/a	n/a
12	HF	/	n/a	n/a	1	n/a	n/a
13	Dioxins (incl. furans)	/	1 ng TEQ/m ³ ; 0.1 ng TEQ/m ³ for new incinerators built after 2008	0.1 ngTEQ/m ³ Test average	0.1 ngTEQ/m ³ (6-8 hr average)	13 (ng/m ³)(total mass)	0.2 ng TEQ/m ³
Note			Effective for existing MSW incinerator until December 31, 2015	To be effective for existing MSW incinerator on Jan 1 st , 2016		7%o oxygen, dscm: milligrams per dry standard cubic meter	mg/m ³ =ppmv*co mpound molecular weight/22.4

1.5 Important environmentally sensitive targets

The sensitive receptors in the vicinity of Konggang incineration plant are shown in Table 1-2 and Figure 1-2.

Table 1-4 List of Environmental Protection Object and Distance Scale

S/N	Protection object	Relative to the project direction	Distance to the project boundary (m)	Population	Executive standard
1	Zhangzigou	Southeast	1000	107	Level-2 standard in <i>Ambient air quality standard</i> (GB3095-1996) and maximum allowable concentration of hazardous substances in the air in the residence zone in Table 1 in <i>Design Hygienic Standard of Industrial Companies</i> (TJ36-79)
2	Sand drain	South	1500	461	

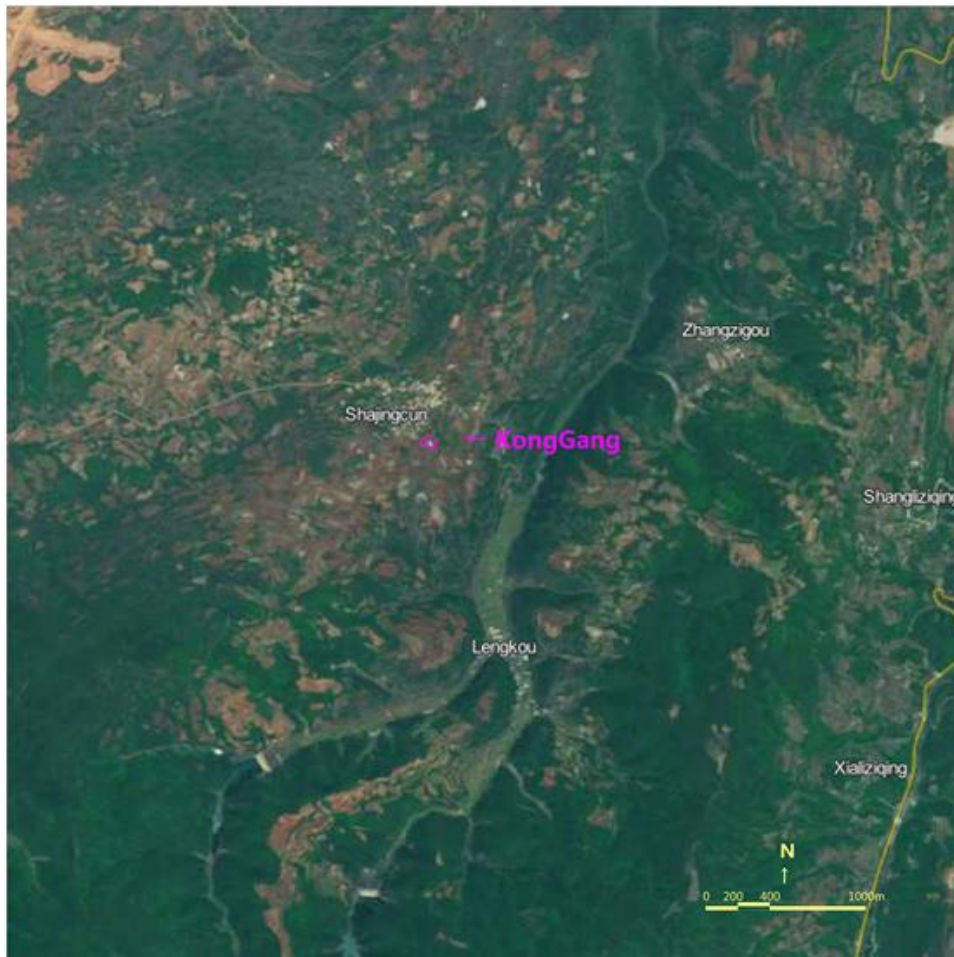


Figure 1-2 Konggang incinerator and nearby village/community

2 Mitigation Measures

2.1 Construction period

The implementation of operational improvement program is not anticipated to include major civil works. In Konggang incineration plant, limited works associated with reparation and installation of equipment may take place. Mitigation measures to such construction activities are included in Table 2-1.

Table 2-1 Mitigation measures during the construction period

Activities	Influences	Measures	Implemented by	Supervised by	Monitored by
Construction period	<p>☐ ● Domestic Sewage from Construction Personnel</p> <p>● Fugitive Dust in Construction and Exhausted Gas from Construction Equipment</p> <p>● Certain noise pollution may be generated by construction equipment in operation.</p>	<p>● The domestic sewage will be gathered up into the existing sewage system in the plant.</p> <p>● The construction site should be surrounded by a fence no less than 2m in height. Fences and masonry walls should be set up for construction works using the dust-raising materials like cement, lime powder and gravel, with covering cloth being deployed to suppress the dust. The piles excavated earth and construction wastes that stays for over 48 hours should be furnished with dust-proof provisions like covering or water sprinkling. The major dust source should be sprinkled with water for dust suppression. The ground of the construction site should be sprinkled with water before cleaning the site.</p> <p>● The construction site should be completed with the vehicle cleaning facilities and the necessary drainage and slurry settlement devices. All transportation vehicles must be cleaned off the mud and flushed before exiting the construction site.</p> <p>● Vehicles transporting materials, slag and wastes into the construction site should preferably be completed with the enclosed hopper to prevent spillage. The payload and the access road entering and leaving the landfill should be sprinkled with water timely. The contractor requires the contractors to provide the mobile sprinkler on their own.</p> <p>● The low-noise equipment and techniques should be used if possible, with each piece of equipment properly placed.</p> <p>● The construction plan should be properly prepared. It is required for nighttime construction to register the construction plan in the local authority of public utilities.</p> <p>● Strengthen the maintenance of the construction equipment. Strengthen the construction management to conduct the construction works in a civilized manner.</p> <p>● The route and timing of vehicles entering and leaving the construction site should be properly arranged. Strengthen the management of construction vehicles, require the drivers to drive in a</p>	Company & Contractor	Company & Environmental Protection Agency	Monitoring Station

		civilized manner without horns, and shunt the route away from communities. For construction vehicles that have to take the route through communities, a proper route plan should be prepared, and negotiations and communications should be maintained with local residents to avoid any noise disturbance to the local population during the construction period.			
--	--	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	--	--

2.2 Pollution control during the operation period

The mitigation measures during operational period include provisions of SC BAT/BEP Guidelines and WBG EHS Guidelines for MSW incineration, and identified improvement measures for Konggang incineration plant. These mitigation measures will be complemented by the operational improvement program developed after the first-year operating and environmental performance audit.

See Table 2-2.

Table 2-2 Mitigation measures during the operation period

	mitigation measures	note ¹	Implemented by	Supervised by	Monitored by
pre-treatment	<ul style="list-style-type: none"> • Presorting out the chlorine plastics and metals and especially the copper through the pretreatment of garbage to control the generation of HCl, CuO, CuCl₂ and Dioxin precursors. • Presorting out non-combustible wastes such as construction waste. • Increase homogeneity of wastes through presorting, shredding and mixing • Keep garbage in bunker for at least 3-5 days to drain off leachate and increase heat value to 5,024KJ/kg minimum. 	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
Air emissions	Ensure best combustion conditions through proper management of time, temperature and turbulence (the "3 Ts"), as well as oxygen (airflow). <ul style="list-style-type: none"> • Residence time above 850°C >2s • Optimize and control combustion conditions by the control of air (oxygen) supply, distribution and temperature, including gas and oxidant mixing; the control of combustion temperature level and distribution; and the control of raw gas residence time; • Minimize the uncontrolled ingress of air into the combustion chamber via waste loading or other routes 	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
	Avoid re-formation of dioxins after combustion chamber <ul style="list-style-type: none"> • Rapid quenching of the flue gas after leaving all combustion chambers and before entering any particulate matter air pollution control device to avoid re-generation of dioxins; • Flue gas 850 °C ~ 950 °C under high-power traction followed by induced draft fan super heater, evaporator convection tubes, economizer, air pre heater, a sharp decline in the temperature of the flue gas in the 1s to about 300 °C. 	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
	Minimize furnace down-time and unsteady operation <ul style="list-style-type: none"> • Implement maintenance and other procedures to minimize planned and unplanned shutdowns; • The waste charging system should be interlocked with the temperature monitoring and control system to prevent waste additions if the operating temperature falls below the required limits; 	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
	Use flue gas treatment system for control of dioxins, acid gases, particulate matter, and other air	law, EHS, BAT/BEP	incinerator	EPB	monitoring station

¹ Law: domestic law, regulation, approved documents, etc.

	<p>pollutants;</p> <ul style="list-style-type: none"> Minimize formation of dioxins and furans by ensuring that particulate control systems do not operate in the 200 to 400 degrees Celsius temperature range; identifying and controlling incoming waste composition; using primary (combustion-related) controls; using designs and operation conditions that limit the formation of dioxins, furans, and their precursors; and using flue gas controls; Using semi-dry purification tower + activated carbon injection + bag filter Optimize lime powder and activated carbon injections to increase the mixing uniformity of lime powder/activated carbon with flue gas Automatic metering unit is provided for the activated carbon. Using PTFE coated bag filters and bag breakage detection devices. 				
	<p>Enhance instrumentation, control and environmental monitoring in order to maintain optimal and flexible combustion conditions according to design parameters and emission levels.</p> <ul style="list-style-type: none"> Investments in monitoring equipment for plant performance and environmental performance, Integration of environmental performance monitoring and process control; e.g. build CO into control loop; Maintain and validate existing online monitoring devices regularly to ensure monitoring reliability. 	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
	<p>Odor control</p> <ul style="list-style-type: none"> Fully enclosed design for each process point prone to produce odor. Maintain micro-negative pressure environment at garbage storage pit. Odor is collected and combusted in the incinerator and various types of pollutants provided by the combustion and its auxiliary facility can satisfy corresponding standard limits of emission. 	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
waste water	<p>Leakage and leachate in the garbage pit and wastewater during production shall be pretreated and individually treated. The treatment process is AO+MBR and the treatment shall meet the requirement of Urban Miscellaneous Water Quality GB/T18920-2002. Drainage outside is not allowed.</p>	law	incinerator	EPB	monitoring station
Fly ash and other solid wastes	<p>Bottom ash and residuals should be managed based on their classification as hazardous or non-hazardous materials. Hazardous ash should be managed and disposed of as hazardous waste. Non-hazardous ash may be disposed of in an MSW landfill or considered for recycling in construction materials.</p> <ul style="list-style-type: none"> Bottom slug is non-hazardous and recycled as construction materials Fly ash is hazardous that needs safe treatment (see below) 	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
	<p>Manage bottom ash separately from fly ash and other flue gas treatment residues to avoid contamination of the bottom ash for its potential recovery;</p>	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
	<p>Separate remaining ferrous and non-ferrous metals from bottom ash as far as practicably and economically viable, for their recovery;</p>	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
	<p>Treat bottom ash on or off-site (e.g., by screening and crushing) to the extent that is required to meet</p>	law, EHS,	incinerator	EPB	monitoring

Environmental Management Plan of Kunming KongGang Municipal Solid Waste Incineration Power Plant

	the specifications set for its use or at the receiving treatment or disposal site;	BAT/BEP			station
	Leaching toxicity of fly ash and fly ash solidified body, dioxins and water content should be in line with 6.3 of <i>Standard for Pollution Control on the Landfill Site of Municipal Solid Waste</i> (GB16889-2008). Then it can be sent for landfill..	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
noise	Noise reduction measures <ul style="list-style-type: none"> • Low-noise equipment in terms of type selection, • Sound insulation of plant building, • provision of damping pad and • installation of silencer 	law, EHS, BAT/BEP	incinerator	EPB	monitoring station
Environmental monitoring	Environmental monitoring program includes <ul style="list-style-type: none"> • Inspection monitoring by local EPBs • Environmental quality monitoring • Online monitoring: online monitoring of pollutant are connected to environmental protection bureau • Additional dioxins monitoring supported by the project • Online monitoring of operating parameters and emission data supported by the project. • See Chapter 4 for details 				
Public engagement	<ul style="list-style-type: none"> • See Chapter 8 for details 				
others	The health protection zone between the boundary of the incinerator and environmentally sensitive target is set at 800m.	law	incinerator	EPB	monitoring station
	Total pollutant index: SO ₂ 222.5t/a	law	incinerator	EPB	monitoring station

3 Responsibilities of Environmental Management

FECO of MEP, as the national GEF project execution unit, takes overall responsibility for project implementation, including environmental safeguards. Yunnan Provincial Environmental Protection Department, as local PIU, will supervise Xishan incineration plant in implementing the project. The incineration plant's environmental management responsibility in implementing the project and operating the incineration plant is summarized in below.

3.1 Management organization and responsibilities assignment

The company has set up an organization for environmental protection management, where general manager responsibility system is adopted; one full-time staff for environmental protection is employed, who takes charge of the company's environmental protection and environmental protection coordination with other organizations and fulfills environmental management and supervision, consisting of the following responsibilities:

- (1) To implement environmental regulations and standards;
- (2) To set up environmental management system and often conduct inspection and supervision;
- (3) To compile environmental protection plans for the project and organize the implementation;
- (4) To lead and organize the implementation of project's environmental inspection, and establish monitoring files;
- (5) To well cover environmental education and technological training and improve the quality of staffs;
- (6) To build up rules and regulations on project-related pollutant emissions and the operation of environmentally protective facilities;
- (7) To take charge of daily environmental management and support the department of environmental protection management to coordinate with other social sectors on environmental protection;
- (8) To formulate the emergency response plans for sudden accidents and participate in the emergency treatment for sudden accidents;
- (9) To regularly inspect and supervise the implementation of environmentally protective laws and regulations and timely contact related department to implement environmentally protective measures in all aspects to ensure the normal implementation of the measures.

Responsibilities for Environmental Monitoring

- (1) To formulated annual plans on environmental monitoring and implementation plans as well as build up regulations and carry out the regulations;
- (2) To complete the monitoring assignments regulated in the environmental monitoring plan related to project on schedule and compile reports according to related regulations

and take charge of submitting reports;

(3) To actively participate in the investigation and treatment of accidents when sudden pollution accidents related to project occur;

(4) To take charge of the maintenance and inspection of monitoring devices to ensure normal monitoring;

(5) To organize and supervise the implementation of environmental monitoring plans;

3.2 Environmental management

The environmental management of the company mainly includes:

(1) Management of rubbish towards the factory

It shall enhance the management of rubbish towards to the factory, including formulating regulations on the traveling of waste trucks in the factory, operating instruction on how to prevent foul smell and percolate leakage, especially the management on the waste towards to factory during peak hours and high-temperature seasons;

(2) Formulate pollutant emission related post operation procedures according to the incineration process and equipment requirements, strictly implement the process operating rules.

(3) Formulate flue gas online monitoring operation procedures to ensure the normal operation of on-line monitoring instrument.

(4) Formulate pollutant emission equipment repair and maintenance work operation rules.

(5) It shall formulate monitoring plan for pollutant emissions and organize the implementation of monitoring.

(6) Make operation rules to control secondary pollution in fly ash melting, slag temporary storage in plant and transport process.

(7) It shall, according to national control regulations on dangerous chemical management, clearly specify the building structure of storehouse, safe distance, emergency facilities, notes for fire controlling, etc.

(8) It shall, according to regulations on managing the transportation of dangerous goods, formulate regulations on transportation management, explicit transportation routes and time, make related records, and build up management machine account.

(9) It shall enhance the company's resources and energy management, further reduce the energy consumption, and improve cleaner production to minimize the affect left by the project on the environment.

(10) It shall follow the national and local policies, orders, and regulations on environmental protection, regularly train the staffs for environmental protection, strengthen the safety and environmental protection sense of the staffs, and intensify their responsibility sense of pollution control.

(11)The constructing organization shall, according to the requirements of industrial authority, meet the requirements of the third-party independent supervisory organization for monitoring the whole of the manufacturing process.

4 Environmental Monitoring Plan

Environmental monitoring refers to that, during the construction period and operation period of the GEF project, the monitoring organization shall collect and test environmental samples, deal with data, compile related reports, and proactively respond to environmental problems related to the project. The formulation and implementation of environmental monitoring plan is the basis of environmental management. It provides environmental statistics and environmental quantitative evaluation with scientific basis to ensure the implementation of pollution controls and timely find the problems in environmental protection measures and correct and improve.

4.1 Environmental monitoring plan

4.1.1 Environmental monitoring during construction period

Local environmental monitoring station will be engaged to implement environmental monitoring during construction period and the monitoring plan can be seen in Table 4-1.

Table 4-1 Monitoring Plan during Construction Period

	Monitoring location	Monitoring items	Monitoring frequency
air	One spot in each of the four sides of the plant	TSP	Once for three months, once lasting one day, 4 periods in total
Sound		Equivalent Continuous A-weighted Sound Pressure Level	

4.1.2 Environmental monitoring during operation period

The environmental monitoring programs during operational period follow domestic regulatory requirements; including the following

- 1) Per Chinese regulation, regular inspection monitoring are carried out by environmental monitoring station that is under local environmental protection bureau;
- 2) Continuous Emission Monitoring System (CEMS),
- 3) Dioxins monitoring which is to be conducted by licensed monitoring institute since Yunnan province is yet to have a dioxin monitoring lab; and
- 4) Ambient environmental quality monitoring.

In addition, the GEF project will support additional monitoring during project implementation (see section 4.2).

Environmental monitoring plan during operation period can be seen in Table 4-2.

Table 5-2 Environmental Monitoring Plan during Operation Period

Monitoring category	Monitoring content	Monitoring location	Monitoring items	Monitoring frequency
Pollution source monitoring	Air pollution source	Stack Stack	SO ₂ , NO _x , TSP, HCl, CO, Temperature, fume flow rate, oxygen content,	Continuous online Automatic monitoring
			Fume flow rate, oxygen content, SO ₂ , NO _x , TSP, HCl, CO, Temperature	Regular inspection monitoring, quarterly
		Heavy metals: Pb, Cd, Hg		
	Behind bag house	Dioxins	Once a year	
	Solid wastes	Furnace Slag	Output, disposal volume	Monthly
Fly Ash		Output, disposal volume, leaching toxicity		
	Wastewater	Inlet and outlet of wastewater/leachate treatment plant	Flow rate, pH, COD, NH ₃ -N, BOD ₅ , TN, TP, Pb, Cd, Hg, As	Quarterly
Environment quality monitoring	Ambient air quality	Sensitive area downwind of the dominant wind direction (Zhangzigou)	SO ₂ , NO ₂ , PM ₁₀ , NH ₃ , H ₂ S, HCl, Pb, Cd, Hg, dioxins	Once a year
		plant boundary	NH ₃ , H ₂ S, and odor concentration	Quarterly
	Groundwater environment	Outside incineration workshop, outside garbage pit, wastewater treatment plant	pH, Sulfate, total hardness, NH ₃ -N, NO ₃ -N, NO ₂ -N, volatile phenol, permanganate index, fluoride, As, Hg, Cd, hexavalent chromium, Fe, Mn	Twice a year
	Acoustic environment	1m away from the plant boundary	Equivalent Continuous A-weighted Sound Pressure Level	Quarterly

4.1.3 Standardize sampling location

The waste water of Konggang incineration plant is not discharged hence no online monitoring for wastewater is needed.

Sampling location for online monitoring of air emission is in the middle of the 80-m stack of the incinerator, following "Technical Specification on Continuous Monitoring System of Flue Gas Emission from Stationary Pollution Source" released by Ministry of Environmental Protection; stationary pollution source CEMS shall be installed at a representative location that allows reliable continuous monitoring of the flue gas emission from stationary pollution sources. Data sampling and controlling shall be implemented according to HJ/T212-2005 "Standards on the Data Transmission of Online Automatic Monitoring System of Pollution Source".

The location for manual sampling and the methods of monitoring and sampling should

comply with GB/T16157-1996 "Methods for Measuring Particulate Matters and Sampling Gaseous Pollutants from Stationary Pollution Sources"; the sampling platform and hole size shall be normalized; the monitoring holes shall set up at the entrance and exit of controlling devices and the aperture shall be over 80 mm.

4.1.4 Plant monitoring staff

There are 5 water quality testing personnel working for water workshop in KongGang Incinerator. Lab facilities include equipped with electronic balance and ultraviolet spectrophotometer, responsible for the company's waste water detection. To ensure the accuracy of monitoring data, the monitoring shall be strictly implemented according to monitoring standards.

4.2 Environmental Monitoring Enhancement

The GEF project will support monitoring enhancement in addition to the environmental monitoring programs required by domestic regulatory requirements. The monitoring enhancement includes operating and environmental monitoring in the first year of project implementation, and improved monitoring of MSW incinerators during operation.

4.2.1 Operational and environmental performance monitoring

The project would fund consultants to evaluate the collected data together with Kunming UMB and EPB, and to determine weaknesses and areas for improvements in the incinerators' operations. Jointly with the companies, UMB and EPB, the consultants would develop customized operational improvement programs. The program would define baselines, targets and milestones for the improvement of operating procedures in the facility.

As part of the effort, operational and environmental performance monitoring would be carried out during the first 9-12 months of Project implementation to fill the information gap on operating conditions at the four Kunming incinerators. Kunming UMB and Kunming EPB would collect in a systematic manner periodic information on operating parameters, including notably combustion temperature, residual oxygen, carbon monoxide, flue gas flow rate; emission of HCl, SO₂, NO_x, mercury and other heavy metals, and total suspended particulates; incoming waste characteristics; and combustion residuals, including bottom and fly ash. The monitoring of these data would be carried out through continuous emission monitoring (CEM) and/or stack sampling and waste characterization. Two stack tests for dioxin emissions per plant would also be carried out during this period.

4.2.2 Improved monitoring of MSW incinerators during operation

The Project would support environmental monitoring for operation, including (i) enabling continuous access by regulators to incinerator operating and emission data; and (ii) additional stack emission testing for dioxin.

i. Enabling Continuous Access by Regulators to Incinerator Operating and Emission Data

The Project would support investments in monitoring equipment at the incinerator needed to enable the monitoring of the above parameters (i.e. operating and emission parameters, including notably combustion temperature, residual oxygen, carbon monoxide, flue gas flow rate; emission of HCl, SO₂, NO_x, mercury and other heavy metals, and total suspended particulates; incoming waste characteristics; and combustion residuals, including bottom and fly ash.) and IT systems to transmit real time and continuously data from MSW incinerators to the environmental protection bureaus (EPBs) and urban management bureaus (UMBs) in Kunming. Kunming UMB's existing state-of-the-art Digital Urban Management Platform would be used to publicize real-time operating performance and (non-dioxin) emission data.

Dioxin Stack Testing following Standards

In Kunming, the Project would fund one more stack test annually at each selected demonstration incinerator in addition to the one test per year that facilities are required to carry out by domestic regulatory requirement, in order to gauge the impact of improved operations and investments on dioxin emissions. The baseline tests would be carried out during the initial period of operational and environmental performance audit. All tests, regardless of funding source, would be carried out by the same facility, following a set of sampling procedures. Kunming UMB and EPB will jointly ensure that normal operating conditions prevail at the time of sampling.

5 Risk control and emergency management

5.1 Major risk factors

Analyses on the identification of hazardous materials and the production procedures of the Company suggest the existence of toxic gases like the hydrochloric acid, sulfureted hydrogen and methane during the production procedure, and the incineration process may create certain amount of dioxin with considerable environmental impact. HCl and NaOH are separately stored in acid and alkali storage tank of 5 tons. The minimum everyday storage of HCl is 1 ton, and the daily reserve of NaOH is 1 ton. In addition, light diesel is used to ignite combustion in the boiler. There is one 30-ton light diesel steel storage tank in the plant with daily reserve at about 50 tons.

The risk factor analysis is shown in Table 5-1.

Table 5-1 Risk Factor Analysis for Proposed Works

S/N	Place/Equipment position/Activity	Section	Source & Nature of Risk	3 Tenses			3 Situations			Pattern	Danger Source Grading	Management Approach
				Past	Present	Future	Normal	Abnormal	Emergency			
1	Municipal solid waste incineration produced fly ash storage tank (two 150M ³ fly ash storage tanks)	Production Department	Potential Risk of Leakage & Fly Ash Pollution			√			√	Solid	A	Strengthen the supervision, take preventive measures and deploy more emergency facilities
2	Alkali tank (Storage capacity 5T)	Production Department	Potential Risk of Leakage, Personal Injury and Environmental Pollution			√			√	Liquid	A	
	Acid tank (storage capacity of 5T)		Potential Risk of Leakage, Personal Injury and Environmental Pollution			√			√	Liquid	A	
3	Boiler Room (Excessive dioxin and smoke, etc.)	Production Department	Potential risk of fire and secondary gas pollution			√			√	Gas	A	
4	Leachate treatment station	Production Department	Potential Risk of Leakage, Personal Poisoning and Environmental Pollution			√			√	Liquid	A	

Note: The ordinary environmental risk sources are rated as Grade B, and the critical ones are rated as Grade A.

5.2 Environmental risk accidents

5.2.1 Fire and explosion

(1) Environmental accidents due to boiler or pipe explosions

The boiler as a steam-generating device is one of the major equipment in the plant. Subjected to the high-temperature flame and smokes that contain large volume of dusts and highly corrosive gases, the heating surface of the boiler is always under the high temperature and pressure load of the heated media (i.e. water) from inside, and the impact and corrosion of the high-temperature smoke from outside; any leakage, explosion or fire happened on the boiler may result in severe personal injury and equipment damage. The boiler and pipe explosion can be easily triggered by the overpressure, component flaw or severe shortage of water in the boiler due to the equipment malfunction, automatic device failure, mal-operation or poor management, posing great threat to the security and environmental safety of the boiler operators, plant staff and the surrounding environment.

(2) Environmental Accidents due to the Fire and Explosion of the Fuel System and the Diesel Tanks

The waste furnace is fueled by 0# diesel, for which a 30t steel tank for light diesel will be built in the plant. Diesel is a combustible material, which is highly inflammable when contacted with oxidants, or exposed to high temperature, open fire or static sparks.

(3) Waste storage fire

The domestic wastes in storage are prone to generate methane and similar gases, which, without being expelled timely, may cause fire or explosion when reaching the explosion limits and exposed to the ignition source.

5.2.2 Environmental risk monitoring and preventive measures

Necessary safety and environment monitoring facilities should be set up company-wide for contingency, making sure these facilities work in emergency cases and send the alarming signals timely.

5.2.3 Monitoring method

(1) The company shall set up special organizations and assign personnel take in charge of safety and environment works, establish daily patrol inspection systems, and inspect records and corrective actions. The revealed potential risks should be corrected immediately for production safety.

(2) It shall strengthen the management, it shall define responsibilities for each relevant body such as production, storage and transportation, waste disposal and other procedures, and establish corresponding management system to make each work of the company conduct in accordance with regulations and all the operations are under control.

5.2.4 Preventive measures

(1) Establishment and Completion of Rules and Regulations: Including the monitoring of critical risk sources, safety operation procedures of major equipment, positional operation guidance, watch system, routine inspections, approval for special operations and various performance-based rewards and punishments.

(2) It shall assess the safety and environmental risk on regular basis; establish all kinds of safety and environmental management files for major risk source, and do a good job of report and registration to the local security and environmental protection departments.

(3) Act by the rules to prevent any breaching activities. Strengthen the trainings and examinations for employees, requiring all employees to receive the specific training courses, and to pass the tests on such courses before taking position. Special operation undertakers are required to hold the qualification certificates. Process parameters should be controlled and recorded as per the requirements of each individual position.

(4) Safety and environmental protection facilities are complete and valid. The pressure vessels, fire equipment and safety equipment shall be well-equipped and their functions shall be guaranteed through the regular inspection.

(5) The lighting-proof facilities should be checked each year to make sure they are intact and functioning.

(6) Strengthen the management of special operations. Operation licenses should be acquired for temporary line operations, fire-involved works, high-altitude works and operations entering the tanks, with necessary safety provisions being deployed. The operators should receive the corresponding safety training courses, and be specified with supervisors in operation.

(7) It shall try to prevent the occurrences of natural disaster. The company shall do well in dealing with all kinds of natural events based on the weather report.

That disaster preparedness includes flood and typhoon prevention. The procedure of production suspension should be prepared for extreme weather conditions, and inspections on tanks, outdoor production facilities and environmental protection facilities should be strengthened, with all revealed problems being corrected immediately.

5.3 Accident response plan

5.3.1 Early warning procedure

The early warning of emergent environmental pollution accidents should be graded according to the severity, emergent level and potential extensiveness of the accidents, establishing the warning system with the progressive grades at company level, workshop level and team level, represented by the color of orange, yellow and blue respectively. The warning can be upgraded, downrated or cancelled as per the progression of situations and the feedback of the countermeasures being taking against the warning cases. To those emergency cases beyond the emergency response at the company level, the government's grading on early warning of emergent environmental incidents should be adopted.

Measures to be taken in early warning situations:

Grade I: Equipment malfunction or micro-leakage with no threat to the production, which can be handled by checking the equipment or replacing the pipes. The operators should follow the uniformed command of the team to solve the problem immediately.

Grade II: Part of the auxiliary facilities in the plant is affected, and the risk of fire emerges in the workshop. Emergency response procedures should be initiated to evacuate the personnel from the warning zone, and the emergency response team should be gathered up in such zone, following the command of the directorate to take responses.

Grade III: The grade III alarm should be sounded in case of leakage in the plant beyond the alarming level, ordinary fire or explosion. In such case, the emergency directorate of the Company should alarm the surrounding entities with phone, and report the situation to the government of the Economic Development Zone, requesting and providing guidance for the neighboring entities to initiate their emergency responses. Meanwhile, the plant should initiate the emergency procedure to evacuate its personnel to the specified safety zones, allowing for the Company's emergency salvage operations, conducting the rescue missions, buying time for the efforts to reduce the accidental loss.

5.3.2 Emergency plan initiation procedure

(1) The first witness of the accident should report the situation to the production supervisor of the Company immediately, and take necessary measures to stop the situation from escalating. The accidents of grade II (or above) should be reported immediately to the government of the zone (town), the local environmental protection agency, the local safety production supervision administration and the local police, etc.

(2) The production supervisor should make emergency arrangements as per the nature and pollution intensity of the accident immediately after receiving the accident report.

(3) Upon the breakup of the accident, the section where the accident occurs should immediately investigate the cause to such accident, and to make sure the situation is under control; otherwise the situation should be reported to its superior-level office immediately. The production technical department should join in the accident section and other relevant sections to make the decision of partial or total suspension of production as necessary.

(4) After the situation is under control, preventive measures should be prepared immediately, salvage teams should be organized, and salvage plans should be prepared to resume the production as soon as possible.

(5) The salvage works should be completed by the accident section independently as much as possible, with corresponding measures being discussed and determined, salvage teams being organized, and salvage plans being prepared, in order to resume the production as soon as possible.

5.3.3 Organization & responsibilities

In order to prevent and handle emergent environmental incident, the company has set up an emergency headquarters on environmental incident (hereinafter referred to as

Emergency Headquarters), in which the general manager acts as commander in chief, vice general manager on production as deputy commander in chief, and managers of all departments as assistant to commander.

Emergency Headquarters is composed of company leadership, production technology department and operation branch, maintenance branch, safety supervision office, general affairs department and finance department. Manager of the General Affairs Dept. is appointed as director of the directorate office, and heads of other departments as assistant directors of the office.

The field executive mechanism of the Directorate is formed by its Environmental Protection Team, the Production Control Team, the Fire Control Team, the General Team, the Salvage Team and the Communication and Press Team. The Directorate operates under the command of:

(1) General Director

- Execute the guidelines, policies and regulations of the state and the local authorities and the superior offices on environmental safety, and organize the preparation of emergency plans for emergent environmental incidents;
- Build the emergency rescue team for emergent environmental incidents;
- Keep surveillance on the progression of the accidents, appoint the field commanders, and support the work of the emergency response team;
- Determine whether it is necessary to call for external supports or salvages, according to the incident profile and the possible development of the situation. Accept the instructions and mobilizations from the superior emergency commanding authorities, and provide assistance for the handling of the incidents;
- Approve the initiation and termination of the emergency plan;
- Prepare the internal accident report and the report to the government, and provide assistance for the efforts of environmental recovery, accident investigation and the summary of experiences and lessons by relevant authorities;
- Review and update the emergency plans from each level of the Company;
- Organize the external review of the plans.

(2) Executive Office of the Directorate

- Prepare the emergency and preventive facilities, equipment (like the leak-stopping tools, emergency lagoons, protective equipment, rescue apparatus and emergency transports, etc.) and emergency supplies, particularly for the storage of chemicals capable of processing, dissolving and absorbing the pollutants.
- Provide the organized training courses on emergent accident salvage, and rehearse the emergency plan. Provide publications on the nature of major chemicals used by the plant and the knowledge on emergency rescue to the neighboring companies and villages.
- Report the emergent environmental incidents and the possible scale of influence;

- Conduct inspections and supervisions to make sure the preventive measures against emergent environmental incidents and emergency salvage preparations are properly made. Supervise and assist the relevant sections to eliminate the leakage and spillage toxic and hazardous substances.

- Determine the grade of the incident, and notify the grading to General Director. Organize the execution of the Company's emergency plan, contact and mobilize the emergency teams, and coordinate their works in site. Approve and execute the provisional emergency plans, and determine whether to seek external help in emergency cases.

(3) Emergent Incident Response Team

- Environmental Protection Team

Conduct the periodical inspections on critical environmental risk sources, and on the construction and operation of emergency facilities. Show up in the place of incident timely to organize investigations determining the nature and magnitude of the hazard, with the reports submitted to the office immediately. Prepare the pollutant disposal plans, determine the scale of pollution, carry out assessments on the influence of the incident, and prepare and organize the implementation of the recovery plans. Provide assistances for the environment monitoring practices undertaken by the superior authorities.

- Production Control Team

Organize the cutoff and transportation of materials in the incident site, and coordinate the operation of production facilities and the supply and utilization of fire-control water and steam. Coordinate the sewage emission procedure of other equipment and auxiliary devices. Organize the salvage team to conduct the system blocking and diversion works. Coordinate the operations of material recovery and sewage processing and storage. Organize the resumption of the production afterwards.

- Fire control team

Responsibilities: Rescue and evacuate the wounded and trapped personnel from the incident site. Organize the execution of the fire-control, gas protection and salvage plans in the site. Supply and distribute the protective equipment to the emergency response personnel in site. Perform the decontamination of the pollutants in site, with the water supply for fire control and decontamination being properly utilized.

- General Team

Establish the provisional medical center in the nearby safety zone, where the wounded are attended, and critical ones are transferred to hospital for further treatments. Arrange the vehicles, and determine the destination hospitals for rescue missions. Make casualty statistics. Execute the rescue plan according to the natures of the injury and toxicity.

Evacuate the personnel and guard the incident site. Secure the traffic for rescue missions. Organize the evacuation of personnel in the potentially influenced areas, and protect the security of the evacuated area. Protect the security the incident site and the surrounding areas.

Allocate the internal and external emergency supplies to secure the supply. Organize the delivery of such supplies, and detail vehicles for the transportation of pollution prevention supplies.

Coordinate and allocate the household supplies and personnel transportation. Make sure the site communication is well functioning. Perform the recording, videotaping and photographing of the incident site. Draft the notes and circulars published by the Directorate.

Provide consolations for the employees and the neighboring residents, and contact the local authorities as per the instructions of the Directorate, if necessary, for evacuation and pacification.

- Salvage Team

Confirm the cutoff of the disconnecting valve. Maintain and control the electrical equipment. Control and cut off the combustion sources. Shut off the external gate of the sewage processing system. Provide the existing supporting equipment and documents and those available nearby for the salvage efforts.

- Communication and Press Team

Receive the visitors from press, government agencies and other authorities. Handle the publication of the incident information.

5.3.4 Reporting and notification

In case of accidents, the National Response Plan for Emergent Environmental Incidents, the Practice of Notification for Emergent Environmental Incidents by Environmental Protection Administrations (Trail) and other governmental regulations should be followed to report the incident to the Directorate immediately, and to notify the incident to the superior authority and the local government at the same time, maintaining a 24h contact with the authorities to facilitate the corresponding salvage efforts.

5.4 Emergency responses and salvage measures

5.4.1 Responding procedure

In case of incidents escalating beyond the risk control of the company level (Grade I), the Communication and Press Team should immediately call for external supports, allowing for the district authority to take responses, taking uniform command to initiate the emergency plan at the district level.

The company level response (Class II response) emergency command is charged by the company emergency rescue headquarter, general manager holds the post of commander in chief and deputy general manager takes the job of deputy commander in chief for organization and command of emergency rescue work of the company, if the general manager and deputy general manager is not in the company, the minister of integrated management works as a temporary commander in chief and is responsible for the emergency rescue work (issue emergency action, resource allocation and emergency

command). All functional departments should initiate their emergency plans by their responsibilities.

Department level response (Class III response) emergency command is charged by the production supervisor and immediately set up the workshop event emergency command department based on the shift supervisor and team leader, production supervisor works as commander for the organization and command of workshop emergency work. In case of incident escalating beyond the control of the workshop, the commander should report the situation to the Directorate of the Company, and upgrade the response to the company level (Grade I).

Post (shift) level response (Class IV response) emergency command is charged by the shift supervisor, immediately set up the team emergency event department based on staff on duty, shift supervisor works as commander for the organization and command of team emergency work. In case of incident escalating beyond the control of the team, the commander should report the situation to the Directorate of the Company, and upgrade the response to the workshop level (Grade III).

5.4.2 Emergency measures

The field response team should be equipped with professional protective gears fitful for the specific situations, along with other safety measures. The incident site emergency access procedure should be strictly followed.

The Directorate in site is responsible for the protection of the local residents, including:

- Notifying the residents to take necessary protective measures according to the nature of the incident;
- Instructing the responsible department to organize the evacuation of the residents to safety, and determining the means of evacuation according to the weather and geographical conditions and the population density;
- Set up the emergency shelter outside the safety boundary of the incident site;

The entity and individual responsible for the emergent environmental pollution incident and the supervising administration of such incidents should, upon the detection of the incident, report the incident to the Environmental Protection Agency of the government in 1 hour, and organize the field investigation immediately. It is allowable to bypass the reporting chain in urgent cases.

(1) Field Response Measures for Emergent Environmental Incidents

The responsible entity in the emergency environmental incidents should take immediate actions to control or cutoff the source of pollution, taking all possible measures to control the situation, in order to prevent the secondary pollution and the derivative incidents. The field rescue team should be organized immediately if necessary to reduce the casualty and property loss.

Meanwhile, it should be determined that whether the incident is severe enough to be reported to the superior office; the Grade I incidents must be reported to the executive

office of the direct government, the district environmental protection administration and relevant experts, with necessary assistances being provided for the environmental monitoring station to gather up the environmental information, in order to further strengthen the existing responsive measures. Requests for support should be sent to the emergency response offices of the neighboring companies, if necessary, when taking the above measures. The superior government (or emergency response commission) and the superior administration should be notified of the incident according to the regulations on information disclosure.

Individuals in the contaminated area should be evacuated to safety, and irrelevant individuals should be barred from the area. The emergency response personnel should be equipped with self-contained breathing apparatus and chemical protection suits. No direct contact with the leaked substance. Conduct the leakage-stopping working safely. The flushing water used to dilute the pollutant should be drained to the sewage system. The pollutant absorbed by earth and gravel should be neutralized by large volume of water before being drained into the sewage system. In case of severe leakage, the pollutant should be gathered with a cofferdam, and then collected, transferred and recycled, or should it be subject to nuisanceless treatment before been discarded.

5.4.3 Emergency monitoring

In case of unexpected environmental events, the company shall timely contact with Guandu District Environmental Protection Bureau and the Guandu District Environment Monitoring Station will make on-site emergency monitoring of accident scene and external air and water environment

5.4.4 Termination of emergency

The emergency for those situations that meet the following requirement is qualified to be terminated:

- (1)The scene of incident has been under control, and the conditions for the incident to occur are removed;
- (2) The leakage or release of pollution source has been limited within a stipulated scope;
- (3) The hazard caused by the incident has been thoroughly removed and can not cause any new incident;
- (4) It is not necessary to continue to adopt professional emergency disposals at the incident site;
- (5) Necessary measures have been taken for protecting the public from any secondary danger。

6 Environmental training plan

6.1 Goal and content of training

To ensure the effective implementation of the plan for environment protection management, related staffs shall have relatively rich environmental knowledge and high skills in environmental protection. Therefore, the personnel who participate in the project management and construction shall accept related environmental training so as to guarantee the effective implementation of environmental protection measures.

- Environmental regulations: The related governors to environmental protection management shall learn domestic environmental legal system and its constitutions, related World Bank environmental policies, the legal liabilities regulated by environmental laws, "Regulations on the Administration of Environmental Protection Management for Construction Project", local environmental protection regulations and rules, and the plan and schedule for local national economy and social development to help administrative staffs learn laws and act by laws.
- Environmental monitoring: The related governors to environmental protection management shall learn the methods for environmental monitoring, regulations and methods for sampling water quality, air, living beings, etc., the analyzing methods, standards, and data reorganization for environmental parameters, and the requirements for analysis techniques.
- The treatment and reaction capacity for environmental accidents: The related governors to environmental protection management shall learn the occurrence mechanism of accident potential, corresponding preventive measures and methods, and emergency treatment methods after the occurrence of the accident.
- Public participation and public contact: The related governors to environmental protection management shall learn the types and methods, basic methods, and importance of public participations, and basic methods and procedures related to public participation.
- Pollution control and management during construction period: The contractor of the construction work shall learn the constructive procedure of the project and the links that will produce pollutions, the pollution controlling methods during construction period, and management and monitoring measures.

6.2 Regular training plan

The KongGang Incinerator has regular training plan, as described in this section. The GEF project will support enhanced training for incinerator manager and operators, which is described in section 6.3.

The KongGang Incinerator offers the staffs three-level training, namely, group-level training, department-level training, and company-training, formulates corresponding annual training plan, as well as examines and evaluates the results of the training so as to improve the staffs' capacity of emergency treatment and environmental pretreatment.

6.2.1 Emergency drill and training

- (1) A drill that consists of environmental incidents is organized every year to imitate the organization and command of emergency measures.
- (2) A special drill is organized every year: A drill where the members of special groups of the company respectively carry out special operations included in emergency rescue tasks.
- (3) At the beginning of each year, the annual, quarterly, and monthly emergency training plans will be formulated.

6.2.2 Special trainings on environmental laws and regulation as well as related environmental knowledge

- (1) In terms of knowledge related to the raw and auxiliary materials the company deals with, security features of chemicals, fire equipment, the usage of tools for emergency rescues, the basis knowledge of rescuing people on the spot, related environmental laws and regulations, etc., every year, the company delivers a written publicity, an oral publicity, and corresponding lectures to improve the staffs' environmental preparedness and capacity of emergency treatment.
- (2) Special training shall be conducted on the new laws, regulations, national standards, industrial standards and technical standards on environmental protection to ensure that the existing staffs have some acquaintance with the relevant existing regulations for the purpose of promoting their legal awareness.

6.2.3 Environmental risk identification

- (1) The staffs shall be organized to be familiar with the features, sources of danger and points of risks of the relevant environmentally protective facilities and equipment and the relevant preventive measures.
- (2) New contractors and staffs of the factory shall be treated with three-level education to ensure that each employee be familiar with the sources of danger and points of risks of the environment and the relevant environment system of the company.
- (3) Risk analysis, analysis evaluation and the corresponding preventive measures against pollution sources of the company shall be quarterly made to effectively promote the staffs' awareness of sources of environmental risks and dangers and to avoid the environmental pollution accidents.

6.2.4 Budget for training expenditure

Training shall be planned once each quarter. Budget for each training shall be about RMB 30,000 and that for training each year shall be RMB 120,000.

6.3 Enhanced training for incinerator managers and operators

The GEF project would fund consultant services to design training materials and train approximately 250 MSW incinerator managers and operators in BAT and BEP. The program would be implemented in three phases: (i) training of eight trainers, (ii) training of

approximately 30 managers and operators from incinerators in Kunming, and (iii) training of approximately 200 managers and operators from across China. Based on the experience with the pilot program, consultants would prepare recommendations for the institution of a training and certification requirement for MSW incinerator operators. Detailed training program and materials will be developed during project implementation.

7 Environmental reporting

7.1 Reporting

During construction period of the project, organizations of environmental management shall regularly (once each quarter according to the monitoring plan) authorize the local environmental monitoring center to conduct the environmental monitoring and to report to the engineering management office and the local environmental protection department. The contents of the report at this stage shall cover the construction progress, main construction contents and methods, remarks on environmental impacts incurred and implementation of mitigation measures of environmental impacts.

During operation period of the project, the company shall conduct environmental monitoring according to the operation situation of the project and timely submit the monitoring report to the local environmental protection department. Contents of monitoring reports:

- (1) Monitoring time, frequency, point position, monitoring items, methods and quality control program;
- (2) Monitoring data and statistical analysis;
- (3) Description of operation conditions of the facilities during monitoring period;
- (4) Remarks on abnormal working conditions.

To sum up, construction unit of the project shall conduct the monitoring and plan the filing as per construction period and operation period and shall submit one semi-annual monitoring report to the environmental protection department and the World Bank.

7.2 Record filing

For the effective operation of environmental management system, organizations of environmental management shall establish a perfect environmental protection record system and keep the records in the following aspects:

- (1) Requirements of laws and regulations;
- (2) Project approval;
- (3) Environmental factors and relevant environmental impacts;
- (4) Training for management and construction personnel;
- (5) Inspection, verification and maintenance construction and management activities;
- (6) Record on environmental quality monitoring data;
- (7) Conformity analysis of environmental quality;
- (8) Effectiveness of the corrective and preventive measures in case of disconformities;

(9) Information of the parties concerned of the project;

(10) Examination and verification;

(11) Review.

Besides, the necessary control shall be conducted on the above-mentioned records including identification, collection, cataloguing, filing, keeping, management, maintenance, inquiring, storage life, disposition and others of the records.

8 Public Engagement Plan

The GEF project will support a comprehensive public engagement program that consists of public disclosure of emission data and public awareness raising aspects. Such program include :a) organizing residents to visit nearby MSW INCINERATION plants; b) installing display panels at plant gates to disclose online monitoring information; c) disclosing online monitoring data of the MSW INCINERATION plants to the public; d) conducting publicity events annually; e) strengthening the online monitoring system for incineration gases; and f) developing an information disclosure and public participation plan.

Of particular important is the disclosure of incinerator operating and emission data. Key emission and plant data would be disclosed on a website that the general public can access at will. Thus, a concerned citizen could observe real time SO₂, CO, NO_x and other emissions (monitored real time by CEMs); several key process variables such as the furnace temperature, and activated carbon feed rate; and periodic postings of annual stack test results for dioxins, heavy metals and the like.

8.1 Information Disclosure and Public Participation Strategy

To ensure that residents have a good source of information on MSW incineration pollutants (especially incineration gases), ensure their equal participation in emission reduction, improve their awareness of public participation, environmental action teams will be established at the community level. Trials will be conducted within 3km around the MSW INCINERATION plants, and then the practice will be extended gradually.

8.1.1 Information Disclosure and Public Participation Program

The information and Public Participation disclosure strategy is established on the basis of improving existing modes of information disclosure and the public needs for information disclosure. The estimated cost of information interface establishment is CNY 120,000, and the publicity and interactive activities is CNY 374,400.

The monitoring index and cost estimate will be implemented by PMO. Public participate expert will be engaged by PMO to in charge of the information and public participation details. The payment of public participate expert is CNY 30,000 man-month, and the total cost is 20 man-month X 30,000= CNY 600,000.

Table 8-1 Information and Public Participation Disclosure Strategy

Content	Targeting people	Channel	Time and frequency	Implement institution	Monitoring index	Estimated cost (CNY)
Details and target of GEF project	Residents around MSW INCINERATION plants	Community bulletin board Website of EPD	During the preparing stage of GEF project	PMO The village committee	Number of posters on the community bulletin board The publicity announcement on the website of EPD	Information interface establishment: CNY120,000 Publicity and interactive activities: CNY 374,400
Disclose the operating and online monitoring data (see table 5-19 for details of online monitoring data)	Residents around MSW INCINERATION plants, especially vulnerable group which include the aged, women, children and disabled.	Community bulletin board Website of EPD LED panels	Community bulletin board: Once per month Website of EPD :Once per day LED panels: Instant	PMO Information center of EPD The village committee	Number of incineration data posters on the community bulletin board per month The publicity of monitoring data on the website of EPD per day The publicity of online monitoring data on the LED panels.	
Disclose the monitoring reports of dioxin	Residents around MSW INCINERATION plants	Community bulletin board Website of EPD	Dioxin monitoring reports: 1 or 2 times per year	PMO Information center of EPD	Dioxin monitoring data and knowledge of dioxin on the community bulletin board The publicity of dioxin data on the website of EPD	
Popularize the knowledge of waste incineration and health. The knowledge publicity should be taken in an easy way to understand, such as chart, comic, etc.	Residents around MSW INCINERATION plants, especially vulnerable group which include the aged, women, children and disabled.	Brochure Community bulletin board Website of EPD Media Events organized by MSW INCINERATION plants	Irregularly	PMO Information center of EPD UMB MSW INCINERATION plants Public participation expert	Reach to 80% awareness rate of incineration, health and dioxin knowledge in the residents around MSW INCINERATION plants	
Activities on	Residents around	Brochure	Once per half year	PMO	Waste sorting and	

<p>popularizing the knowledge of waste sorting and incineration</p>	<p>MSW INCINERATION plants, especially vulnerable group which include the aged, women, children and disabled. Insure 30% women of participation</p>	<p>Community bulletin board Website of EPD Media Events organized by MSW INCINERATION plants</p>		<p>Information center of EPD UMB MSW INCINERATION plants Public participation expert</p>	<p>incineration knowledge on the community bulletin board around the MSW INCINERATION plants Column of waste sorting and incineration knowledge on the website of EPD Reach to 80% awareness rate of waste sorting and incineration knowledge in the residents around MSW INCINERATION plants</p>	
<p>Interaction of MSW INCINERATION plants and the residents around the MSW INCINERATION plants, insure 30% women participation in the activities.</p>	<p>Residents around MSW INCINERATION plants, especially vulnerable group which include the aged, women, children and disabled.</p>	<p>Residents visit to the MSW INCINERATION plants FDGs between residents and the MSW INCINERATION plants</p>	<p>1 or 2 times per year</p>	<p>PMO MSW INCINERATION plants Village committee Public participation expert</p>	<p>Frequency of residents visit to the MSW INCINERATION plants Frequency of FDGs between residents and the MSW INCINERATION plants The proportion of women participation in the activities.</p>	

Table 8-2 Online monitoring data of MSW INCINERATION plants

Wuhua MSW INCINERATION plant	Xishan MSW INCINERATION plant	DongJiao INCINERATION plant	Konggang MSW INCINERATION plant
<ul style="list-style-type: none"> · Dust · Flu gas velocity · SO₂ · NO_x · O₂ · CO · Flu gas temperature · Standard state flow 	<ul style="list-style-type: none"> · Dust · Flu gas velocity · Flu gas pressure · SO₂ · NO_x · O₂ · CO · HF · Flu gas temperature · Standard state flow 	<ul style="list-style-type: none"> · Dust · Flu gas velocity · SO₂ · NO_x · O₂ · CO · Standard state flow 	<ul style="list-style-type: none"> · Dust · Flu gas velocity · Flu gas pressure · SO₂ · NO_x · CO · HF · Flu gas temperature · Standard state flow

Details of information disclosure:

During project implementation, the enterprises should put information on record timely, and disclose it to the public on the website of the provincial environmental protection department. Enterprises should maintain continuous information monitoring, ensure the effectiveness of information, and make it available timely upon request.

The following information should be put on record timely: 1)Monitoring results of SO₂, CO, NO_x and other incineration gases; 2) Monitoring results of wastewater, noise and MSW emissions; 3) Monitoring results of dioxin emissions issued by an authoritative third party; 4) Incinerator operating conditions, e.g., temperature;; 5) Technical upgrading of MSW incineration of the MSW INCINERATION plants; and 6) Publicity materials and photos of information disclosure.

8.2 Grievance Redress Mechanism

If any MSW INCINERATION plant pollutes the environment or affects the physical health of any nearby resident during operation, a resident may file an appeal through the following procedure:

Stage 1: The resident reports to the community committee in writing or orally, which should negotiate with the MSW INCINERATION plant and give a reply within two weeks.

Stage 2: If the resident is dissatisfied with the disposition of Stage 1, he/she may file a written or oral appeal with the district environmental protection bureau, which should make a disposition within two weeks.

Stage 3: If the resident is dissatisfied with the disposition of Stage 2, he/she may file a written or oral appeal with the municipal environmental protection bureau, which should make a disposition within two weeks.

Stage 4: If the resident is still dissatisfied with the disposition of Stage 3, he/she may file an appeal with a local court in accordance with the Civil Procedure Law of the People's Republic of China and be subject to court judgment. Currently, the municipal and district environmental protection bureaus have director-general mailboxes and environmental appeal hotlines.

Residents may also file an appeal through Kunming Digital Urban Administration or online directly.

Table8-4 Grievance Redress Contact of GEF Project

Unit	Contact	Tel.
PMO	Office	0871-64166316
UMB	Office	0871-63190771
Wuhua MSW INCINERATION plant	Office	0871-68307396
DongJiao MSW INCINERATION plant	Office	0871-67396512
Xishan MSW INCINERATION plant	Office	0871-68599896
Konggang MSW INCINERATION plant	Office	0871-68017385

This procedure should be included in the GEF project publicity during every stages of the project, and the residents will be informed via bulletin board and brochure. Monitor the effect of grievance redress will be included in the process of M&E.

8.3 Other Public Engagement Programs

The project should establish linkage mechanism with mass media and valuing the role of new media, to this end, the project will a) disclose project information completely and objectively online; b) introduce technical information of the MSW INCINERATION plants to media at the operation stage; and c) explaining major negative events and reports openly and transparently, and proposing corresponding solutions for public .

MSW incineration plants, EPB and UMB will work together to carry out the program to make sure during project implementation the project information, incinerator operating conditions and major events relevant to the incinerators are accessible through internet and/or public media.

9 Legal implication of environmental management plan

Environmental management plan shall have the corresponding legal force in view of environmental standards, clean production, total quantity control, relevant project documents and agreements.

(1) Environment standards shall be the regulations on various works related to environment in accordance with the environmental protection law and the relevant policies to protect the population health, prevent environmental pollution, prompt the virtuous circle of ecology, utilize the resources reasonably and promote the economic development. Since the companies are difficult to avoid the pollutant emission during production, to prevent that the companies transfer the internal costs to the external environment and to balance the emission rights among the companies, the governments on behalf of public interests shall control the emissions of pollutants and thus the standards for emission of pollutants emerge. This represents the external index of characteristics of pollution sources on environmental effect. It requires that the technical measures against continuous emission and reduction of pollutants at the sources of pollution shall be made and the technical compulsory measures with legal binding force shall be implemented against the behaviors of pollutant emission.

(2) Clean production refers to continuously apply the comprehensively preventive environmental protection strategies to the production and products so as to reduce the human and environmental risks. In connotation, clean production substantially means a production mode of taking the wholly preventive environmental strategies against the production process and the products to reduce or eliminate their possible danger on human and environment and meanwhile to fully meet the human demands and maximizing the social and ecumenical benefits. Law of the People's Republic of China on Promoting Clean Production was issued and publicized on June 29, 2002 In the ninth session of the standing committee of the National People's Congress of the People's Republic of China and has been executed since January 01, 2003.

(3) Total quantity control of pollutant emission (shorted as total control) means to control under the scope of some amount the total quantity of pollutants at some control area (such as administrative region, river basin, environmental functional area, etc.) which is taken as a complete system so as to meet the environmental quality requirements at the area. Total control shall include the contents in the following three aspects: total amount, area and time of pollutant emission. Total control system means a legal system that the national environmental management authorities decide the total amount of pollutant emission at the area according to the surveyed regional environmental capacity and individually distribute to the companies in the area their own mode of total amount limit of pollutant emission according to the reduction plan of total amount of emission.

(4)Details of the environment management plan is a part constituting the tender document and the construction contract signed between the project owner and project contractor

(5)This project is executed by the World Bank, complying with the environment

management plan is specified as one clause in the project agreement and grant agreement between the World Bank and the Chinese government, the environment management plan shall come into legal effect therefore.

Therefore, the project construction unit shall strictly implement environmental pollution prevention measures, environment risk elimination measures, accident emergency plan, environment supervision plan, regular environment report of environmental impact, environment information discussion plan, environment protection record plan, environment protection supervision plan to maintain the legal effect of environment management plan.

10 EMP Budget

The project by nature is an environmental protection project and will be supported by GEF grant USD12 million and counterpart funding from national, provincial, municipal level and participating incinerators. Total budget is about USD 60 million.