The following is the text of a letter and the summary of the report issued by MWH Environmental Engineering (Shanghai) Co., Ltd., an independent environmental consulting company, in connection with its environmental assessment on the production sites of the Group.

29 May 2007

The Directors
Tianneng Power International Limited
Kingsway Capital Limited

Dear Sirs,

MWH Environmental Engineering (Shanghai) Co., Ltd. (MWH) was engaged jointly by Tianneng Power International Limited (Tianneng Power) and Kingsway Capital Limited to perform an Environmental Assessment at their five existing sites. The five sites are involved in the various stages of the manufacturing of lead-acid batteries and other products. They are located in Changxing in Zhejiang province, Shuyang in Jiangsu province, and Wuhu in Anhui province, People's Republic of China (China).

The purpose of this Environmental Assessment was:

1) to assess and document the environmental regulatory status of the sites with respect to the local Chinese regulations,

2) to compare local environmental standards to relevant international environmental standards, and

3) to assess whether corrective actions would be required if international environmental standards were to be applied at the sites.

Scope of Work

The Environmental Assessment at each site consisted of:

- Review of available environmental documents to obtain information on environmental regulatory frameworks, discharge standard, permit requirements and other related information.

- Interviews with site personnel, including Environmental, Health and Safety (EHS) manager and operations manager to obtain information on the environmental settings, pollutants discharge, abatement measures, environmental permitting issues and other related information.

- A visual inspection of the five sites to verify information provided and assess other potential environmental issues.

Limitations

This report is based on the data and information collected during the Environmental Assessment conducted by MWH. The assessment is based solely on the site conditions encountered at the time of the site investigations from March 21 through 25, 2007. No assurance is made regarding changes in conditions subsequent to the time of investigation. In preparing this report, we have relied solely on documentation provided by Tianneng Pawer. No independent testing was conducted.

In evaluating the five sites, MWH has relied in good faith on information provided by individuals noted in this report. We assume that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions, misinterpretations or fraudulent acts of the persons interviewed or contacted.

Summary of Comparison

Based on our review of relevant international standards, lead air emissions and wastewater discharges have been restricted in most developed countries like USA, Japan and Members of the European Union. In USA, there are specific regulations for battery manufacturing on lead containing wastewater discharge and specific regulations for battery smelters on lead air emissions. Environmental concerns of lead have also been well recognized in China, and there are specific regulations for lead emissions and discharges.

Although standards differ greatly in terms of mass loading, concentrations, etc, the comparison indicates that Chinese standards are generally more stringent than other available international standards for air emissions. For waste management, the Chinese standards are similar to the other available international standards. For wastewater discharge, the Chinese standards are not as stringent as other selected international standards, however, they apply to discharge to municipal wastewater collection systems for further treatment by local wastewater treatment plant rather than to direct discharge to the environment. A review of the monitoring data for the Tianneng Power sites indicates that the current wastewater discharges meet some other countries discharge standards such as the ones for France and Germany. Standards for Japan and the UK apply to direct discharge to surface water bodies, which is not the case for the Tianneng Power sites.

As a result, it was concluded that no additional corrective actions would be required for the five sites with respect to the status of their environmental discharges to the environment in light of the relevant applicable international environmental standards.

On the assumption and under the unlikely event that the Tianneng Power sites were to discharge wastewater directly to the environment and have to comply with the strictest standards for direct wastewater discharge to the environment and/or with the use of the best available technologies, some corrective actions would be required involving further treatment or monitoring. A professional opinion of the costs associated with these

corrective actions is provided below along with an opinion on the time required. These opinions have been developed to focus on the presence of lead in the wastewater discharge from each of the sites. Costs would range between US$750,000 to US$1,500,000 requiring between 6 months to 2 years.

We enclosed here with a summary report of our assessment. This summary report fully and accurately reflects all material information presented in the full version of the report.

Yours sincerely,

For and on behalf of
MWH Environmental Engineering (Shanghai) Co., Ltd.
Claire Fiessinger
General Manager — Consulting Services

Note: This report was compiled by the following environmental consultants:

Ms. Claire Fiessinger, Principal Consultant, EHS Consulting. Ms. Fiessinger holds a BSc in Chemical Engineering from University of Toronto in Canada, a MSc in Civil and Environmental Engineering from Stanford University in USA, and a MBA from INSEAD in France. Ms. Fiessinger is the General Manager of MWH consulting services in Shanghai. She offers over 14 years international experience in environmental engineering. She has worked on a variety of projects including environmental due diligence assessments, field investigations, risk assessments, remedial design, pilot studies, site decommissioning and the supervision of remediation works for both private and governmental clients. Based in China since 2003, Ms. Fiessinger conducts around fifty Phase I and II projects a year for multinational companies in China and is familiar with the local regulatory framework.

Mr. Jeffrey Yuan, Senior Consultant, EHS Consulting. With a BSc and MSc in Environmental Engineering from Tsinghua University, Jeffrey Yuan offers over four years experience in the field of environmental, health and safety consulting. He is involved in environmental due diligence, EHS compliance audit, site characterization and remediation of contaminated soil/ groundwater. As an environmental consultant, he has conducted numerous projects involving EHS Due Diligence, EHS compliance audit, environmental site assessment, soil and groundwater investigation, and remediation of contaminated land. He is also responsible for the internal EHS laws and regulations database construction and EHS newsletter within MWH, and is therefore very familiar with the EHS laws and regulations in China.

Ms. Karie Sai, Junior Consultant, EHS Consulting. Ms. Sai holds a BSc in Chemical Mechanics from Hebei University of Technology in Tianjin and MSc in Chemical Process Equipment from East China University of Science & Technology in Shanghai. Ms. Sai is an Environmental Consultant with one year experience in environmental due diligence, soil and groundwater investigation. She has conducted several EHS Due Diligence for multinational clients in China.

Summary of the MWH Report

1 INTRODUCTION

1.1 Purposes

MWH Environmental Engineering (Shanghai) Co., Ltd (MWH) was engaged jointly by Tianneng Power International Limited (Tianneng Power) and Kingsway Capital Limited to perform an Environmental Assessment at their five existing sites. The five sites are located in Changxing in Zhejiang province, Shuyang in Jiangsu province, and Wuhu in Anhui province, People's Republic of China (China). The site visits were conducted by Jeffrey Yuan and Karie Sai of MWH from March 21 through March 25, 2007. The five sites are involved in the various stages of the manufacturing of lead-acid batteries and other products.

Tianneng Power is in process of applying for listing in the Hong Kong stock exchange and thus requires that an independent consultant carry out an Environmental Assessment, whereby the current Chinese discharge standards that apply to the facilities will be compared to a selection of relevant international environmental standards. Brief information about the five sites is summarized below.

Site Name	Site Location	Total Area
Zhejiang Tianneng Battery Co., Ltd	Meishan Industrial Park, Changxing, Zhejiang province	105,000 m^2
Zhejiang Tianneng Battery (Jiangsu) Co., Ltd	No.1 Tianneng Industrial Park , Tianneng Road, Shuyang County Economic Development Zone, Jiangsu province	131,200 m^2
Tianneng Battery (Wuhu) Co., Ltd	Xikaihu Industrial Zone, Wuhu City Economic and Technology Development Zone, Wuhu City, Anhui province	40,595 m^2
Zhejiang Changxing Tianneng Power Supply Co., Ltd	Meishan Industrial Park, Changxing, Zhejiang province	54,666 m^2
Zhejiang Tianneng Electronic Apparatus Co., Ltd	Zhicheng Town, Changxing County, Zhejiang province	310,000 m^2

The purpose of this Environmental Assessment was:

1) to assess and document the environmental regulatory status of the sites with respect to the local Chinese regulations,

2) to compare local environmental standards to relevant international environmental standards, and

3) to assess whether corrective actions would be required if international environmental standards were to be applied at the sites.

1.2 Scope of Work

The Environmental Assessment at each site consisted of a series of interviews with relevant parties, a review of readily available documents, and a site inspection. The assessment included:

- Review of available environmental documents to obtain information on environmental regulatory frameworks, discharge standard, permit requirements and other related information.

- Interviews with site personnel, including Environmental, Health and Safety (EHS) manager and operations manager to obtain information on the environmental settings, pollutants discharge, abatement measures, environmental permitting issues and other related information.

- A visual inspection of the five sites to verify information provided and assess other potential environmental issues.

1.3 Project Implementation Methodology

Interview

The following persons were interviewed during our site visits:

Mr. Yang Yuanling	Secretary of Board of Directors of Tianneng Power International Limited
Mr. Ren Anfu	General Manager Assistant of Zhejiang Tianneng Battery (Jiangsu) Co., Ltd
Mr. Chen Jianqiang	Deputy General Manager of Zhejiang Tianneng Battery (Jiangsu) Co., Ltd
Mr. Hu Jianqiang	Deputy General Manager of Zhejiang Tianneng Battery (Jiangsu) Co., Ltd
Mr. Zhang Kaihong	General Manager of Tianneng Battery (Wuhu) Co., Ltd

Document Review

The first stage of the project implementation incorporated a review of relevant documentation held by site management, where available. Some documents relating to the site activities were provided, including the following items:

- Brochure of Tianneng Power International Limited;
- Site Location Map of the five sites of Tianneng Power International Limited;
- Current Site Layout of the five sites;
- Original Site Layout of the five sites;
- Land Use Certificate for the five sites;
- Pipeline Layout;
- Production Flow Chart;
- Geological Investigation Report;
- EHS Management System Certificate;
- Environmental Impact Assessment Report (EIA);
- "Three Synchronies" Monitoring Report and Approval Forms;
- Annual Pollution Discharge Registration Form for air, wastewater, noise and solid waste;
- Pollution Discharge Permits for air, wastewater, noise and solid waste;
- Environmental Monitoring Documents (including wastewater, air, emissions and noise);
- Solid Waste List and Disposal Documents (contracts, vendor license, and five-sheet form);
- Records of Environmental Incidents and Emergency Actions taken regarding spills, leaks, air emissions.

Site Inspection

The site inspection was based on qualitative observations and addressed items of potential environmental concern, including:

- air emissions;
- wastewater discharge;
- waste segregation and storage; and
- chemical management and storage.

1.4 Limitations and Exception of Assessment

This report was intended to provide a preliminary assessment of the current environmental conditions at the five sites of Tianneng Power.

This report is based on the data and information collected during the Environmental Assessment conducted by MWH. The assessment is based solely on the site conditions encountered at the time of the site investigations from March 21 through 25, 2007. No assurance is made regarding changes in conditions subsequent to the time of investigation. In preparing this report, we have relied solely on documentation provided by Tianneng Power. No independent testing was conducted.

In evaluating the five sites, MWH has relied in good faith on information provided by individuals noted in this report. We assume that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions, misinterpretations or fraudulent acts of the persons interviewed or contacted.

1.5 MWH Project Team

MWH-Shanghai possesses all of the requisite skills needed to provide high-energy leadership, proven expertise and substantial resources to complete a project such as this environmental assessment.

MWH is a global leader in providing knowledge-driven services. With more than US$1 billion in revenue, our 6,100 specialists in more than 36 countries provide premiere solutions to municipalities, government agencies, multinational companies, industrial concerns and military organizations worldwide.

Since 1996, MWH Shanghai has been very active in China, assisting multinational clients who are investing in new or existing manufacturing facilities across the country. MWH staff have worked on hundreds of manufacturing plants and sites in China completing environmental health and safety due diligence,

environmental health and safety compliance audits, environmental impact assessment, remediation design and cost estimates, and providing evaluation and design services for wastewater, air treatment systems, hazardous materials storage facilities and ISO-14000 training and support services.

MWH has assisted numerous industrial clients in China with regard to environmental and health and safety issues. Representative clients are listed in the table below along with the dates when the projects where completed in the last three years

Client Name	Services Provided	Year Completed
Automotive Industry		
Delphi Automotive System	EHS Audit/EMS Environmental Due Diligence (EDD) Environmental Engineering and operation supports	2004, 2005, 2006, 2007
Eaton	EHS Audit/EDD Environmental Engineering	2004, 2005, 2006, 2007
Federal Mogul	EHS Audit/EMS Environmental Due Diligence	2004, 2005, 2006, 2007
TRW	EHS Audit/EMS Environmental Due Diligence	2004, 2005
Aircraft Engines		
Honeywell	EHS Audit/EMS Environmental Due Diligence	2004, 2005, 2007
Chemicals/Pharmaceutics		
3M	Environmental Due Diligence	2004
Bayer	Environmental Due Diligence	2006
Danisco	Environmental Due Diligence	2005, 2006

Client Name	Services Provided	Year Completed
Forbo	Environmental Due Diligence Wastewater Assessment	2005, 2006
Genencor	Environmental Due Diligence	2004
Monsanto	Environmental Due Diligence	2005
Rohm and Haas	EHS Audit/EMS Environmental Due Diligence Groundwater Monitoring	2004, 2005
Secco	Groundwater Monitoring Noise Assessment	2005, 2006, 2007
Electrical /Electronics		
Applied Materials	EHS Audit/EMS Environmental Due Diligence	2004, 2005
Intel	EHS Audit/EMS Environmental Due Diligence Environmental Engineering	2004, 2005
Philips	Industrial Hygiene	2006
Tyco	Environmental Due Diligence	2006
Mechanical, Construction & Others		
Alstom	Environmental Due Diligence Environmental Engineering	2004, 2005

Client Name	Services Provided	Year Completed
American Standard	EHS Audit/EMS Environmental Due Diligence Environmental Engineering	2006
Atlas	Environmental Due Diligence EHS	2004
Ebay	Environmental Due Diligence	2005
GE	EHS Audit/EMS Environmental Due Diligence Environmental Engineering	2004, 2005, 2006, 2007
General Cable	EHS Audit/EMS Environmental Due Diligence	2005, 2006
Masco	EHS Audit/EMS Environmental Due Diligence	2004, 2006, 2007
New Balance	Industrial Hygiene	2006
Oracle	Environmental Due Diligence	2004, 2005, 2006
Parker Hannifin	EHS Audit/EMS Environmental Due Diligence	2005, 2006

The MWH project team involved with this environmental assessment was selected for its extensive experience in reviewing similar manufacturing sites across China. The main individuals that reviewed the operations of Tianneng Power were:

Ms. Claire Fiessinger, Principal Consultant, EHS Consulting. Ms. Fiessinger holds a BSc in Chemical Engineering from University of Toronto in Canada, a MSc in Civil and Environmental Engineering from Stanford University in USA, and a MBA from INSEAD in France. Ms. Fiessinger is the General Manager of MWH consulting services in Shanghai. She offers over 14 years international experience

in environmental engineering. She has worked on a variety of projects including environmental due diligence assessments, field investigations, risk assessments, remedial design, pilot studies, site decommissioning and the supervision of remediation works for both private and governmental clients. Based in China since 2003, Ms. Fiessinger conducts around fifty Phase I and II projects a year for multinational companies in China and is familiar with the local regulatory framework.

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2 CHINESE REGULATORY FRAMEWORK

2.1 Major Environmental Regulations

In China, the national legislature is responsible for formulating and enacting relevant laws, and ensuring that they are implemented and enforced by national, provincial, municipal and local government administrations. Environmental regulations are formulated by the State Environmental Protection Administration (SEPA) and enacted into law by the People's Congress Committee, China's highest legislative body. Regional and local governments are also empowered to enact environmental regulations and standards, which may be stricter than national requirements or may contain parameters not covered by national regulations and standards.

Special industrial sector environmental standards are set by industrial ministries, in conjunction with SEPA and the State Technical Supervision Bureau (STSB). These standards are often stricter than national standards. In the past few years, more politically prominent industrial ministries have issued new environmental regulations. As a result of the rapid development of the environmental legal framework, there is often a degree of overlap between industry specific and other national and sub-national environmental legislation and regulations.

2.2 Integrated Site Permits

Environmental management in China is based upon the following major principles of management. These principles have been advanced to facilitate the integration of environmental protection into decision-making mechanisms and form the basis of China's regulatory framework. Implementation of these principles has been facilitated within the Environmental Impact Assessment Report (EIA Report) or Environmental Impact Form (EIF) and is encoded in the Environmental Protection Law. The environmental enforcement in China is continuously strengthening.

1. **Environmental Impact Assessment System** – a compulsory part of the permit process for any new projects, or those undergoing major expansion or changes. Suggestions for pollution mitigation are a requirement of EIA Report or EIF. Request to conduct an EIA Report or an EIF is based on the project characteristics. Level of environmental protection authority to approve EIA Report (EIF) is based on the industrial sector and total investment.

2. **Three Synchronies Policy** – controls pollution emissions by requiring new construction projects to include pollution control facilities. Include the following two procedures: (1) Project Design Approval – The environmental protection part of project design should be reviewed by the Environmental Protection Bureau (EPB) to ensure adequate pollution control facilities are included to meet EIA Report; (2) Three Synchronies Inspection Approval – Inspection and approval of the pollution control facilities by the EPB is required after construction and before operation commences. Generally, the Three Synchronies Inspection is undertaken within three months after the trial operation commences.

3. **Pollution Discharge Registration** – Based on national and local environmental regulations, new facilities that discharge pollutants shall trustfully report to and register with the local EPB based on the stipulations of the types, quantities and concentrations of pollutants, manner of discharge and destination of the pollutants as well as the types of pollution prevention and control facilities, and submit technical documents on pollution prevention and control system within one month of construction completion. If for any reason, the registration cannot be completed by this time, the facility must report to the local EPB and provide an explanation and schedule for submission.

4. **Pollution Discharge Permits** – facility-specific permits that set discharge limits for specified parameters involving air emission, wastewater discharge, solid waste and noise generation.

5. **Mass Loading Controls** – Outlines the proposed national ceiling for emissions of 12 hazardous pollutants. They are implemented at the national and local levels. Mass loading controls are seen as

developmental increments towards establishing environmental capacity standards for pollution-receiving bodies throughout China. Capacity standards are defined as the maximum sustainable load that can be absorbed by surface waters, the atmosphere, or land, without further quality deterioration. Mass loading control is implemented through the Discharge Permit Policy. Mass loading allocation is the first stage in implementing the pollution discharge permits. EPBs will issue permits after a facility is in compliance with both discharge concentration limits and the mass loading allocations.

6. **Pollution Discharge Fees and Fines** – According to the local EPB, the pollution discharge fee is currently regulated based on national pollution discharge fee regulation. The fee rate is determined based on pollutant concentration and the level of concentration in excess of the required standards. Wastewater discharges, which are in compliance with the required standards, are charged at the normal sewerage fee.

   Pollution fines are currently levied for major non-compliance related to air emissions, wastewater discharges and noise generation in China. The criteria for the fine follows the protocol established in the local Pollutants Discharge Fine Standards. The local authorities calculate fines according to the monitoring data provided by the local environmental monitoring station.

2.3 Air Emissions

The PRC Air Pollution Prevention and Control Law (2000) is China's main air protection legislation. The key features of this framework regulation include: provisions for the promulgation of national standards, with stricter local standards allowed; requirements for environmental impact assessments for large construction projects; and policies for preventing and controlling dust, exhaust and odor from boilers and chimneys. Ambient air quality standards are contained within the national *Air Quality Standard (GB3095-1996)*.

The Comprehensive Air Emission Standard (GB16297-1996) was promulgated at the end of April 1996 and was enforced from 1 January 1997. Under the 1996 regulation, standards for both fugitive and process emissions, based on stack height, are set for 33 priority air pollutants. Stack height interval categories are not the same for each pollutant group and standards are given as maximum emission rates (mass/time) and concentrations (mass/volume).

Generally, industrial facilities should meet Class II standards of GB16297-1996.

2.4 Wastewater

The Integrated Wastewater Discharge Standard (GB 8978-1996) applies to all enterprises and units discharging wastewater and has been implemented since January 1, 1998. Permissible discharge is determined according to the classification of the receiving water bodies, as defined under GB3838-2002, and the classification of pollutants to be discharged as defined under this standard.

Generally, an industrial facility that generates wastewater and discharges it to a municipal collection system linked to a wastewater treatment plant should meet Class III of *Integrated Wastewater Discharge Standard (GB 8978-1996)* as applicable at the sites. However, the maximum allowable concentration standards of the *Integrated Wastewater Discharge Standards (GB 8978-1996)* are applicable for those Type I pollutants, such as lead.

Storm water should be collected through a distinct collection system than the wastewater. If available, the site storm water should be discharged to the public storm water collection system.

2.5 Waste Management

Waste management practices in China, in general, are quite weak. The *Solid Waste Pollution Prevention Law* was revised on 29 December 2004 and became effective on 1 April 2005. This Law is enacted for the purpose of preventing and controlling environmental pollution by solid waste, safeguarding human health and promoting the development of socialist modernization drive. According to this law, all hazardous waste must be disposed of in accordance with the regulations and any enterprise that produces hazardous waste must report and register it with the local EPB. Organizations, which collect, store or dispose of hazardous waste are required to be licensed under *The Solid Waste Pollution Prevention Law.*

The *Solid Waste Pollution Prevention Law* defines that hazardous waste refer to "wastes listed in the national directory of hazardous wastes or wastes identified as having hazardous nature by identification standards or methods stipulated by the state". The directory of hazardous wastes was prepared by SEPA and became effective on 1 July 1998. Standard for *Pollution Control on Hazardous Waste Storage (GB18597-2001)*, which sets forth requirements for hazardous waste storage, transportation, treatment, and disposal, is a newly applied standard on hazardous waste management.

In China, battery waste should be stored and disposed as per the requirements of *Battery Waste Pollution Prevention Policy* implemented from October 9, 2003. Under this policy, the collection, transportation, removal, and recycle of lead acid battery were required to comply with related requirements.

2.6 Chemical Storage

Storage and handling of chemicals and hazardous substances is primarily regulated by the *Safety Management Regulation for Dangerous Chemicals (2002)*, which was effective on March 15, 2002. It requires that warehouse or storage rooms containing hazardous chemicals have adequate ventilation, fire equipment and fire fighting equipment, explosion protection, pressure release, storm protection, temperature control, static electricity protection and protection bund (secondary containment). Requirements for the preparation of material safety data sheets (MSDS) are detailed in the *General Rules to Drafting Safety Data Sheet for Dangerous Chemicals (GB16483-1996)*, which generally includes detailed information

about the chemicals' identities, characteristics, dangers, toxicity and health hazards, first aid, personal protection measures, packaging and transporting, accidental release and emergency response and disposal. In addition, there are some regulations regarding chemical storage safety, which are enforced by the Safety Work Bureau and Labor Bureau, and fire protection, which are enforced by the Fire Control Bureau.

Based on the relevant regulations, typically the following environmental management procedures for chemicals are required:

1. Special warehouse required for hazardous chemicals, which must be approved by the department of public security;

2. Secondary containment installed for the storage areas of hazardous chemicals;

3. Proper labeling and packaging of hazardous chemicals meeting the requirements;

4. Appropriate safety measures or emergency action plan required for hazardous chemicals;

5. Dedicated technician responsible for management of hazardous chemical warehouse;

6. No hazardous chemicals stored in any open, humid and watery storage facilities;

7. Different properties of hazardous chemicals stored separately;

8. Regular inspections of the storage facilities regarding the release of hazardous chemicals;

9. Complete chemical inventory and file relevant MSDS.

3 COMPARISON WITH WORLD STANDARDS

Generally, the manufacture of lead-acid batteries releases lead mostly through its air emissions, its wastewater discharges and solid waste sent off-site for disposal. While significant improvements have been made by the industry in recent decades, there tend to be some variations between standards across the world. This chapter intends to compare current practice and enforceable standards in China to selected international standards applicable to this industry.

In most countries, manufacturing facilities are licensed to allow emissions up to levels set by the regulatory authority. Regulations regarding monitoring and reporting of pollutant discharges are set. Some emissions are continuously monitored, including

concentrations of metals in wastewater and in stack emissions. The three following chapters summarize applicable regulations in a selected number of countries and compare relevant standards in a table for air emissions, wastewater discharges and waste management.

It should be noted that the World Health Organization (WHO), who is the United Nations specialized agency for health, has only developed guidelines for ambient air and drinking water quality. The WHO has not issued specific guidelines for air emissions from manufacturing sites or for industrial wastewater discharges. Similarly, the World Bank, who is a source of financial and technical support for developing countries around the world, has not issued such standards.

3.1 Air Emissions

China

Based on the properties of air emissions generated by battery manufacturing operations, the Chinese national *Comprehensive Air Emission Standard (GB16297-1996)* stipulates that concentrations of lead in air emissions should meet the limits summarized as follows:

Lead Emission Limits in China

	Maximum permissible emission concentration (mg/m^3) [4]	Stack Height (m)	Maximum permissible rate (kg/h) Class I [1]	Class II	Class III	Fugitive emission concentration (mg/m^3) [5]
Lead & its compound	0.9	15	Emission	0.005	0.007	0.0075
Emission Limits for		20	prohibited	0.007	0.011	
Existing sources[2]		30		0.031	0.048	
		40		0.055	0.083	
		50		0.085	0.13	
		60		0.12	0.18	
		70		0.17	0.26	
		80		0.23	0.35	
		90		0.31	0.47	
		100		0.39	0.6	
Lead & its compound	0.7	15	Emission	0.004	0.006	0.006
Emission Limits for		20	prohibited	0.006	0.009	
New sources[3]		30		0.027	0.041	
		40		0.047	0.071	
		50		0.072	0.11	
		60		0.1	0.15	
		70		0.15	0.22	
		80		0.2	0.3	
		90		0.26	0.4	
		100		0.33	0.51	

Note:

(1) The rate shall be implemented according to the categories of the quality areas and locations of the pollution sources of *Ambient Air Quality Standards (GB 3095-1996)*.

Pollution sources located in Category I areas must comply with Class I standards;

Pollution sources located in Category II areas must comply with Class II standards;

Pollution sources located in Category III areas must comply with Class III standards.

According to *Ambient Air Quality Standards (GB 3095-1996)*, air quality standard define three classes for the areas as follows:

Class I: Nature preservation area, Scenic and Historic Interest area, and other special preservation area;

Class II: Residential area, Commercial and residential area, general industrial area, and rural area;

Class III: Special industrial area

(2) Existing sources: All pollution sources built before January 1, 1997.

(3) New sources: All pollution sources built (newly built, expanded, or rebuilt) after January 1, 1997.

Except for Zhejiang Tianneng Battery Co., Ltd., all other four sites of Tianneng Power were built after January 1, 1997, and should comply with limit for new sources.

(4) Maximum permissible emission concentration refers to the hourly average concentrations that should not be exceeded while the waste gases are in the emission stacks, whether or not the stacks are equipped with treatment facilities.

(5) Fugitive emission concentration limit refer to average concentration limits at control points for any one hour.

USA

The Clean Air Act, which was last amended in 1990, requires the Environmental Protection Agency in the USA to set National Ambient Air Quality Standards (NAAQS) for wide-spread pollutants from numerous and diverse sources considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against

visibility impairment, damage to animals, crops, vegetation, and buildings. The Clean Air Act requires periodic review of the science upon which the standards are based and the standards themselves. EPA has set NAAQS for six principal pollutants, which are called “criteria” pollutants. The primary standard value and secondary standard value for lead is 1.5 μg/m3 measured as a quarterly average. This value is a general standard for lead. However, in the case of specific industries, such as lead-acid battery manufacturing and secondary lead smelter operations, NAAQS is superseded by specific National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories as described in the next paragraph.

In this case, NESHAP is defined in **Title 40 of *Code of Federal Regulations(CFR):*** *Environmental Protection PART 63 – National Emission Standards For Hazardous Air Pollutants For Source Categories Subpart X – National Emission Standards for Hazardous Air Pollutants from Secondary Lead Smelting*. The provisions of this subpart apply to the following affected sources at all secondary lead smelters: blast, reverberatory, rotary, and electric smelting furnaces; refining kettles; agglomerating furnaces; dryers; process fugitive sources; and fugitive dust sources. The provisions of this subpart do not apply to primary lead smelters, lead refiners, or lead remelters. The threshold values stipulated that for lead emissions from both fugitive dust sources and process sources that: “No owner or operator of a secondary lead smelter shall discharge or cause to be discharged into the atmosphere from any building or enclosure ventilation system any gases that contain lead compounds in excess of **2.0 milligrams of lead per dry standard cubic meter**.” For operations similar to the ones conducted by Tianneng Power, this is the standard that would prevail.

Japan

The government enacted the *Air Pollution Control Law* in 1968, under which emission controls are enforced for factories and automobiles emitting any of the following: sulfur oxides, nitrogen oxides, carbon monoxide, suspended particulate matter (SPM), photochemical oxidants, and other substances that pollute the atmosphere. Air emission standard for lead is **10 milligrams per standard cubic meter (mg/m3)**.

Europe

The European Union defines the obligations with which highly polluting industrial and agricultural activities must comply. It establishes a procedure for authorizing these activities and sets minimum requirements to be included in all permits, particularly in terms of pollutants released. The aim is to prevent or reduce pollution of the atmosphere, water and soil, as well as the quantities of waste arising from industrial and agricultural installations to ensure a high level of environmental protection. This was enacted through the Integrated Pollution Prevention and Control (IPPC) Directive (Council Directive 96/61/EC of 24/09/96).

Facilities involved with the manufacturing of lead-acid batteries are required to have a permit according to the IPPC Directive. In order to receive the permit, the facility must comply with certain basic obligations. In particular, it must:

- Use all appropriate pollution-prevention measures, namely the best available techniques (which produce the least waste, use less hazardous substances, enable the recovery and recycling of substances generated, etc.);
- Prevent all large-scale pollution;
- Prevent, recycle or dispose of waste in the least polluting way possible;
- Use energy efficiently;
- Ensure accident prevention and damage limitation;
- Return sites to their original state when the activity is over.

In addition, the decision to issue a permit must contain a number of specific requirements, which are defined by the Member States according to relevant national legislation, in particular including:

- Emission limit values for polluting substances (with the exception of greenhouse gases if the emissions trading scheme applies);
- Any soil, water and air protection measures required;
- Waste management measures;
- Measures to be taken in exceptional circumstances (leaks, malfunctions, temporary or permanent stoppages,etc.);
- Minimizing of long-distance or trans-boundary pollution;
- Release monitoring;
- And all other appropriate monitoring.

Applicable standards in France, Germany, Netherlands and United Kingdom have been included in ***Table 1*** below for comparison purposes.

TABLE 1 – STANDARDS FOR LEAD IN AIR EMISSIONS

Country	Maximum Lead Level (mg/m^3)	Date Operative	Title of Legislation	Current Status	Controlling Authority
CHINA	0.9 for existing sources 0.7 for new sources (facilities built after 1 January 1997)		Comprehensive Air Emission Standard (GB16297-1996)	Legal	Environmental Protection Bureau
EUROPEAN UNION	None quoted.				
FRANCE (Battery Manufacturing Plants)	1	1993	Decret no.1-3-1993	Legal	Regional Authorities
GERMANY	5	1986	Technical Instructions Air	Legal	State Governments
JAPAN Calcination and drying furnace etc. for lead, and secondary lead smelting furnace	10	1968	Air Pollution Control Law	Legal	Ministry of Environment
NETHERLANDS	Variable	1970	Air Pollution Act	Proposal	Ministry of Environmental Protection
UNITED KINGDOM	10	1985	EC Directive on Lead In Air 82/994/EEC	Legal	Department for Environment, Food and Rural Affairs
UNITED STATES	2.0	1995	National Emission Standards for Hazardous Pollutants from Secondary Lead Smelting, 40 CFR Parts 9 and 63	Legal	State Governments through EPA

Source: International Lead and Zinc Study Group – Environmental and Health Controls on Lead – 2007

Table 2 below summarizes lead concentrations measured in air emissions from the five sites.

TABLE 2 – LEAD CONCENTRATIONS IN AIR EMISSIONS

Site Name	Measured Lead Concentrations in Air Emissions (mg/m^3) (2007)
Zhejiang Tianneng Battery Co., Ltd	0.072 to 0.47
Zhejiang Tianneng Battery (Jiangsu) Co., Ltd	0.004 (at boundary)
Tianneng Battery (Wuhu) Co., Ltd	0.004 to 0.474
Zhejiang Changxing Tianneng Power Supply Co., Ltd	0.41
Zhejiang Tianneng Electronic Apparatus Co., Ltd	No lead air emissions

These monitoring results show that the five sites comply with the international standards mentioned previously for air emissions of lead.

3.2 Wastewater Discharge

China

According to national *Integrated Wastewater Discharge Standard (GB 8978-1996)*, the permissible limit for lead is **1.0 mg/L** for discharge to a municipal wastewater collection system or directly into the environment (i.e. surface water body).

USA

Title 40 of *Code of Federal Regulations(CFR)*: Environmental Protection

PART 461 – Battery Manufacturing Point Source Category

This subpart applies to discharges to waters of the United States and introduction of pollutants into publicly owned treatment works from the manufacturing of lead anode batteries.

Generally, in the USA, the requirement is that Best Available Technology be applied to treat the wastewater discharges, and the amount of lead permitted in wastewater is measured by reference to the amount of lead used in production. Thus, there is no specific quantitative standard for wastewater discharge.

Japan

Under its Water Pollution Prevention Laws, national standards for unified hazardous substances discharge standards and unified living circumstance items discharge standards were implemented in industrial factories in Japan. The permissible wastewater discharge limit for lead and its compounds is **0.1 mg/L**. However, for some industries which could not reach the national standards based on current pretreatment technologies, temporal discharge standards are implemented. According to the temporal standards, for the manufactories involved in Lead dioxide, the permissible lead limit is 0.2 mg/L.

Europe

As described in the previous chapter, the European requires that facilities discharging wastewater must comply with specific requirements, which are defined by the Member States according to relevant national legislation. Applicable requirements for lead for wastewater discharges in France, Germany, Netherlands and United Kingdom have been included in **Table 3** below for reference.

TABLE 3 – STANDARDS FOR LEAD IN INDUSTRIAL WASTEWATER DISCHARGES

Country	Maximum Lead Level (mg/L)	Date Operative	Title of Legislation	Current Status	Controlling Authority
CHINA	1.0	1996	Integrated Wastewater Discharge Standard (GB 8978-1996)	Legal	Environmental Protection Bureau
EUROPEAN UNION	None quoted				
FRANCE	0.5	1993	Ministerial Decree of 1 March 1993	Legal	Regional Authorities
GERMANY	0.5	1989	Federal Water Act	Legal	State Governments
JAPAN	0.1	1993	Water Pollution Prevention Law	Legal	Ministry of Environment
NETHERLANDS	Variable (according to type of plant, its location and nature of receiving water)	1970	Pollution of Surface Water Act	Legal	National, Provincial and Local Water Authorities
UNITED KINGDOM	Variable (typically 0.004-0.25 mg/L for discharge to fresh surface waters)	1989	Water Resources Act,1991 Water Industry Act,1991	Legal	National Rivers Authority
UNITED STATES	Variable (based on Best Available Technology-BAT)	1984	Clean Water Act 1977 (as amended)	Legal	Environmental Protection Agency

Source: International Lead and Zinc Study Group – Environmental and Health Controls on Lead – 2007

Table 4 below summarizes lead concentrations measured in the wastewater samples collected at the outlet of each wastewater treatment plant for each of the five sites. It also indicates where the wastewater effluent is discharged to. After wastewater is discharged from a site to the municipal wastewater collection system, the site no longer bears any responsibility for further treatment, as it falls under the responsibility of the municipality. Generally, wastewaters collected through a municipal wastewater collection system are treated through a municipal wastewater treatment plant and then discharged to the environment.

TABLE 4 – LEAD CONCENTRATIONS IN WASTEWATER DISCHARGES

Site Name	Measured Lead Concentrations at Outlet of WWTP (mg/L) (2007)	Wastewater Discharge Outlet
Zhejiang Tianneng Battery Co., Ltd	0.559 to 0.577	All industrial wastewaters are recycled and therefore there is no discharge to the environment. An online monitoring meter was installed by EPB to verify that there is no wastewater discharge to the environment.
Zhejiang Tianneng Battery (Jiangsu) Co., Ltd	0.130	Wastewaters containing lead are treated to meet the Integrated Wastewater Discharge Standard. Treated wastewaters are discharged to the WWTP of Shuyang Economic and Development Zone for further treatment.
Tianneng Battery (Wuhu) Co., Ltd	0.256 to 0.314	Treated wastewaters are discharged to the municipal wastewater drainage system, which finally connects to Zhu Jia Qiao WWTP for further treatment.
Zhejiang Changxing Tianneng Power Supply Co., Ltd	0.170	All wastewaters are recycled and therefore there is no discharge to the environment An online monitoring meter was installed by EPB to verify that there is no wastewater discharge to the environment.
Zhejiang Tianneng Electronic Apparatus Co., Ltd	No Lead Discharge	Wastewaters from the site are discharged to the municipal wastewater drainage system, which connects to the local WWTP for further treatment.

Review of the wastewater discharge monitoring results indicates that:

- There will be no lead discharge from the Zhejiang Tianneng Electronic Apparatus Co., Ltd to the environment.

- Lead containing wastewaters generated from the Zhejiang Tianneng Battery Co., Ltd, and Zhejiang Changxing Tianneng Power Supply Co., Ltd meet the Integrated Wastewater Discharge Standards and are recycled by the site, therefore no industrial wastewater will be discharged to the environment.

- The lead concentration in wastewater samples collected at the WWTP outlet from the Zhejiang Tianneng Battery (Jiangsu) Co., Ltd was lower than the standards for lead in industrial wastewater for China, France, Germany and the United Kingdom; but marginally exceeded the Japanese standards for lead in industrial wastewater discharge, which is 0.1 mg/L. However, as the industrial wastewater discharge from the Zhejiang Tianneng Battery (Jiangsu) Co., Ltd will be finally discharged to the WWTP of Shuyang Economic and Development Zone for further treatment, the associated impact to the environment is considered low.

- The lead concentration in wastewater samples collected at the WWTP outlet from the Tianneng Battery (Wuhu) Co., Ltd was lower than the standards for lead in industrial wastewater discharges for China, France, and Germany; but exceeded the Japanese standards of 0.1 mg/L and the United Kingdom standard of 0.25 mg/L However, the Japanese standard and the United Kingdom standards are applicable to those wastewaters that are discharged to fresh water bodies, while the wastewaters generated from the Wuhu site are discharged into the WWTP of Wuhu City Economic and Technology Development Zone for further treatment, and therefore they are not strictly comparable, and the associated impact to the environment is considered low.

3.3 Waste Management

According to the Chinese Solid Waste Prevention Law (as described in Section 2.5 of this report), all hazardous waste must be disposed of in accordance with the regulations and any enterprise that produces hazardous waste must report and register it with the local EPB. Organizations, which collect, store or dispose of hazardous waste are required to be licensed under the Solid Waste Law. Wastes containing lead are classified as Hazardous Waste in China and must be disposed of accordingly. Currently, the five sites of Tianneng Power comply with the Chinese Solid Waste Prevention Law.

Wastes containing lead are also classified as hazardous waste in USA, Japan, UK, France and Germany and must disposed of through licensed waste disposal vendors.

Thus, the standards for solid waste management in China are similar to the relevant standards in the USA, Japan, UK, France and Germany.

3.4 Summary of Comparison

Based on the above literature review, lead air emissions and wastewater discharges have been restricted in most developed countries like USA, Japan and Members of the European Union. In USA, there are specific regulations for battery manufacturing on lead containing wastewater discharge and specific regulations for battery smelters on lead air emissions. Environmental concerns of lead have also been well recognized in China, and there are specific regulations for lead emissions and discharges.

Although standards differ greatly in terms of mass loading, concentrations, etc, the comparison indicates that Chinese standards are generally more stringent than other available international standards for air emissions. For waste management, the Chinese standards are similar to the other available international standards. For wastewater discharge, the Chinese standards are not as stringent as other selected international standards, however, they apply to discharge to wastewater collection for further treatment rather than to direct discharge to the environment. A review of the monitoring data for the Tianneng Power sites indicates that the current wastewater discharges meet some other countries discharge standards such as the ones for France and Germany. Standards for Japan and the UK apply to direct discharge to surface water bodies, which is not the case for the Tianneng Power sites.

As a result, it was concluded that no additional corrective actions would be required for the five sites with respect to the status of their environmental discharges to the environment in light of the relevant applicable international environmental standards.

On the assumption and under the unlikely event that the Tianneng Power sites were to discharge wastewater directly to the environment and have to comply with the strictest standards for direct wastewater discharge to the environment and/ or with the use of the best available technologies, some corrective actions would be required involving further treatment or monitoring. A professional opinion of the costs associated with these corrective actions is provided in Table 5 below along with an opinion on the time required. These opinions have been developed to focus on the presence of lead in the wastewater discharge from each of the sites. For specific conditions of each of the wastewater discharges, please refer to Table 4 in Section 3.2.

Table 5 – Cost Opinion on Potential Corrective Actions

Site Name	Cost Opinion on Potential Corrective Actions (in USD)	Opinion on Time Required
Zhejiang Tianneng Battery Co., Ltd	$150,000 to $300,000	6 months to 1 year
Zhejiang Tianneng Battery (Jiangsu) Co., Ltd	$250,000 to $500,000	1 to 2 years
Tianneng Battery (Wuhu) Co., Ltd	$200,000 to $400,000	1 to 2 years
Zhejiang Changxing Tianneng Power Supply Co., Ltd	$100,000 to $200,000	6 months to 1 year
Zhejiang Tianneng Electronic Apparatus Co., Ltd	$50,000 to $100,000	6 months to 1 year
OVERALL	$750,000 to $1,500,000	6 months to 2 years