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Contract No.: 16001065
Project No.: EG/CPR/99/G31

December, 2006

Energy Conservation and GHG Emissions Reduction In Chinese TVEs-Phase II

Metal Casting Sector Replication Projects for Energy efficiency (4)

Final Report

To :
The United Nations Industrial Development Organization (UNIDO)

Prepared by:
Energy and Environmental Development Consulting Limited (EED)

北京中环恒远咨询有限公司
EED ENERGY AND ENVIRONMENTAL DEVELOPMENT CONSULTING LIMITED

January 20, 2007

To: Ms. M. Latrech.
Chief
Procurement Services
Unit/OSS
Wagraer Strasse 5
A-1220 Vienna, Austria

Subject: Final Report for Project No.: EG/CPR/99/G31 – Energy Conservation and GHG Emission Reduction in Chinese TVEs, Metal casting Sector Replication Projects for Energy Efficiency (4) (Contract No.:16001065)

Dear Ms. M. Latrech,

According to contract signed between Energy and Environmental Development Consulting Limited (EED consulting) and UNIDO, EED consulting is pleased to submit its final report for the above mentioned project which has integrated the comments from all sides.

This report summarized what we have done and the outputs of the project from July 13, 2006 to January 20 2007. As per the instruction provided in the contract, this report has the attachment as follows:

1. Monitoring and Evaluation Form
2. Installation and Test Report
3. Production and Energy Management System for Enterprises
4. Certificate of Acceptance
5. Training report
6. Training material
7. Invoice for the fifth payment request.

We remain standby to provide all necessary supporting documents required thereto upon your request.

As the project finished, I would like to sincerely appreciate the kind support from UNIDO, PMO of MOA for EED Consulting to implement this project, we are looking forward to cooperating with you in the future.

Sincerely yours,

Liu Xin Ph.D

Managing Director, EED Consulting

CC: Ms. Wang Guiling, Project director, PMO of TVEs project

Mr. Wang Hai, President, Hongyuan Company

Content

I Introduction

Township and village enterprises (TVEs) constitute a significant share of Chinese economic production and social welfare. TVEs also contribute significantly to local and global environmental problems. The aim of this project, Energy Conservation And Greenhouse Gas Emissions Reduction In Chinese Township And Village Enterprises —Phase II, which is funded by the Global Environmental Fund (GEF), is to reduce greenhouse gas emissions in China from the TVE sector by increasing the utilization of energy efficient technologies and products in the brick, cement, metal-casting, and coking sub-sectors. The project intends to overcome key policy, market, technological, and financial barriers to the production, marketing, and utilization of energy efficient technologies and products in these industries.

This subcontract, Foundry Sector Replication Projects for Energy Efficiency (4), is intended to replicate the successful experiences and best practices of the demonstration foundry plants by implementing technology upgrading to improve energy efficiency and product quality. For project replication in the foundry sector, UNIDO and the Project Management Office (PMO) of the Ministry of Agriculture have identified 10 foundry enterprises.

This report is final report submitted to the United Nations Industrial Development Organization (UNIDO) by Energy and Environmental Development Consulting Limited (EED) as the contractor of Metal Casting Sector Replication Projects for Energy Efficiency (4).

II Project summary

From the project kick-off on July 13, 2006, the contractor has provided the 10 foundry plants with all consulting and engineering services required in the contract. The services include:

Task I: Consulting services

Activity 1: Project start-up meeting

Activity 2: Perfect the project implement plan

Activity 3: Summarize and study the successful experiences of demonstration plant

Activity 4: Site investigation and basic analysis for the assessment

Activity 5: Site investigation, assessment and communications on technology renovation with plant manager

Activity 6: Review and finalization of the renovation schemes

Activity 7: Draft feasibility study report

Activity 8: Revise feasibility study report and complete the first progress report

Task II: Engineering services

Activity 9: Engineering design, construction preparation, Equipments selection and purchase

Activity 10: Construction supervision and draft second progress report, and training plan

Activity 11: Equipments installation and test, staff training, management systems set-up, and draft the final report

Activity 12: Check and accept, summarize and compile the final report

By *now, the contractor* has finished all the consulting and engineering services required in the contract. The contractor organized 10 plants to visit the replication enterprise to learn its advanced experiences on energy saving technology renovation and improving the production and management system. The contractor helped the plants complete the technology renovation design, construction and equipments purchase, installation and test. Now, the new energy saving equipments run well and ensure the normal production. The contractor assisted the plants in setting up the production and energy management system. Furthermore, the contractor conducted the training on energy saving technology and policy for the managers and technicians of 10 plants.

During the implementation of the project, the plants actualized the co-financing ratios they promised. The ratios are all higher than the lowest ratio requirement (4:1) and the highest reached 9.08:1. The financing investment of 10 plants is summarized in Table 1.

1. Outcome

(1) Promotion of energy conservation and technical renovation in the 10 plants

The current situation of 10 participating foundries is that most foundries are holding low-level production process, lacking in technicians and operating the business out of order. These led to the unstable product quality and high production cost. Moreover, due to the high energy consumption and large effluent, the pollution is very severe. The 10 plants have the common problems including the high energy consumption due to the out of date equipments, unstable product quality due to the lack of advanced equipments and management measures,, severe environmental pollution and a large waste of resources without the recycling of pig iron and scrap steel.

Although the entrepreneurs realized the importance to adopt energy saving technology, they delayed the technical renovation with the consideration of the capital, technology and equipments. This project provided an opportunity for 10 plants to conduct technical renovation. Besides financial support, it helped all plants to find out the existing problems in producing process and energy consumption, and proposed feasible scheme about renovation and equipment purchase. All the project activities made the entrepreneurs decide to implement the technical renovation.

Through the technical renovation, the production capacities of 10 plants increased from 10% to 53% and the outputs reached 3,600 to 38,500 ton castings per year. The energy consumption per unit product reduced to the extent of 0.133 to 0.289 tce per ton castings, decreasing 16.80% averagely. The total energy consumption reduced 754.593 tce averagely, and the most amount of reduction was 1,715.5 tce. The total CO_2 emission reduction was 18,812 tons per year. The CO_2 emission meets the national standard. The comparison of the energy consumption before and after the technical renovation is in Annex 1.

Table 2 Contrastive data of output and rate of energy conservation

Enterprise	Output before renovation (t castings/a.)	Output after renovation (t castings/a.)	Output increasing percent (%)	Rate of energy conservation (%)
Shanxi Sanlian Foundry Co. Ltd.	8500	13000	52.94	11.89
Shanxi Fengkun Foundry Co. Ltd	15000	21000	40	12.46
Shanxi Huaxiang Tongchuang Foundry Co. Ltd	35000	38500	10	7.65
Shanxi Tangrong Auto-parts Co. Ltd.	15000	18000	20	36.08
Yicheng Hua'er Foundry Co. Ltd.	20000	25000	25	13.05
Pingyao Shuangqing Foundry Co. Ltd.	31500	36500	15.87	22.92
Pingyao Yongjian Zhongxing Foundry Co. Ltd	9200	11000	19.56	15.42
Shanxi Pingyao Huaxing Motor	9200	11000	19.56	19.24

Casting Co. Ltd				
Taigu Dianli Magang Foundry Co. Ltd.	3000	3600	20	10.93
Taigu Xingli Magang Co. Ltd	8000	9600	20	18.4
Total			242.94	168.04
Average			24.29	16.8

(2) Improvement of economic benefit and management of the 10 plants

The average energy saving reached 754.59 tce per year and the outputs increased over 10 percent after technical renovation, which brought high economic benefit. The awareness of 10 plants on safe production, product quality, energy management and environmental protection was enhanced through the training. The related systems are established and the level of integrated management is improved.

(3) Promotion of energy conservation and technical renovation in other plants

The plants selected in this project are located in three places including Jinzhong City and Linfen City. The great achievements of energy saving effects and economic benefit after the technical renovation in the ten extension plants have encouraged the other plants to conduct technical renovation, which is very helpful for the further replication of the project. Other enterprises have much interest in the energy saving foundry equipments and discussed with the technician of equipments plan in the training course. Some enterprises prepared to purchase the energy saving equipments such as front iron liquid quality apparatus to improve the production level and reduce the energy consumption.

At the same time, in order to overcome the obstacles of technical renovation and widen the enterpriser's eyesight, local governments intend to entrust the SME bureau to organize the visiting of the internal advanced enterprises for the staff of local foundry enterprises.

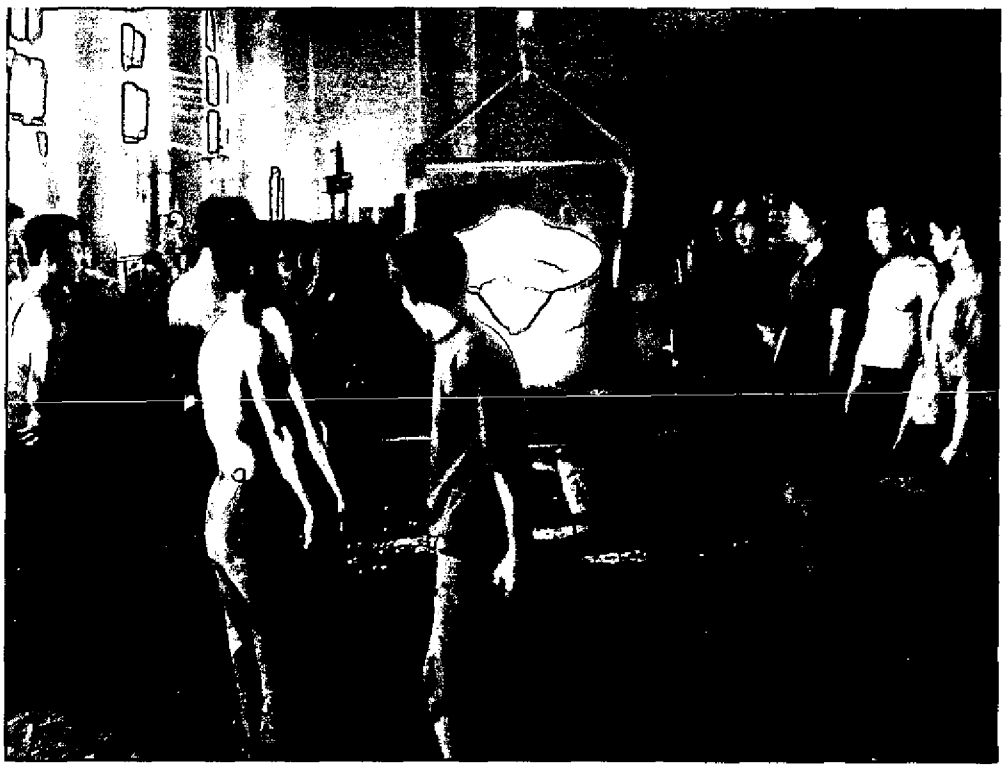
(4) Great Benefits from the technical training for the foundry enterprise

The technical training is a good chance for local foundry enterprises to communicate with famous experts and learn the developing trend of foundry industry and the updated foundry technology. It is important and helpful for the enterprises to establish the development strategy.

Subcontractor actively cooperated with the local governments to organize most local foundry enterprises to participate in the training. Other enterprises were provided the opportunity to understand the background and outcome of this project, and the information of the equipment providers. All the activities are helpful to technical renovation.

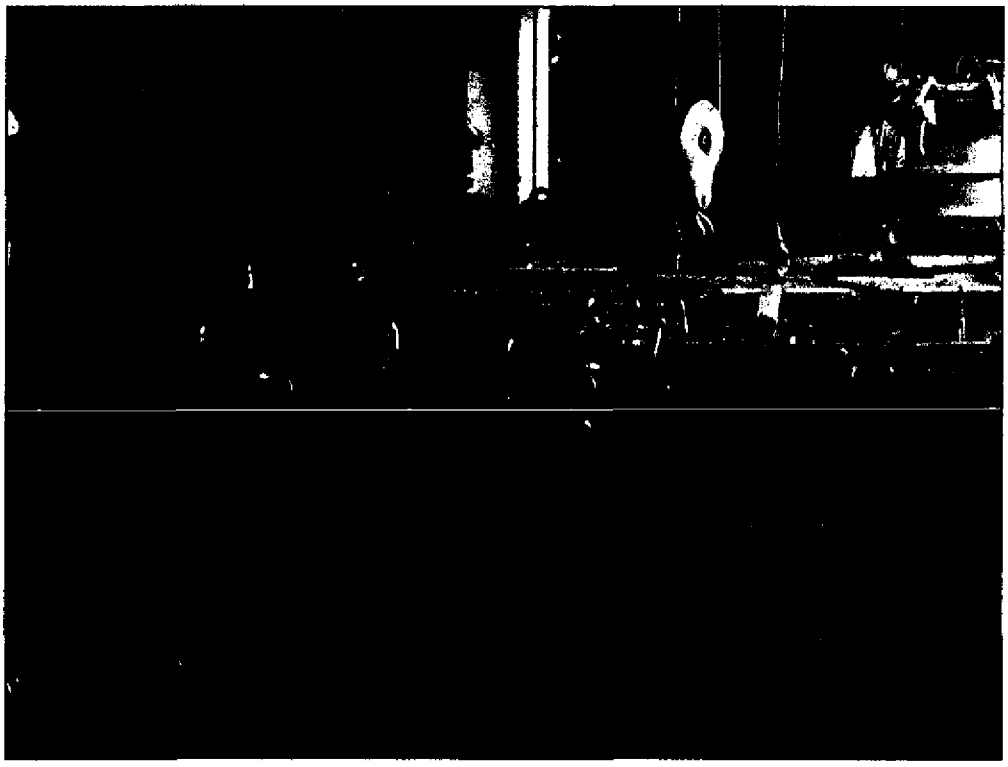
The contrastive photo for after and before the technical renovation is follow.

1A Manual cast before the technical renovation



1B Mechanized cast after technical renovation

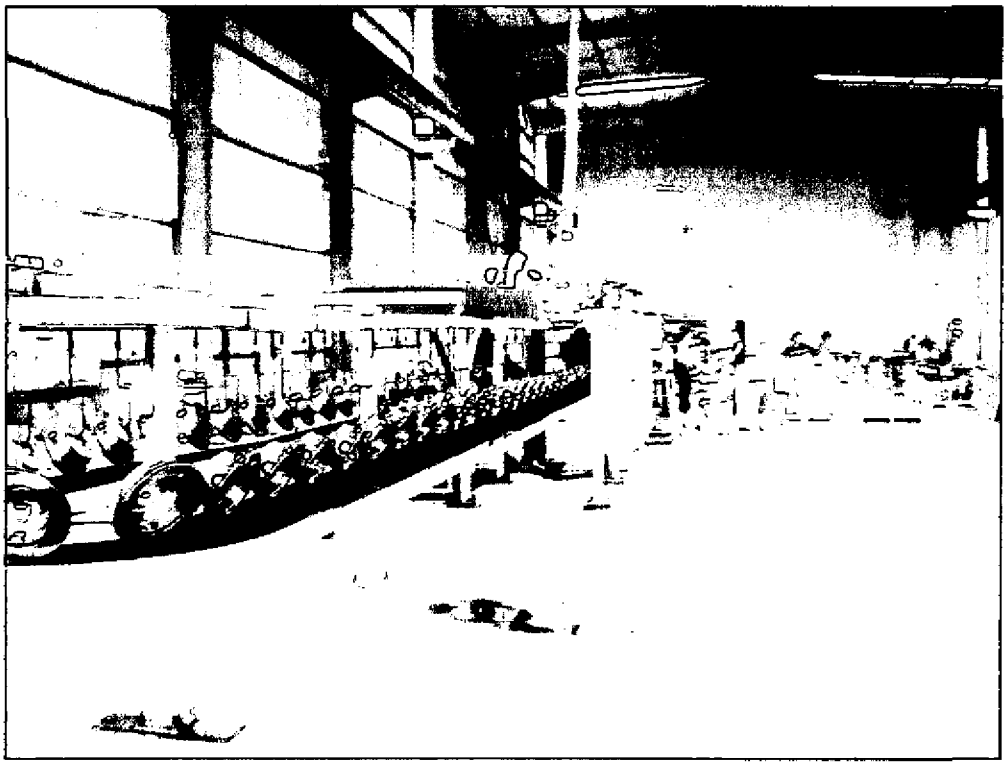
2A Molding equipment before the technical renovation



2B Lost foam pattern casting line after technical renovation

3A Workshop before technical renovation

3B Automatization production line workshop



2. Project Experience

(1) Wide communication with local governments and TVEs to help them understand the project fully

Since it was the first time for many government officials and entrepreneurs to participate in the international project, it indicated that the biggest obstacle for the smooth implementation of the project lied in the inadequate understanding of the project objective, requirements and implementation process. The contractor has actively disseminated the project on many aspects, such as training, field visits and the participation of the activities conducted by other contractors, and communicated with replication TVEs and local governments to help them understand the project deeply.

(2) Adequate surveys in the project implementation

Surveys should be conducted during the project implementation to find the existing problems in production process, technology, equipments and management because of the large varieties among the local foundry enterprises. According to the survey results, together with the project requirements and needs of the plants, the practical technical renovation scheme is formulated. The first-hand materials on energy consumption should be gathered to ensure the veracity of calculation about the energy savings and emission reduction after technical renovation.

(3) Enhancement of the active participation of the local governments

During project implementation, subcontractors coordinated with local governments and enhanced their active participation. Local governments provided subcontractor with much help to promote the project implementation. SME bureau supported the coordination with local enterprises and surveys in-site and organization of the training workshop.

Subcontractor benefited from the administrative advantage, regional advantage and personnel advantage to overcome the difficulty in communication and slow process because of the information block from the regional difference.

(4) Development of technical training for the enterprises with flexible form

Subcontractor organized the site visiting for some famous foundry experts and compiled the training materials to satisfy the strong requirements of enterprises. The training form included lecture, case analysis, discussion, one on one communication. The rich training content included development prospect and production process of foundry industry, and usage of energy saving equipment, and advanced management and operation system. It is a fruitful training. Many enterprises gave good feedback. Annex 5 is the training report.

(5) Enhancement of the active participation of equipment plant and replication enterprise

Subcontractor chose the appropriate production equipments for the replication

enterprises according to the actual condition of enterprises. During the training courses, subcontractor arranged the equipment demonstration to enhance the active participation of the equipment plants.

Because almost all the foundry enterprises attended the training, it is a good chance to disseminate the equipments for the equipment plants in the aspects of the usage and advantage of the equipments The replication enterprise delivered a lecture on their own experience to promote the communication among the enterprises. This activity gets twice the result with half the effort.

3. Suggestions

(1) Promotion of technical renovation in more plants through the radiant role of 10 replication TVEs

LPIC should carry out the preferential policies for replication TVEs to play their radiant role and attract more TVEs to adopt energy saving technologies. Thereafter, the energy efficiency of local industry will increase and the GHG emission will be reduced.

(2) Offer of further technical services and guidance

Though Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises project, the subcontractor should set up long-term relationship with replication TVEs, develop the cooperated area and provide them with technical services and guidance when they adopt further energy saving technologies and develop new products. It will ensure a sustainable project with regard to the promotion of local energy conservation.

III Activities conducted

From the project kick-off on July 13, 2006 to October 30, 2006, the contractor conducted the activities as following:

Activity 1: Project briefing meeting

Task members: Liu Xin, Qian Li

Output: Specified work plan

The project briefing meeting was held on July 13, 2006. The contractor reported the approaches, work plan and personnel arrangement, implementation methodology, and control measures to implement the contract. The briefing of this project is July 13, 2006 determined at this meeting and the duration is six months. The contractor promised that they would implement this project on time and contract price would not change. The work plan was specified at the meeting. PMO was clear that the contractor made some replacement of personnel. Mr. Liu Jinshan was replaced by Mr. Qian Li.

Activity 2: Draft the work plan for phase I

Task members: Liu Xin, Qian Li, Zeng Daben

Output: Detailed work plan for phase I

From July 13 to 14, the contractor listed the detail responsibilities for each expert and team member and set up a sound operation and communication process to ensure the high work efficiency. Additionally, the contractor drafted the work plan in details for phase I.

Activity 3: Survey and learn experience on Jinmei replication plant

Task members: Liu Xin, Qian Li, Zeng Daben

Output: Advanced experience of replication enterprise

From July 15 to 16, the contractor conducted a survey on the replication enterprise, Dalian Jinmei Casting Pipe Co. Ltd., to learn the experiences on renovation schemes selection and engineering design based on the actual conditions. Information on energy consumption before and after renovation, production and market was colleted. These experiences were the solid base of renovation in the 10 plants.

Activity 4: preliminary site investigation and the basic analysis for the assessment in 10 plants

Task members: Liu Xin, Qian Li, Zeng Daben, Li Youming, Chen Wei, Liu Guangdong, Zhuang Wei, Zhang Ke

Output: Primary professional feedback

From July 17 to 18, the contractor visited SME Bureau, Science and Technology Bureau, Environmental Protection Bureau, Land and Resources Bureau of Jinzhong City and Linfen City in Shanxi Province. The objective was to collect information on related laws, regulations, and industrial rules, and find the production and market of local metal casting.

From July 19 to 20, the contractor visited the 10 mental plants selected in this project to know the conditions of technology and products, and analyzed the status of production, emission, technology and market for the 10 selected plants to make the preparation for the further site survey and assessment.

Activity 5: Site investigation, assessment and communications on technology renovation with plant manager

Task members: Liu Xin, Qian Li, Zeng Daben, Li Youming, Chen Wei, Liu Guangdong, Zhuang Wei, Zhang Ke

Output: Draft technical renovation schemes

From July 21 to June 25, the contractor carried out investigations for the 10 plants to implement the plan-level assessment. The main contents included production processes, production technology and equipments, raw materials, consumption status of energy, products, outputs and marketing, financial status and management system.

From July 26 to July 27, the contractor carried out a comprehensive assessment and

identified the issues and origins based on the investigation results and the project goals. The contractor designed technology renovation scheme for the 10 selected plants which suited the conditions of these plants, referring to the successful experience of replication plants in terms of technology, equipment, and management.

From July 28 to 29, the contractor communicated and consulted with plant manager regarding the above assessment and designed technical renovation schemes and proposed a list of measures and investments to plant managements to upgrade the existing production technologies and equipments. Additionally, the contractor fully considered the reasonable suggestions to ensure that the proposed renovation schemes would be fully agreed by the plant management.

Activity 6: Review and finalization of the renovation schemes

Task members: Liu Xin, Qian Li, Zeng Daben, Li Youming, Chen Wei, Liu Guangdong, Zhuang Wei, Zhang Ke_

Output: Technology renovation schemes

From July 30 to 31, the contractor organized experts to review and appraise the renovation scheme on the production progress, raw materials and energy saving, environmental impact and safety appraisal, etc. Meanwhile, the contractor solicited comments from 10 plants.

From August 1 to 2, technology renovation schemes were finalized based on the appraisal results as well as comments from enterprises and experts.

Activity 7: Draft feasibility study report and plant-wide management system framework

Task members: Liu Xin, Qian Li, Zeng Daben, Li Youming, Chen Wei, Liu Guangdong, Zhuang Wei, Zhang Ke

Output: Draft feasibility study reports.

From August 3 to 20, the contractor drafted the feasibility study reports for the 10 metal casting plants. During the process, the contractor identified the existing problems in daily business and set up a feasible plant-wide management system framework.

The major contents of feasibility study report include:

Chapter 1 Introduction

Chapter 2 Market forecasting and current energy resource

Chapter 3 Production scale and products

Chapter 4 Technical renovation measures

Chapter 5 Work plan

Chapter 6 Investment estimation and financial scheme

Chapter 7 Financial analysis

Chapter 8 Occupational safety and health

Chapter 9 Training

Chapter 10 Environmental impact assessment

Chapter 11 Conclusion and Recommendation

Activity 8: Revise feasibility study report and complete the first progress report

Task members: Liu Xin, Qian Li, Zeng Daben, Li Youming, Chen Wei, Liu Guangdong, Zhuang Wei, Zhang Ke

Output: Feasibility study reports, first progress report, monitoring and evaluation form (see the first progress report)

From August 21 to 22, the contractor conducted survey at Jinzhong City and Linfen City to identify the comments from 10 plants on feasibility study report and plant-wide management system framework. The representatives from PMO were specially invited.

From August 14 to 18, the feasibility study reports were revised based on the consultation with PMO and 10 plants. After approving the reports, 10 plants subscribe the letter of confirmation. The feasibility study reports were approved by enterprise and IAs, and confirmed by relevant experts. It is the basement of the project implement.

From August 19 to 21, the contractor completed the first progress report.

August 25, Subcontractor submitted the first progress report including the monitoring and evaluation form.

Activity 9: Engineering design, construction preparation, equipments selection and purchase

Task members: Liuxin, Zeng Daben, Qianli, Li Youming, Chenwei, Liu Guangdong

Output: Shop drawings

From September 1 to 5, the subcontractor organized experts to collect the baseline data and documents for the engineering design, including the new design standards.

From September 6 to 10, the subcontractor conducted engineering design in compliance with the latest industry standards and requirements, and the finalization of the renovation schemes. The contractor clarified the shop drawings to plants on site, and to provide the technical assistance so as to make them understand the drawings thoroughly, assisted plants to prepare for the construction, including stating the type, standard and quantity of construction materials.

From September 10 to 15, the subcontractor assisted plants to select and purchase required Equipments by bidding. The lists of Equipments purchase are as follows

(Note: the capital of purchasing Equipment with * was from UNIDO entirely or partially.)

Table 3 List of Additional Equipment

No.	Enterprise	Planned Additional Equipment				Actual Additional Equipment					
		Equipment	Unit	Quantity	Price ($) Ten thousand	Equipment	Model	Quantity	Production plant	RMB (Yuan)	US ($)
1	Shanxi Sanlian Foundry Co. Ltd.	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		resin sand molding line	set	1	6	resin sand molding line	5t/h	1	Baoding foundry equipment plant	480,184	60,023
2	Shanxi Fengkun Foundry Co. Ltd	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		front iron liquid quality apparatus	set	1	5.11	self-reading spectrometer	WCD-3C	1	Beijing Nake analysis equipment Co. Ltd	408,800	51,100
		suspended type cleaning machine	set	1	2.24	suspended type cleaning machine	XSY	1	Wuxi Huishan Xinguang machine equipment plant	179,200	22,400
3	Shanxi Huaxiang Tongchuang Foundry Co. Ltd	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		bottom pour casting machine	set	1	7.81	bottom pour casting machine	JZ1000A	1	Baoding Kemeng mechanical and electric technology exploitation Co. Ltd	624,800	78,100
4	Shanxi Tangrong Auto-parts Co. Ltd.	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		cupola	set	2	7.52	cupola	3t/h	2	Wuxue Fengshen foundry equipment Co. Ltd	601,600	75,200

No.	Enterprise	Planned Additional Equipment				Actual Additional Equipment					
		Equipment	Unit	Quantity	Price ($) Ten thousand	Equipment	Model	Quantity	Production plant	RMB (Yuan)	US ($)
5	Yicheng Hua'er Foundry Co. Ltd.	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		lost foam pattern casting line	set	1	13.5	lost foam pattern casting line		1	Jilin Chuangxin lost foam pattern foundry equipment plant	1,089,120	136,140
6	Pingyao Shuangqing Foundry Co. Ltd.	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		resin sand molding line	set	1	8.57	resin sand molding line	5t/h	1	Tianyang foundry equipment plant	686,568	85,821
7	Pingyao Yongjian Zhongxing Foundry Co. Ltd	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		atomic emission spectrometer	set	1	2	atomic emission spectrometer	SPECTR OLAB	1	Germany spark analysis equipment company	198,880	24,860
		resin sand molding line	set	1	5.6	resin sand molding line	5t/h	1	Xingyuan foundry equipment plant	458,400	57,300
8	Shanxi Pingyao Huaxing Motor Casting Co. Ltd	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		airless blast cleaner	set	2	6.17	airless blast cleaner	Q69	2	Baoding foundry equipment Co. Ltd	495,200	61,900

No.	Enterprise	Planned Additional Equipment				Actual Additional Equipment					
		Equipment	Unit	Quantity	Price ($) Ten thousand	Equipment	Model	Quantity	Production plant	RMB (Yuan)	US ($)
9	Taigu Dianli Magang Foundry Co. Ltd.	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		chain-type coal-burning installation	set	1	5.16	chain-type coal-burning installation	4150×11 00×750	1	Jiangsu Xinlantian Huanbao Shiye Co. Ltd	428,992	53,624
		galvanizing furnace	set	1	3.02	galvanizing furnace	300×200	1	Hebei Huanbao Jieneng equipement plant	253,112	31,639
10	Taigu Xingli Magang Co. Ltd	front iron liquid quality apparatus	set	1	1.05	front iron liquid quality apparatus*	HF-2002 T	1	Tianjin Huifeng survey equipment Co. Ltd	84,000	10,500
		resin sand molding line	set	1	6.3	resin sand molding line	5t/h	1	Xinyuan foundry equipment plant	551,736	68,967

Please see the invoice for equipment purchase from UNIDO finance in Annex 4.3

Table 4 Expenditure of UNIDO Capital

Enterprise	Unit	Budget			Actual Cost		
		UNIDO Capital		Ratio	UNIDO Capital		Ratio
		Total	Equipment purchase		Total	Equipment purchase	
Shanxi Sanlian Foundry Co. Ltd.	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Shanxi Fengkun Foundry Co. Ltd	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Shanxi Huaxiang Tongchuang Foundry Co. Ltd	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Shanxi Tangrong Auto-parts Co. Ltd.	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Yicheng Hua'er Foundry Co. Ltd.	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Pingyao Shuangqing Foundry Co. Ltd.	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Pingyao Yongjian Zhongxing Foundry Co. Ltd	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Shanxi Pingyao Huaxing Motor Casting Co. Ltd	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Taigu Dianli Magang Foundry Co. Ltd.	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	
Taigu Xingli Magang Co. Ltd	US$	15,000	10,500	70%	15,000	10,500	70%
	Equivalent to RMB: Yuan	120,000	84,000		120,000	84,000	

Activity 10: Construction supervision, and draft second progress report and training plan

Task members: Liuxin, Zeng Daben, Qianli, Li Youming, Chenwei, Xu Tianda, Xu Chengqiang

Output: training plan, second progress report

From September 15 to October 26, the subcontractor organized related experts to conduct construction supervision and assistance in addressing the emerged issues on site during the construction. The plant managers and operators familiarized the whole processes and mastered the key quality control points with the help of experts; it is helpful to strengthen the production control and product quality control in regular production period. At the same time, the contractor supervised the co-financed fund arranged by the plant for this project through the supervision of project teams.

The actual capital arrangement of 10 plants is shown as following, if the actual cost is over budget, the margin is paid by plant itself.

Subcontractor submitted the second progress report in September 30.

Activity 11: Equipments installation and test, staff training, management systems set-up, and draft the final report

Task members: Liuxin, Zeng Daben, Qianli, Li Youming, Chenwei, Xu Tianda, Xu Chengqiang

Output: Draft final report, training material, installation and test report

From October 8 to 19, the contractor organized some experts to compile the training material according to the fact condition. Training material is in Annex 6.

From October 8 to 18, the contractor guided the 10 plant to install and test the purchased equipments based on the construction requirements. After all equipments were installed, the 2-round test for each equipment was carried out. 1-day test for the equipment without load and the 5-day test with heavy load were carried out. At last all equipments ran well.

From October 13 to 20, the contractor finished the Installation and Test Report according to the new equipments installation and test in 10 plants.

From October 21 to 22, the contractor organized some experts to conduct technical training for local foundry plans. Training report is in Annex 5.

From October 23 to 25, the contractor finalized the feasible plant-level production and energy management system for each plant based on the prior successful experience on pilot plants in management and the project progress, in view of the detail situation.

From October 23 to 25, the contractor summarized the progress of energy saving renovation in all plants, including the renovation scheme, energy consumption and the financial investment, etc. All plants accepted the work conducted by the contractor

and subscribed the Certificate of Acceptance. The Certificate of Acceptance is in the Annex 4.

From October 25 to 30, the contractor formulated the Draft Final Report.

Activity 12: Project summing-up and complete final report

Task members: Liuxin, Zeng Daben, Qianli, Li Youming, Chenwei, Xu Tianda, Xu Chengqiang

Output: Final Report

From November 26 to December 20, 2006, the contractor drafted the final report according to the regular operation status, and project target fulfillment and the comments on the draft final report by UNIDO and PMO.

IV Annexes

Annex 1 Monitoring and Evaluation Form

Annex 2 Installation and Test Report

Annex 3 Production and Energy Management System for Enterprises

Annex 4 Certificate of Acceptance

Annex 5 Training report

Annex 6A Training material I

Annex 6B Training material II

Table 1 The Financing Investment of 10 Plants

No.	Plant	Unit	Budget			Actual Cost			The Promised Ratio of Co-finance from Plant to UNIDO Capital	The Actual Ratio of Co-finance from Plant to UNIDO Capital
			including		Total	including		Total		
			UNIDO *Capital*	Co-finance		UNIDO *Capital*	Co-finance			
1	Shanxi Sanlian Foundry Co. Ltd.	US$	15000	60,000	75,000	15000	60,023	75,023		
		RMB: Yuan	120000	480,000	600,000	120000	480184	600,184	4.00 : 1	4.00 : 1
2	Shanxi Fengkun Foundry Co. Ltd	US$	15000	73500	88500	15000	74105	89,105		
		RMB: Yuan	120000	588,000	708,000	120000	592,840	712,840	4.90 : 1	4.94 : 1
3	Shanxi Huaxiang Tongchuang Foundry Co. Ltd	US$	15,000	78,100	93,100	15,000	78,164	93,164		
		RMB: Yuan	120,000	624,800	744,800	120,000	625,312	745,312	5.21 : 1	5.21 : 1
4	Shanxi Tangrong Auto-parts Co. Ltd.	US$	15,000	75,200	90,200	15,000	75,200	90,200		
		RMB: Yuan	120,000	601,600	721,600	120,000	601,600	721,600	5.01 : 1	5.01 : 1
5	Yicheng Hua'er Foundry Co. Ltd.	US$	15,000	135,000	150,000	15,000	136,140	151,140		
		RMB: Yuan	120,000	1,080,000	1,200,000	120,000	1,089,120	1,209,120	9.00 : 1	9.08 : 1
6	Pingyao Shuangqing Foundry Co. Ltd.	US$	15,000	85,700	100,700	15,000	85,821	100,821		
		RMB: Yuan	120,000	685,600	805,600	120,000	686,568	806,568	5.71 : 1	5.72 : 1
7	Pingyao Yongjian Zhongxing Foundry Co. Ltd	US$	15,000	76,000	91,000	15,000	82,160	97,160		
		RMB: Yuan	120,000	608,000	728,000	120,000	657,280	777,280	5.07 : 1	5.48 : 1
8	Shanxi Pingyao Huaxing Motor Casting Co. Ltd	US$	15,000	61,700	76,700	15,000	61,900	76,900		
		RMB: Yuan	120,000	493,600	613,600	120,000	495,200	615,200	4.11 : 1	4.13 : 1
9	Taigu Dianli Magang Foundry Co. Ltd.	US$	15,000	81,800	96,800	15,000	85,263	100,263		
		RMB: Yuan	120,000	654,400	774,400	120,000	682,104	802,104	5.45 : 1	5.68 : 1
10	Taigu Xingli Magang Co. Ltd	US$	15,000	63,000	78,000	15,000	68,967	83,967		
		RMB: Yuan	120,000	504,000	624,000	120,000	551,736	671,736	4.20 : 1	4.60 : 1

No.	TVEs	Business Profile[1]	Major Energy-use Equipments [2]	EE Baseline[3]									Proposed Technical Renovation[4]	Project Investment[5]				Project Status	Actual Results[6]								Remarks
				Energy Type	Energy consumption (physical quantity)	Conversion Factor	Energy use (tce)	Energy Use/Unit Product		Output Before Renovation	Total energy use (tce)	CO2 Coefficient	CO2 Emissions (t/a.)		Total (RMB ¥ 10,000)	GEF support (US$)	Others (RMB ¥ 10,000)		Start-end date	Financial Evaluation			Production after renovation		Energy Use/Unit Product		Energy Savings (tce/a.)	CO_2 emission Reduction(t/a.)	
1	Shanxi Sanlian Foundry Co. Ltd.	Shanxi Sanlian Foundry Co. Ltd locates in Yuncheng City.It is a specialized casting company focused on key parts of car engine, its main products include cylinder block and head,engine body, gear box casting.It now has more than 600 stuffs including about 100 technical workers.	Technical Process:raw material-furnace-pouring- shakeout-cleaningup-casting Energy -use Equipment:intermediate frequency furnace, air compressor, resin sand molding line,.	Coal (t)			0.00	0.328	tce/t castings	8,500	tce/t castings (a.)	2,786.71	2.493	6,947.26	Equip front thermal analyzer; Apply the high-quality insulation work slag-congestion	800,184.00	15,000	Commercial loan		finished	July,2006-November,2006	Payback period	2.54	year	13,000	t castings/a	0.289	tce/t castings	505.02	1,259.02	
				Coke(t)		0.971	0.00										Entrustment Loan				IRR	38	%							
				Power/MWh	7,276.00	0.383	2,786.71										Self-Funding	480,184.00			NPV	136.75	¥10,000							
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	535.7	¥1/tce							
				Sum total			2,786.71																						
2	Shanxi Fengkun Foundry Co. Ltd	Shanxi Fengkun Foundry Co. Ltd locates in Yicheng Township.It has more than 600 stuffs, its key products are brake disc for car, as well as hub, pliers, etc.	intermediate frequency furnace, air compressor, sand production line.	Coal (t)			0.00	0.270	tce/t castings	15,000	tce/t castings (a.)	4,053.88	2.493	10,106.31	Equip front thermal analyzer; Apply the high-quality insulation work slag-congestion; Set up the heat preservation layer with aluminum silicate funicle.	712,840.00	15,000	Commercial loan		finished	July,2006-November,2006	Payback period	2.22	year	21,000	t castings/a	0.237	tce/t castings	923.00	1,727.65	
				Coke(t)	1,172.00	0.971	1,136.48										Entrustment Loan				IRR	47.19	%							
				Power/MWh	7,612.00	0.363	2,815.40										Self-Funding	592,840.00			NPV	197.67	¥10,000							
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	496.75	¥1/tce							
				Sum total			4,053.88																						

No.	TVEs	Business Profile[1]	Major Energy-use Equipments[2]	E E Baseline[3]										Proposed Technical Renovation[4]	Project Investment[5]				Project Status	ActualResults[6]									Remarks
				Energy Type	Energy consumption (physical quantity)	Conversion Factor	Energy use (tce)	Energy Use/Unit Product		Output Before Renovation	Total energy use (tce)	CO2 Coefficient	CO2 Emissions (t/a.)		Total (RMB ¥10,000)	GEF support (US$)	Others (RMB¥10,000)			Start-end date	Financial Evaluation			Production after renovation		Energy Use/Unit Product		Energy Savings (tce/a.)	CO_2 emission Reduction(t/a.)	
3	Shanxi Huaxiang Tongchuang Foundry Co. Ltd	Located in the Economic& Technology Development Zone of Linfen City, Shanxi Huaxiang Tongchuang Foundry Co. Ltd has more than 480 stuffs. Its key products are all kinds of precision castings produced by vertical parting flaskless shoot-squeeze moulding line and horizontal parting moulding line.	cupola, air compressor,sand production line, draught fan.	Coal (t)			0.00	0.158	tce/t castings	35,000	tce/t castings (a.	5,512.99	2.493	13,743.89	Equip front thermal anaiyzer, Appy the high-quality insulation work slag-congestion	745.312.00	15,000	Commercial loan		finished	July,2006-November,2006	Payback period	2.19	year	38,500	t castings/a	0.146	tce/t castings	482.00	1,151.77	
				Coke(t)	5,489.00	0.971	5,312.59										Entrustment Loan				IRR	48.12	%							
				Power/MWh	523.25	0.383	200.40										Self-Funding	625,312.00			NPV	214.07	¥10,000							
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	505.08	¥1/tce							
				Sum total			5,512.99																							
4	Shanxi Tangrong Auto-parts Co. Ltd.	Located in the south suburb of Houma City Shanxi Province, Shanxi Tangrong Autoparts Co. Ltd(TACL) is a joint venture enterprise which has currently 700 employees including 200 technical workers It is engaging mainly in the production of auto components as brake drum, wheel hub and spoke wheel sheave. It is the largest production base of brake drum for heavy truck in China.	cupola, air compressor,sand production line, draught fan.	Coal (t)			0.00	0.207	tce/t castings	15,000	tce/t castings (a.	3,106.58	2.493	7,744.69	Equip front thermal analyzer, Apply the high-quality insulation work slag-congestion; Set up the heat preservation layer with aluminum silicate funicle.	72.16	15,000	Commercial loan		finished	July,2006-November,2006	Payback period	2.48	year	18,000	t castings/a	0.133	tce/t castings	1,332.00	3,320.68	
				Coke(t)	3,125.00	0.971	3,035.63										Entrustment Loan				IRR	41.78	%							
				Power/MWh	185.25	0.383	70.95										Self-Funding	60.16			NPV	168.81	¥10,000							
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	224.58	¥1/tce							
				Sum total			3,106.58																							

No.	TVEs	Business Profile[1]	Major Energy-use Equipments [2]	EE Baseline[3]									Proposed Technical Renovation[4]	Project Investment[5]				Project Status	Start-end date	Actual Results[6]							Remarks
				Energy Type	Energy consumption (physical quantity)	Conversion Factor	Energy use (tce)	Energy Use/Unit Product		Output Before Renovation		Total energy use (tce)	CO2 Coefficient	CO2 Emissions (t/a.)		Total (RMB ¥10,000)	GEF support (US$)	Others (RMB¥10,000)				Financial Evaluation		Production after renovation		Energy Use/Unit Product		Energy Savings (tce/a.)	CO_2 emission Reduction(t/a.)	
5	Yicheng Hua'er Foundry Co. Ltd.	Located in West of Yicheng Township, in south of Yanghou and Jinhan Road, Yichenghua'er Foundry Co, Ltd has more than 550 stuffs.It is engaging in producing single-cylinder body, multi-cylinder body, flywheel, bearing cap, valve, etc.	cupola, foaming machine, drier	Coal (t)			0.00	0.249	tce/t castings	20,000	tce/t castings (a.)	4,979.86	2.493	12,414.80	Equip front thermal analyzer; Apply the high-quality insulation work slag-congestion; Improve the lost foam pattern casting line.	1,209,120.00	15,000	Commercial loan		finished	July, 2006-November, 2006	Payback period	2.51	year	25,000	t castings/a	0.217	tce/t castings	800.00	1,994.40	
				Coke(t)	2,885.00	0.971	2,802.48										Entrustment Loan				IRR	43.64	%						
				Power/MWh	5,685.05	0.383	2,177.37										Self-Funding	1,089,120.00			NPV	358.03	¥10,000						
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	854.4	¥/t/tce						
				Sum total			4,979.86																						
6	Pingyao Shuangqing Foundry Co. Ltd.	Located in the south suburb of Houma City Shanxi Province, Pingyao Shuangqing Foundry Co. Ltd is located in Pingyao City, convenient in transportation. It now has more than 800 stuffs its products include electrical stator frames, enshields, etc.	cupola, air compressor,sand production line, draught fan.	Coal (t)			0.00	0.207	tce/t castings	31,500	toe/t castings (a.)	6,521.38	2.493	16,257.81	Equip front thermal analyzer; Apply the high-quality insulation work slag-congestion; Set up the heat preservation layer with aluminum silicate funicle.	806,568.00	15,000	Commercial loan		finished	July, 2006-November, 2006	Payback period	2.4	year	36,500	t castings/a	0.160	toe/t castings	1,715.50	4,276.74	
				Coke(t)	6,560.00	0.971	6,372.38										Entrustment Loan				IRR	44.55	%						
				Power/MWh	388.03	0.383	149.00										Self-Funding	686,568.00			NPV	221.35	¥10,000						
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	314.88	¥/t/tce						
				Sum total			6,521.38																						

No.	TVEs	Business Profile[1]	Major Energy-use Equipments[2]	E E Baseline[3]										Proposed Technical Renovation[4]	Project Investment[5]				Project Status	Actual Results[6]								Remarks
				Energy Type	Energy consumption (physical quantity)	Conversion Factor	Energy use (tce)	Energy Use/Unit Product		Output Before Renovation		Total energy use (tce)	CO2 Coefficient	CO2 Emissions (t/a.)		Total (RMB ￥10,000)	GEF support (US$)	Others (RMB￥10,000)			Start-end date	Financial Evaluation			Production after renovation		Energy Use/Unit Product		Energy Savings (tce/a.)	CO_2 emission Reduction(t/a.)	
7	Pingyao Yongjian Zhongxing Foundry Co. Ltd	Pingyao Yongjian Zhongxing Foundry Co. Ltd locates in Pingyao City. It has more than 400 stuffs.It produces large and medium-sized machine tools, as well as parts for speed reducer and equipment for coal dressing and coking, such as tathe bed, housing motor for speed reducer, etc.	cupola, air compressor,sand production line, draught fan, annealing lehr.	Coal (t)			0.00	0.192	tce/t castings	9,200	tce/t castings (a.)	1,761.53	2.493	4,391.51	Equip front thermal analyzer; Apply the high-quality insulation work slag-congestion; Set up the heat preservation layer with aluminum silicate furnicle.	777,280.00	15,000	Commercial loan		finished	July,2006-November,2006	Payback period	2.52	year	11,000	t castings/a	0.183	tce/t castings	319.00	795.27	
				Coke(t)	1,770.00	0.971	1,719.39										Entrustment Loan				IRR	40.93	%						
				Power/MWh	110.07	0.383	42.16										Self-Funding	637,280.00			NPV	175.28	￥10,000						
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	472.77	￥1/tce						
				Sum total			1,761.53																						
8	Shanxi Pingyao Huaxing Motor Casting Co. Ltd	Located in the south suburb of Houma City Shanxi Province, Shanxi Located in Pingyao City,Shanxi Pingyao Huaxing Motor Casting Co. Ltd has more than 600 stuffs including nearly 100 technical workers. It is engaging mainly in electric motor casting, including Series Y, Y2, YCT, ID, IT, IL, YB2,BDN,YZR,etc, more than 300 kinds of castings in total.	cupola, air compressor,sand production line, draught fan,shot blasting machine.	Coal (t)			0.00	0.178	tce/t castings	22,000	tce/t castings (a.)	3,926.63	2.493	9,789.08	Equip front thermal analyzer; Apply the high-quality insulation work slag-congestion; Set up the heat preservation layer with aluminum silicate furnicle.	615,200.00	15,000	Commercial loan		finished	July,2006-November,2006	Payback period	1.52	year	25,300	t castings/a	0.144	tce/t castings	660.20	2,144.48	
				Coke(t)	3,929.00	0.971	3,816.63										Entrustment Loan				IRR	71.69	%						
				Power/MWh	267.20	0.383	110.00										Self-Funding	4,952,006.00			NPV	299.56	￥10,000						
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	425.73	￥1/tce						
				Sum total			3,926.63																						

No.	TVEs	Business Profile[1]	Major Energy-use Equipments[2]	E E Baseline[3]									Proposed Technical Renovation[4]	Project Investment[5]				Project Status	Actual Results[6]									Remarks
				Energy Type	Energy consumption (physical quantity)	Conversion Factor	Energy use (tce)	Energy Use/Unit Product		Output Before Renovation	Total energy use (tce)	CO2 Coefficient	CO2 Emissions (t/a.)		Total (RMB ¥ 10,000)	GEF support (US$)	Others (RMB ¥ 10,000)			Start-end date	Financial Evaluation			Production after renovation		Energy Use/Unit Product		Energy Savings (tce/a.)	CO_2 emission Reduction(t/a.)	
9	Taigu Dianli Magang Foundry Co. Ltd.	Taigu Dianli Magang Foundry Co. Ltd is located in the basin of Middle Shanxi province and rich resources and convenient transportation. It has more than 100 stuffs including more than 10 technical workers. Its products are mainly all kinds of electric power fitting (applicated in transportation and transmission electric power line below 500 KV).	cupola, air compressor,sand production line, draught fan, annealing furnace.	Coal (t)			0.00	0.310	tce/t castings	3,000	tce/t castings (a.)	930.49	2.493	2,319.71	Equip front thermal analyzer; chain-type coal-burning installation. Change galvanizing furnace.	802,104.00	15,000	Commercial loan		4	July,2006-November,2006	Payback period	2.1	year	3,600	1 castings/a.	0.258	tce/t castings	187.20	466.69	
				Coke(t)	927.00	0.971	900.49										Entrustment Loan				IRR	50.2	%							
				Power/MWh	78.33	0.383	30.00										Self-Funding	682,104.00			NPV	242.92	¥10,000							
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	658.65	¥1/tce							
				Sum total			930.49																						
10	Taigu Xingli Magang Co. Ltd	Located in Taigu Township, Shanxi Taigu Xingli Magang Co. Ltd has more than 180 stuffs.It mainly produces kinds of blanks for all kinds of pipe wrench. Bulb iron is used for producing grooved fittings and grey iron is used for producing machine and lathe casting.	cupola, air compressor,sand production line, draught fan.	Coal (t)			0.00	0.338	tce/t castings	8,000	tce/t castings (a.)	2,702.78	2.493	6,738.03	Equip front thermal analyzer; Apply the high-quality insulation work slag-congestion; Introduce the resin sand molding technique.	671,736.00	15,000	Commercial loan		finished	July,2006-November,2006	Payback period	2.02	year	9,800	t castings/a.	0.288	tce/t castings	672.00	1,675.30	
				Coke(t)	2,700.00	0.971	2,622.78										Entrustment Loan				IRR	52.43	%							
				Power/MWh	208.88	0.383	80.00										Self-Funding	551,736.00			NPV	216.2	¥10,000							
				Refined Oil(t)		1.471	0.00										Financial Assistance				Cost of energy saving[7]	282.37	¥1/tce							
				Sum total			2,702.78																						

Note:

[1]-[3]. All data are quoted from the Feasibility Study Report, and data of 2005 are used as baseline data.

[4]-[6]. The data arequoted from actual results after the operation of the project.

[7]. Formula for calculating cost of energy savings:

$$CE = \frac{Invest \dfrac{i(1+i)^n}{(1+i)^n - 1} + (c_2 - c_1) \cdot P_2}{EF}$$

Legend:

CE—cost of energy savings, ¥1/tce;

Invest— Initial cost (¥)

i—Discount rate;

n— Project lifecycle (a.)

c2-c1-incremental cost per product, c2 - cost per product after the renovation,c1- cost per product before the renovation. (¥/10,000 tce)

P2 - annual output after the renovation, (¥/10,000 tce)

EF— annual energy savings (tce/a.)

Annex 2 Installation and Test Report

Table of Contents

Installation and Test Report for

Shanxi Sanlian Foundry Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	resin sand molding line	5t/h	set	1

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose 20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the resin sand molding line

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Test without load

Examine the fixation of each part after the installation and cleaning this equipment. Then run the equipment for one hour without load. If it runs well then test it with heavy load. It runs normally and then for normal production.

(1) Test with heavy load

Speed test. First, dump 1t resin sand into mixing-sand machine and test with low speed. If it runs well in one hour then test it with high speed. It runs normally with high speed.

Ration test. Repeat the speed test with 1t, 3t and 5t resin sand respectively. It runs normally in six hours.

It runs normally with heavy load and then for normal production.

Installation and Test Report for

Shanxi Fengkun Foundry Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	self-reading spectrometer	WCD-3C	set	1
3	suspended type cleaning machine	XSY	set	1

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose

20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test.

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the self-reading spectrometer

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Set up the operating system

Install the operating system of the spectrometer and the suitable printer. Then, install the data-analyze adjust software.

(2) Self-check

Start up the equipment and initialize self-check, and then start up the main procedure.

(3) Test the sample

Test the whole sample and deficient sample respectively. Test the examining limit and veracity.

(4) Print the result of examining

Check the working condition of printer and whether the result of examining is same as the printout.

(5) Test the auto cleaning

Start up the auto cleaning, and then repeat foregoing process and check whether the result is same as the first one.

The self-reading spectrometer runs normally with the test.

III The installation and test for the suspended type cleaning machine

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Test without load

Examine the fixation of each part after the installation and cleaning this equipment. Then run the equipment for one hour without load. If it runs well then test it with heavy load. It runs normally and then for normal production.

(2) Test with heavy load

Modulate the deferent rate to 2m/min, check the working condition of each part. Each part runs normally with this speed.

(3) Pressure test

Check whether the pressure is lower than 0.32 MPa with heavy load. The pressure is accord with the requirement of the equipment.

The suspended type cleaning machine runs normally with the test.

Installation and Test Report for

Shanxi Huaxiang Tongchuang Foundry Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	bottom pour casting machine	JZ1000A	set	1

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance, which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose 20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the *waiting icon disappeared.*

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two *minutes.*

The front iron liquid quality apparatus runs normally with the test.

II *The installation and test for the bottom pour casting machine*

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Check equipment

Examine the fixation of each part after the installation and cleaning this equipment. *Check the wall of equipment, if the wall* break up, the equipment should be replaced.

(2) Test without load

Start up and test the equipment for 2 to 3 minutes without load. Check the working conditions of the driving system include electromotor, cardo, retarder and chain belt. *If* it runs well then test it with heavy load. It runs normally and then for normal production.

(3) Test with heavy load

Molten iron moulding test. Molten iron immerged in the annular gap between the stopper stick and stopper cup, pour from the bottom and molding.

Speed test. Adjust the size of the annular gap to change the moulding speed and test the working condition of electric reducer and whorl staff.

Test the bid cart and small cart in the plane direction and adjust the moulding jaws.

(4) Clearing

Clearing the workshop when finish the test especially the underside of the equipment.

The bottom pour casting machine runs normally with the test.

Installation and Test Report for

Shanxi Tangrong Autoparts Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	cupola	3t/h	set	2

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose 20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the cupola

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Thermal test

Checkout before the opening of furnace. First, check the balance dosage. Second check agglomeration extent of the pig iron and steel scrap, prevent the shedding furnace.

Aeration test. Poke the wind eye before importing the wind, and then tamp the coke. Open wide some small wind eye before importing the wind to avoid detonating CO and O_2. Then close the small wind eye after importing the wind.

Block up the peephole in 15 minutes. Block up the taphole when few cold iron liquid discharged from the taphole. At the initial stages, reduce the operation time to heighten the temperature of iron liquid.

Pull bag, suspend bag and pour the iron liquid. Two batch of kentledge should be placed when finish the padding.

Poke the wind eye once per 45 minutes to keep the brightness of tuyere. If the tuyere nigrified, we should add some relay-coke and carpolite. The other hand, open the taphole or peephole to help the coke burning and heighten the temperature.

Clean up the residue once per one hour to avoid the oxidation of iron.

(2) Test was continuing three days.

(3) Stop to supply air and drop the furnace

Clean up the workshop and cover up dry sand. Sprinkle cool water to crush out the residue.

The cupola runs normally with the test.

Installation and Test Report for

Shanxi Hua'er Foundry Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	lost foam pattern casting line		set	1

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose 20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because

the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the lost foam pattern casting line

Three-dimensional vibrator is the main equipment of the lost foam pattern casting line. We chose the three-dimensional vibrator to compile the report of installation and test.

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Check the equipment

Examine the fixation of each part after the installation and cleaning this equipment. Check whether the platform is aclinic and airproof.

(2) Test without load

Start up and test 2 to 3 minutes without load. Check the working condition of libration platform, spring and the electromotor. Every parts run normally.

(3) Test with heavy load

Put the sand box on the three-dimensional vibrator and start up it.

Table-board test. Adjust the highness of the Table-board and repeat some times.

Frequency test. Set up different frequency to repeat the above process.

Auto-lock test. Check the auto-lock in the non-working order.

The three-dimensional vibrator runs normally with the test.

Installation and Test Report for

Shanxi Shuangqing Foundry Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	resin sand molding line	5t/h	set	1

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose 20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the resin sand molding line

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Test without load

Examine the fixation of each part after the installation and cleaning this equipment. Then run the equipment for one hour without load. If it runs well then test it with heavy load. It runs normally and then for normal production.

(1) Test with heavy load

Speed test. First, dump 1t resin sand into mixing-sand machine and test with low speed. If it runs well in one hour then test it with high speed. It runs normally with high speed.

Ration test. Repeat the speed test with 1t, 3t and 5t resin sand respectively. It runs normally in six hours.

It runs normally with heavy load and then for normal production.

Installation and Test Report for

Shanxi Pingyao Yongjian Zhongxing Foundry Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	atomic emission spectrometer	SPECTROLAB		
3	resin sand molding line	5t/h	set	1

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose 20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the atomic emission spectrometer

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Set up the manostat power supply.

(2) Set up the operating system.

Install the operating system of the spectrometer and the suitable printer. Then, install the data-analyze adjust software.

(3) Self-check and zero

Boot-strap and self-check, then start up the main process.

(4) Sample test

Set up the absorbed peak value.

Set up the reading time-lapse, damp and reading time, repeat two times.

Set up the concentration and reading precision.

Check the examine-bounds and veracity.

Open the air compressor, ignite and discharge the solution. Repeat two times.

(5) Print the result of the test

Check whether the print spectrogram is same as the result of the test

The atomic emission spectrometer runs normally with the test.

III The installation and test for resin sand molding line

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Test without load

Examine the fixation of each part after the installation and cleaning this equipment. Then run the equipment for one hour without load. If it runs well then test it with heavy load. It runs normally and then for normal production.

(1) Test with heavy load

Speed test. First, dump 1t resin sand into mixing-sand machine and test with low speed. If it runs well in one hour then test it with high speed. It runs normally with high speed.

Ration test. Repeat the speed test with 1t, 3t and 5t resin sand respectively. It runs normally in six hours.

It runs normally with heavy load and then for normal production.

Installation and Test Report for

Shanxi Huaxing Foundry Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	*front iron liquid quality apparatus*	*HF-2002T*	set	1
2	airless blast cleaner	Q69	set	2

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose 20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the airless blast cleaner

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Test without load

Star up and test 2 to 3 minutes without load, check the working condition of hook, transmission system, and whirlwind dust catcheer and hop-pocket percolator. Each equipments run normally with the test.

(2) Test with heavy load

Check the joint of hook and whether the dust catcheer is airproof.

Test hook with third, half and full load respectively. The hook runs normally with the test.

Test with single and couple of hook respectively. It run normally when the two hook

work at the same time.

Put the casting into the airless blast cleaner to test the productivity. The productivity meets the standard of the requirement.

Test the dust catcher with the full load. Repeat three times and continue testing three days.

The airless blast cleaner runs normally with the test.

Installation and Test Report for

Shanxi Taigu Dianli Magang Foundry Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	chain-type coal-burning installation	4150×1100×750	set	1
3	galvanizing furnace	300×200	set	1

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose

20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the chain-type coal-burning installation

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Test in cool condition

Test the electromotor, transmission system and strobe in cool condition, and adjust the supply of coal.

(2) Test in hot condition

Open the furnace and test in hot condition.

Adjust the supply of coal. Adjust the strobe to control the supply of coal and test the transmission system and the veracity of strobe.

Test the quotient of air. Fill half and full air into the furnace respectively, and test the temperature and the distributing of caloric. The caloric distribute equably in the test.

Repeat again. The chain-type coal-burning installation runs normally with the test.

III The installation and test for the galvanizing furnace

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Test without load

Start up the transmission system, then test without load in 2 to 3 minutes and check the working condition of the transmission system and the electromotor.

(2) Test in hot condition

Check whether the galvanizing boiler is fit with the furnace and the firebox and the air transmission system is airproof.

Put the galvanizing boiler on the anneal furnace and set up the firebox, then hot air inpour from both sides of the boiler.

Use the assistant equipment to test whether the temperature meet the standard. The temperature meet the standard in the test.

Use the assistant equipment to test whether the zinc water is well-proportioned. It meets the standard of requirement.

The galvanizing furnace runs normally with the test.

Installation and Test Report for

Shanxi Taigu Xingli Meagan Co. Ltd

This report is for the installation and test of following equipments:

No.	Equipment	Model	Unit	Quantity
1	front iron liquid quality apparatus	HF-2002T	set	1
2	resin sand molding line	5t/h	set	1

The detailed installation and test procedures are as follows:

I The installation and test for the front iron liquid quality apparatus

1. Apparatus and fittings include

Mainframe, machine tank, CRT color display, mouse, U-disk, cup seat, grounded wire, alloy aiguille, sample cup (200 seats).

2. Detailed procedures

(1) Installation for power supply

The apparatus should be supplied power by switchboard of transformer solely. Electro-equipment which power is more than 5KW should not be used in this system of power supply. Otherwise when the high-power equipment stand-down suddenly will produce ground swell voltage to destroy the front iron liquid quality apparatus.

On the other hand, it is fit to prepare a stabilized voltage supply which output power is 500 KW and the input voltage is 110V. The stabilized voltage supply will impair the ground swell voltage by 50%. When the apparatus stop working, power supply should be shut off.

(2) Installation for grounded wire resistance

The filter system is installed a single grounded wire resistance which resistance is less than 3 Ω. The grounded wire is connected with the earthing pole.

The reason for installation of grounded wire resistance including: to reduce the influence come from inductive electric cooker, electric welding, crane and other equipments, and to ensure the precision of survey.

(3) Checking the grounded wire resistance

The yellow and red testing wire is connected the grounded stick which was inserted into ground, and the green testing wire is connected ground, and the range is chose 20Ω. The result is less than 3Ω.

(4) Starting and electrification

The apparatus is used 16 hours uninterruptedly when it has been installed. Because the benchmark comparator battery and holding memory battery should be electricized for ensure the precision of survey.

(5) Aeration condition

The apparatus operate safely in ventilated and cooling environment. Forbid to install the apparatus in the airtight box or high hot radialization environment.

(6) Test

A. Warming- up

The apparatus is warmed up 20 minutes and stabilized.

B. Self-checking

When the apparatus is started up, the apparatus will start initialization self- checking automatically. The current time is updated continuously in the survey menu up to the waiting icon disappeared.

C. Installment for the sample cup

The sample cup is installed on the pedestal. The survey menu will be closed up.

D. Inpouring of molten iron

Molten iron is poured in to sample cup. The whole survey process will finish in two minutes.

The front iron liquid quality apparatus runs normally with the test.

II The installation and test for the resin sand molding line

1. Installation

First, the installation position should be ascertained based on the technical requirement. Second, install this product line according to the installation requirement and fix it with the instruction of technician. The installation is over.

2. Test

(1) Test without load

Examine the fixation of each part after the installation and cleaning this equipment. Then run the equipment for one hour without load. If it runs well then test it with heavy load. It runs normally and then for normal production.

(1) Test with heavy load

Speed test. First, dump 1t resin sand into mixing-sand machine and test with low speed. If it runs well in one hour then test it with high speed. It runs normally with high speed.

Ration test. Repeat the speed test with 1t, 3t and 5t resin sand respectively. It runs normally in six hours.

It runs normally with heavy load and then for normal production.

Annex 3 Production and Energy Management System for Enterprises

Table of Contents

Production and Energy Management System for Shanxi Sanlian Foundry Co. Ltd

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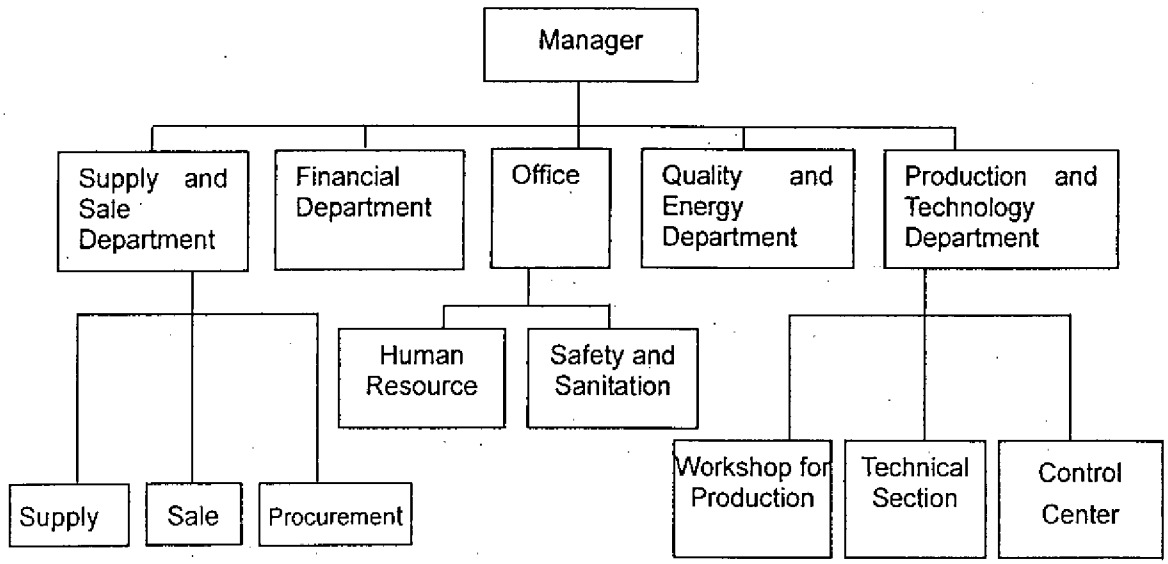

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The enterprise should take measures to reduce noise to meet national and regional environmental standard on noise. Meanwhile, the enterprise should arrange the layout of workshop reasonably, take measures to reduce noise and protect working safety in order to guarantee health of workers.

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The enterprise should evaluate the employees' awareness on safe production, environment and energy-saving. Based on the evaluation results, training on safe production, environmental protection and energy saving technology are conducted to improve the ability of employees and enhance their awareness on energy saving and environmental protection.

Production and Energy Management System for Shanxi Fengkun Foundry Co. Ltd

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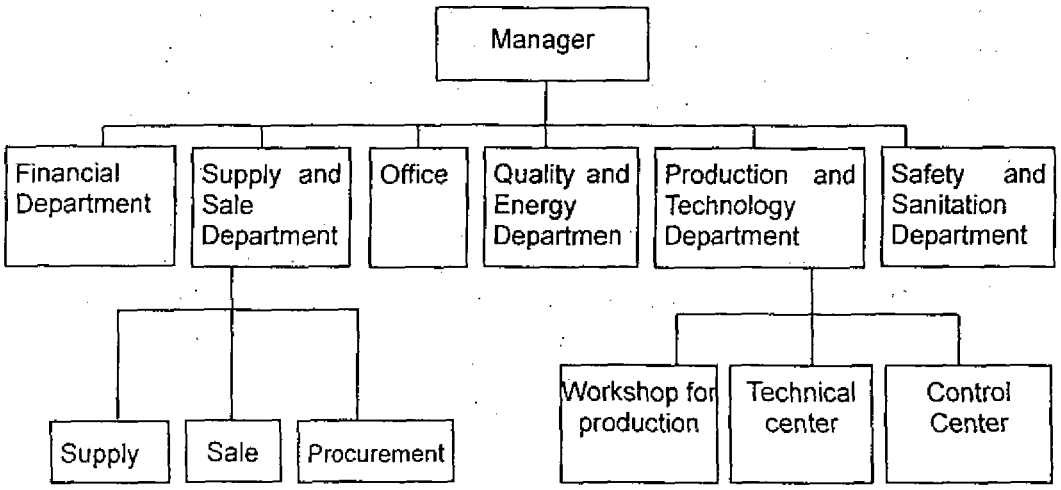

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Chapter 4 Energy Management System

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Production and Energy Management System for Shanxi Huaxiang Tongchuang Foundry Co. Ltd

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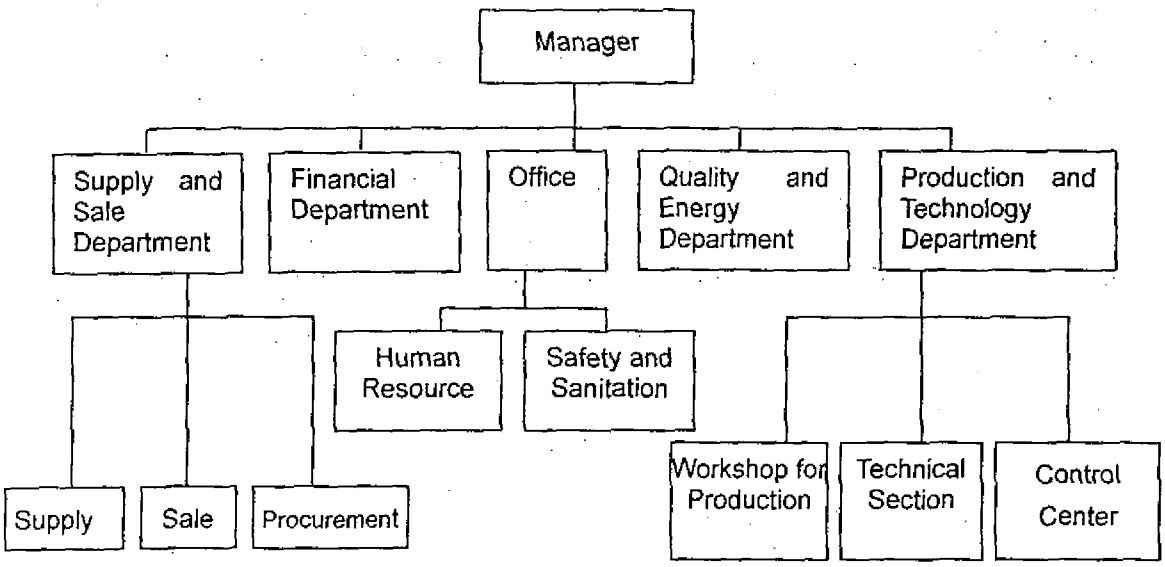

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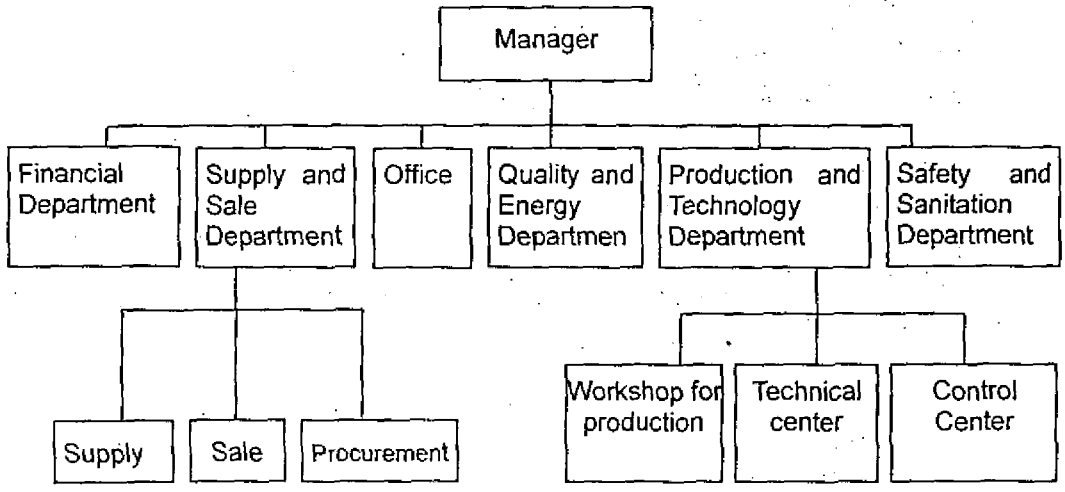

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Production and Energy Management System for Shanxi Hua'er Foundry Co. Ltd

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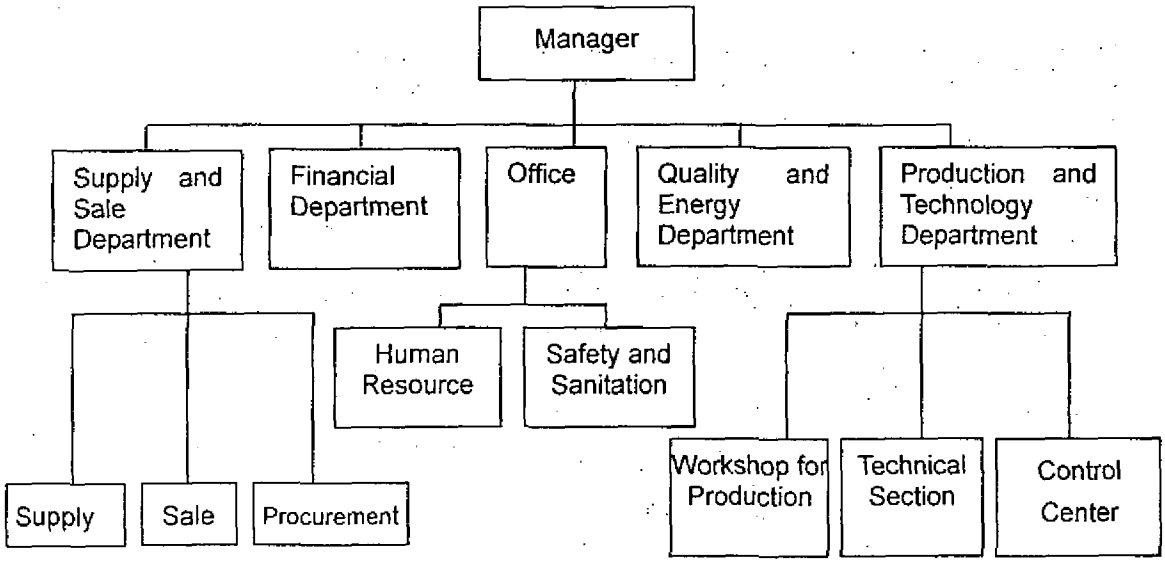

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Production and Energy Management System for Shanxi Shuangqing Foundry Co. Ltd

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The enterprise should carry out target management, quality control system and energy management system. Income distribution inner the enterprise should be combined with production quality and energy consumption.

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The manager should take charge of product quality and energy management of the enterprise overall. Quality and Energy Department is under the charge of manager directly to be responsible for the quality control, quality assurance and energy management. Principal of Quality and Energy Department should undertake the quality and energy management responsibility to ensure the establishment, implementation and maintenance of the Quality and Energy Management System (hereinafter referred to as "System"), and informing the manager of the achievement and improvement demand of the System.

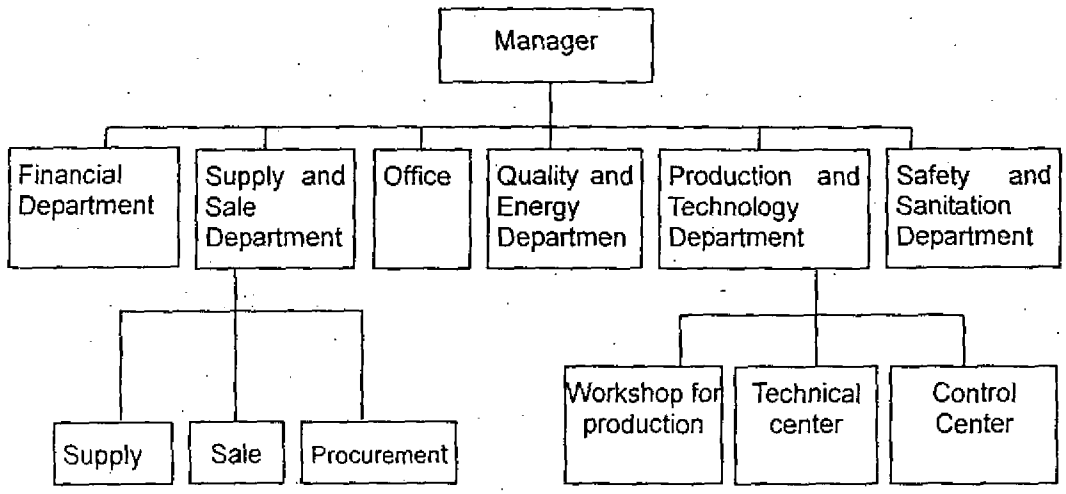

Figure 1 Organizational Structure of Management System for Enterprise

Chapter 2 Quality Management System

Issue 4

The enterprise implements the quality management systems including quality record control system, quality management auditing system and equipment management system and so on.

Issue 5 Quality record control system

This issue is established for standard the management of the record. The record will display product quality objectively factually and truly, and supply the evidence for improving the product line.

Issue 6 Quality management auditing system

The general manager takes responsibility for auditing the quality management system, quality and improved measure termly. Office manager takes responsibility for compiling the report of the auditing and submitting to general manager for approval. It makes sure the management system to implement effectively.

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Issue 8 Process supervises and survey management system

The employees in production department take responsibility for confirming the production process, and planing the disposition of workshop. The employees in technology department take responsibility for estimating the production process and the disposition of workshop, and improving the disposition, and supervising and surveying the production process.

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Issue 10 Production process control system.

The employees in sale department take responsibility for establishing the monthly requirement plan. The employees in procurement department take responsibility for compiling the procurement plan. It makes sure controlling the production process.

Issue 11 Production supervises and survey management system

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Issue 12 Reject control management system

The employees in quantity department take responsibility for analyzing the reject which come from the material, production and callbacked production. The related department establish the rectify measure in accordance with the result of the analysis and submit to quantity department to prevent the reject to next working procedure.

Chapter 4 Energy Management System

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According to the national regulations and local development program on energy use, the enterprise should improve energy structure and enhance energy efficiency to reduce the greenhouse gas emission.

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The full-time energy controller should be assigned by Quality and Energy Department who knows the responsibilities, operation regulations for all process, energy consumption of main energy-consumption equipments, the energy consumption indicators and their test measures.

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Energy controller should formulate energy management plan for enterprise including absolute amounts of energy use, total energy consumption and ration of energy consumption of unit product. The energy controller should compile monthly energy-consumption tables according to actual production and energy consumption.

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The enterprise should adopt management measures on the energy consumption under ration according to the energy management plan, and improve energy efficiency meanwhile by equipment improvement, production process innovation and training for staff to reduce the energy consumption to the lowest level.

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The enterprise should install measure and monitoring system for energy consumption for the accurate and quantitative management. The energy controller should periodically gather and analyze the data on energy consumption according to different energy consumption indicators.

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The enterprise formulates environmental guideline aiming to reduce the pollutants prior to enhancing the efficiency of energy and resources in order to improve production process and reduce pollutants.

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Production and Energy Management System for Shanxi Pingyao Yongjian Zhongxing Foundry Co. Ltd

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Chapter 1 Management Mode

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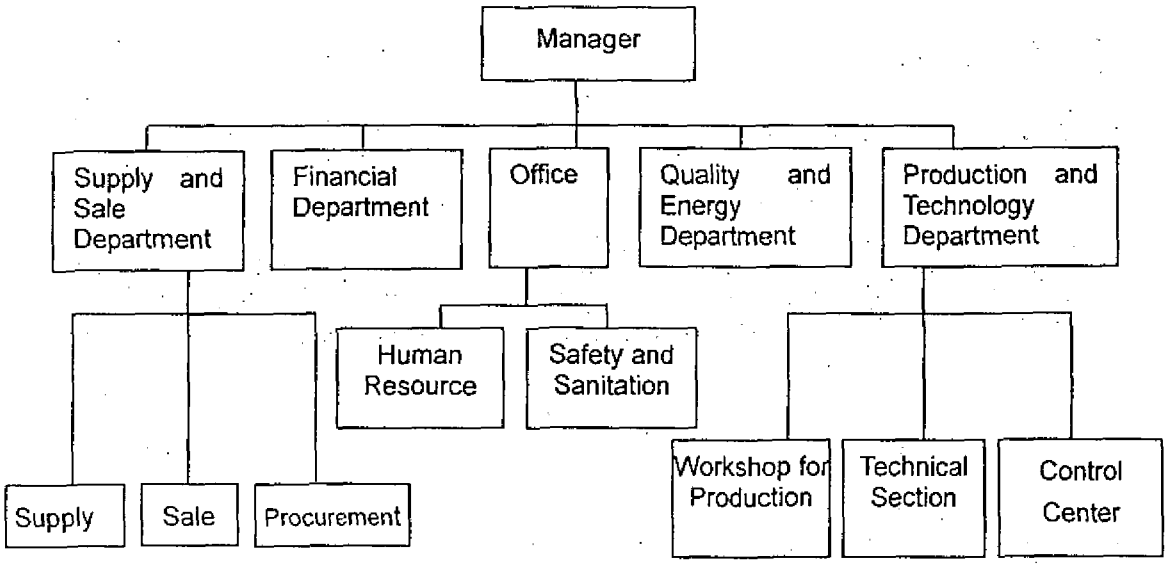

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Production and Energy Management System for Shanxi Huaxing Foundry Co. Ltd

This management system is constituted to enhance the enterprise's management ability, improve product quality, reduce energy consumption and achieve the enterprise's sustainable development.

Chapter 1 Management Mode

Issue 1

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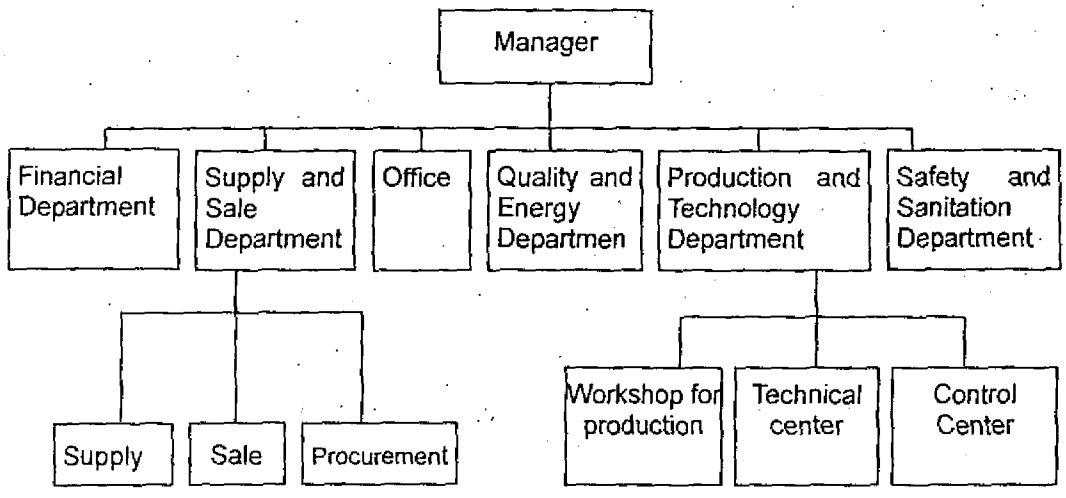

Figure 1 Organizational Structure of Management System for Enterprise

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Chapter 4 Energy Management System

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The enterprise formulates environmental guideline aiming to reduce the pollutants prior to enhancing the efficiency of energy and resources in order to improve production process and reduce pollutants.

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Chapter 6 Training system

Issue 22

The enterprise should evaluate the employees' awareness on safe production, environment and energy-saving. Based on the evaluation results, training on safe production, environmental protection and energy saving technology are conducted to improve the ability of employees and enhance their awareness on energy saving and environmental protection.

Production and Energy Management System for Shanxi Taigu Dianli Magang Foundry Co. Ltd

This management system is constituted to enhance the enterprise's management ability, improve product quality, reduce energy consumption and achieve the enterprise's sustainable development.

Chapter 1 Management Mode

Issue 1

The enterprise should establish the management system (shown in Figure 1) to ensure the departments such as production, supply and sale, finance, human resource, safety, quality and energy management divide the work clearly and conduct their responsibilities respectively.

Issue 2

The enterprise should carry out target management, quality control system and energy management system. Income distribution inner the enterprise should be combined with production quality and energy consumption.

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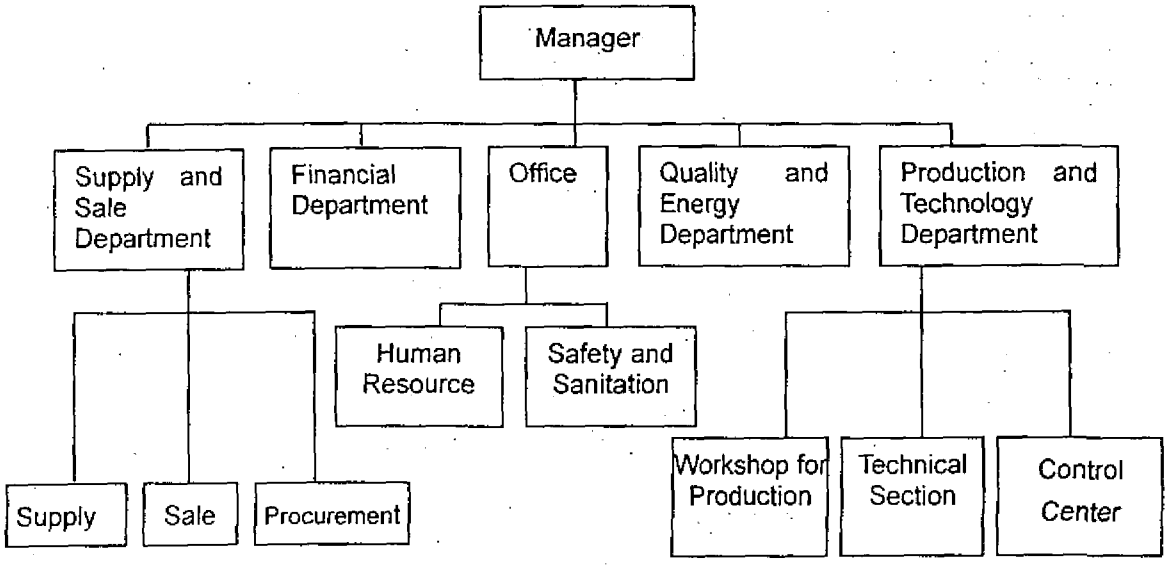

Figure 1 Organizational Structure of Management System for Enterprise

Chapter 2 Quality Management System

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Production and Energy Management System for Shanxi Taigu Xingli Magang Co. Ltd

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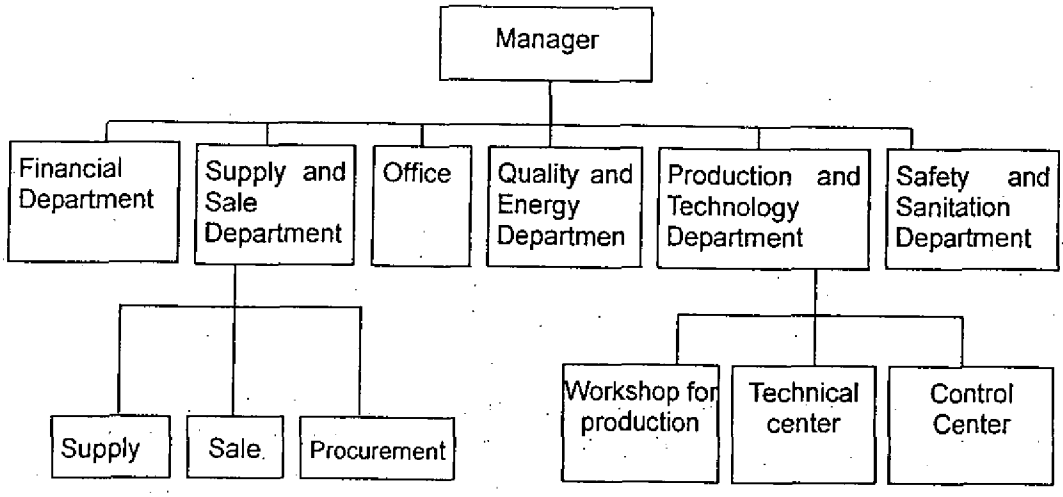

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Annex 4 Certificate of Acceptance

Table of Contents

Certificate of Acceptance

This plant, Shanxi Sanlian Foundry Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

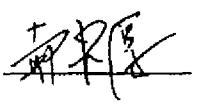
Table1-1 List of Additional Equipment in Shanxi Sanlian Foundry Co. Ltd

No.	Equipment	Model	Unit	Quantity	Production plant
1	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
2	resin sand molding line	5t/h	set	1	Baoding foundry equipment plant

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach or exceed 13000 ton casting per year after technical renovation; qualified rate is improved to 96%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.289 tce per ton casting, and total energy consumption reduces 505.02 tce per year. Carbon dioxide emissions reduce 1,259.02 tons per year.

Signature of the legal representative: 

Date: 10/25/2006

Certificate of Acceptance

This plant, Shanxi Fengkun Foundry Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

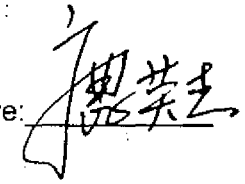
3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

No.	Equipment	Model	Unit	Quantity	Production plant
1	self-reading spectrometer	WCD-3C	set	1	Beijing Nake analysis equipment Co. Ltd
2	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
3	suspended type cleaning machine	XSY	set	1	Wuxi Huishan Xinguang machine equipment plant

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach or exceed 21000 ton casting per year after technical renovation; qualified rate is improved to 97%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.237 tce per ton casting, and total energy consumption reduces 693 tce per year. Carbon dioxide emissions reduce 1,727.65 tons per year.

Signature of the legal representative: 

Date: 10/25/2006

Certificate of Acceptance

This plant, Shanxi Huaxiang Tongchuang Foundry Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

No.	Equipment	Model	Unit	Quantity	Production plant
1	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
2	bottom pour casting machine	JZ1000A	set	1	Baoding Kemeng mechanical and electric technology exploitation Co. Ltd

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach or exceed 38500 ton casting per year after technical renovation; qualified rate is improved to 92%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.146 tce per ton casting, and total energy consumption reduces 462tce per year. Carbon dioxide emissions reduce 1151.77 tons per year.

Signature of the legal representative: _____

Date: 10/25/2006

Certificate of Acceptance

This plant, Shanxi Tangrong Autoparts Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

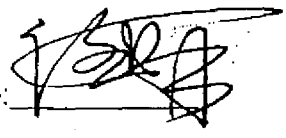
Table 1-4 List of Additional Equipment in Shanxi Tangrong Autoparts Co. Ltd

No	Equipment	Model	Unit	Quantity	Production plant
1	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
2	cupola	3t/h	set	2	Wuxue Fengshen foundry equipment Co. Ltd

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach or exceed 18000 ton casting per year after technical renovation; qualified rate is improved to 80%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.133 tce per ton casting, and total energy consumption reduces 1,332 tce per year. Carbon dioxide emissions reduce 3,320.68 tons per year.

Signature of the legal representative: 

Date: 10/25/2006

Certificate of Acceptance

This plant, Shanxi Hua'er Foundry Co. Ltd Shanxi Shuangqing Foundry Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

Table1-5 List of Additional Equipment in Shanxi Hua'er Foundry Co. Ltd

No.	Equipment	Model	Unit	Quantity	Production plant
1	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
2	lost foam pattern casting line		set	1	Jilin Chuangxin lost foam pattern foundry equipment plant

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach or exceed 25,000 ton casting per year after technical renovation; qualified rate is improved to 85%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.217 ton casting, and total energy consumption reduces 800 tce per year. Carbon dioxide emissions reduce 1,994.40 tons per year.

Signature of the legal representative: 李[illegible]

Date: 10/25/2006

Certificate of Acceptance

This plant, Shanxi Shuangqing Foundry Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

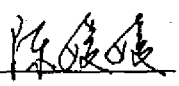
3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

No.	Equipment	Model	Unit	Quantity	Production plant
1	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
2	resin sand molding line	5t/h	set	1	Tianyang foundry equipment plant

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach or exceed 36,500 ton casting per year after technical renovation; qualified rate is improved to 93%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.160 tce per ton casting, and total energy consumption reduces 1,715.50 tce per year. Carbon dioxide emissions reduce 4276.74tons per year.

Signature of the legal representative: 

Date: 10/25/2006

Certificate of Acceptance

This plant, Shanxi Pingyao Yongjian Zhongxing Foundry Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

No.	Equipment	Model	Unit	Quantity	Production plant
1	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
2	atomic emission spectrometer	SPECTROLAB			Germany spark analysis equipment company
3	resin sand molding line	5t/h	set	1	Xingyuan foundry equipment plant

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach or exceed 11,000 ton casting bce per year after technical renovation; qualified rate is improved to 97%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.163 tce per ton casting, and total energy consumption reduces 319tce per year. Carbon dioxide emissions reduce 795.27 tons per year.

Signature of the legal representative: _____

Date: 10/25/2006

Certificate of Acceptance

This plant, Shanxi Huaxing Foundry Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

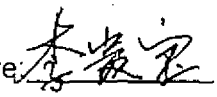
Table1-8 List of Additional Equipment in Shanxi Huaxing Foundry Co. Ltd

No.	Equipment	Model	Unit	Quantity	Production plant
1	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
2	airless blast cleaner	Q69	set	2	Baoding foundry equipment Co. Ltd

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach or exceed 25,000 bce per year after technical renovation; qualified rate is improved to 94%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.144 tce per ton casting, and total energy consumption reduces 860.20 tce per year. Carbon dioxide emissions reduce 2144.48 tons per year.

Signature of the legal representative: 

Date: 10/25/2006

Certificate of Acceptance

This plant, Shanxi Taigu Xingli Magang Co. Ltd, accepts the consulting and engineering services provided by the contractor. Detailed contents are as follows:

1. The contractor finished the Feasibility Study Report for the energy-saving technical renovation (see the First Progress Report) for our plant, and finalized the technical renovation schemes and the ratio of co-financing from the plant to the UNIDO project contribution.

2. Managers and technicians in our plant attended the training on energy-saving technology, policy and safe operation conducted by the contractor; it made us have deeper understanding on this project, the energy saving awareness has been enhanced and we have more comprehensive understanding on the development trend and technology of foundry industry.

3. We accept the equipments purchased with the assistance of the contractor. The list of equipments purchase is as follows:

Table 1-10 List of Additional Equipment in Shanxi Taigu Xingli Magang Co. Ltd

No.	Equipment	Model	Unit	Quantity	Production plant
1	front iron liquid quality apparatus	HF-2002T	set	1	Tianjin Huifeng survey equipment Co. Ltd
2	resin sand molding line	5t/h	set	1	Xinyuan foundry equipment plant

4. The contractor instructed our plant to install new equipments, and conduct the tests for each equipment and the operation of production for try. At last all equipments ran well and meet the requirement for production.

5. The contractor conducted construction supervision and assistance in solving the emerged issues on site during the construction. After the test run, the whole production process runs well.

6. After the test run, the production capability of our plant can reach 9,600 bce per year after technical renovation; qualified rate is improved to 90%. Coal and power consumption decreases greatly. Energy consumption per unit product decreases to 0.268 tce per ton casting, and total energy consumption reduces 672 tce per year. Carbon dioxide emissions reduce 1675.30tons per year.

Signature of the legal representative: 赵星利

Date: 10/25/2006

Annex 5 Training report

Table of content

1 Objective

For project replication in the metal casting sector, UNIDO and the Project Management Office (PMO) of the Ministry of Agriculture have identified about 10 foundries in Shanxi Province which are willing and qualified to participate in project replication. The objectives include increase in the energy efficiency, improvement of the production and reduction of the GHGs from the technical renovation.

EED invited some famous foundry experts to provide training to meet the requirement of the plants, and delivered he advanced techniques to solve the problems. EED utilize the limited finance resources to maximize the benefits of the plants.

2 Preparatory Work

PMO and secretariat of PIC provided guidance to this training, with more support from Hongyuan company. Preparatory work is as follow:

- Handed out the questionnaire of training needs to survey the requirements of the plant. The training plan is included in the second process report.
- Discussed the training time, content, objective and attendee with the local SME bureau, and established the training scheme.
- Organized the experts to compile the training materials.
- Coordinated with local SME bureau and invited the local government officials to attend the training.

3 Memo

Date：21ST October 2006

Location：Shanxi Linfen Jin Dadu hotel

Expert：Zeng Daben, Qian Li, Ma Jianhua, Wang Congxiang, Wang Chunxiang

Attendee: Li Tiantai (mayor of Linfen), Pan Zhongfu(deputy director general of Shanxi provincial SME bureau), Liu Xin (general manager of EED), representative of 81 plants

81 plants included 10 replication plants and other 75 plants. The representatives of 81 plants included 80 persons from the10 replication plants and 150 persons from other 75 plants. The percent of the managers, the technician and staff of plants is respectively 40%, 45% and 15%.

Total number of the attendee: 240

Agenda:

21ST October		
Time	Content	Presenter
8 : 30-10: 40	The advanced technique of cupola	Wang Congxiang
10: 50-12: 00	Discussion	
14: 10-15: 20	The history, trendency, imports and exports of the foundry industry	Zeng Daben
15: 30-16: 40	Stabilization production and technique	Zeng Daben
16: 50-18: 00	Discussion	
22nd October		
Time	Content	Presenter
8: 30-9: 30	Energy conservation measures for the cupola	Qian Li
9: 40-10: 40	Energy conservation measures for intermediate frequency induction furnace	Qian Li
10: 50-12: 00	Discussion	
14: 10-14: 50	The implement of advanced equipments in foundry industry	Ma Jianhua
15: 00-16: 00	demonstration for the front furnace equipment	Ma Jianhua
16: 00-16: 50	The strategy of development and operation in Huaxiang Co. Ltd	Wang Chunxiang
17: 00-18: 00	The experience of energy conservation and technical renovation	Wang Chunxiang

Annex6 is the training material

4 Achievement

(1) The foundry enterprise in replication area learned the history, tendency, domestic and international advanced technique in foundry industry, measures for energy conservation and advanced management mechanism;

(2) The foundry enterprise besides the replication enterprises learned the objective, importance, mode, procedure and achievements of the LPIC;

(3) The foundry enterprise besides the replication enterprises realized the effect and benefit because of the technical renovation. It strengthened the positivity of the replication enterprise;

(4) The foundry enterprises in replication area acquired the knowledge on usage of the energy conservation equipments;

(5) The replication enterprises communicated the process of the project and offered the experience for energy conservation and technical renovation.

5 Experience

5.1 Conducting adequate surveys in the preparatory phase to ensure the training to meet the requirements of the enterprises

Adequate surveys should be conducted to find the existing problems in production process, technology, equipments and management because of the different training needs, resulting from the large variety among the local foundry enterprises. Subcontractor investigated the requirement of the training. The questionnaire and training report is in the annex 4.4 in second process report. The training scheme has been established according to the requirements of the project and the needs of the enterprises. The training scheme is in the annex 4.4 in second process report.

5.2 Enhancing the active participation of the local governments

Contractors benefited from the administrative advantage, regional advantage and personnel advantage of the local government to overcome the difficulties. Contractors coordinated with local governments to enhance active participation.. Local government supported contractors greatly in the training course.

The local SME bureau helped the contractor to invite the government officials and other foundry enterprises, and organized meeting affairs. It is necessary for this training.

5.3 Providing technical trainings for the enterprises with flexible forms

Subcontractor organized the site visiting for some famous foundry experts and compiled the training materials to satisfy the strong requirements of enterprises. The training form included lecture, case analysis, discussion, one on one communication. The rich training content included development prospect and production process of foundry industry, and usage of energy saving equipment, and advanced management and operation system. It is a fruitful training. Many enterprises gave good feedback. Annex 5 is the training report.

The contents covered the common issues and the respective problem in the enterprises. The representatives of the enterprises are satisfied with the training.

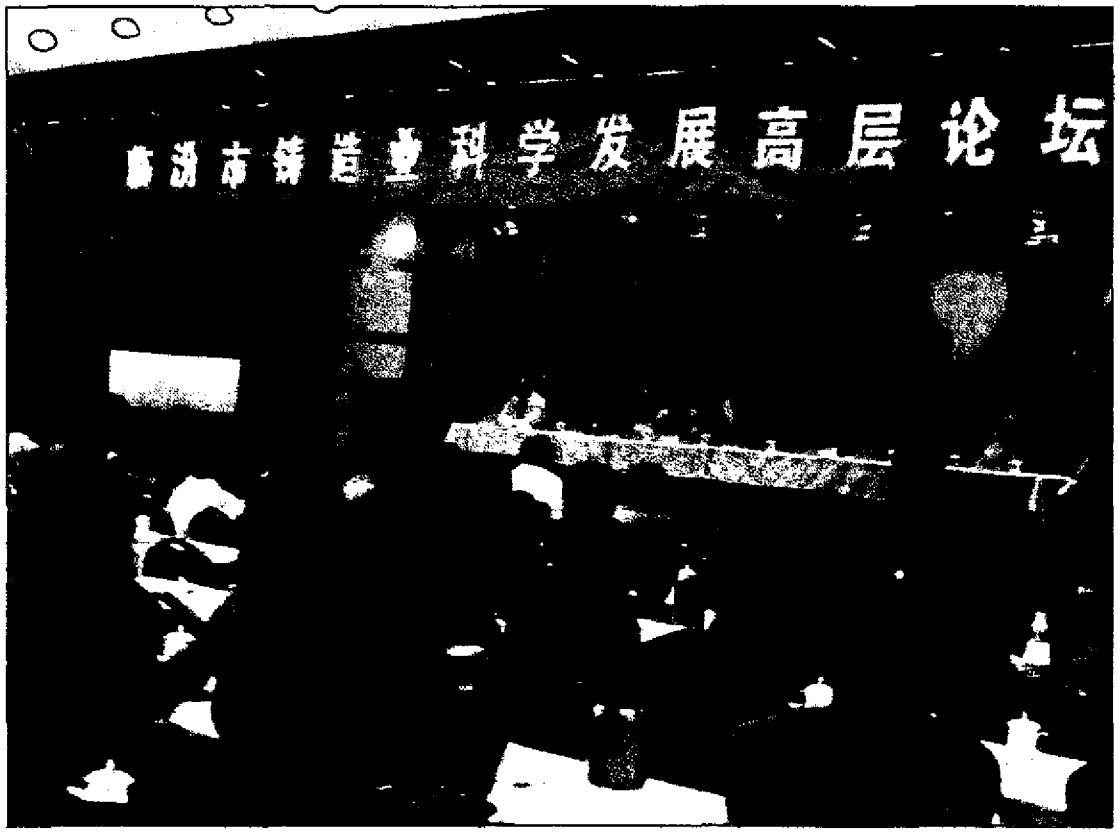
5.4 Enhancing the active participation of equipment plants and replication enterprises

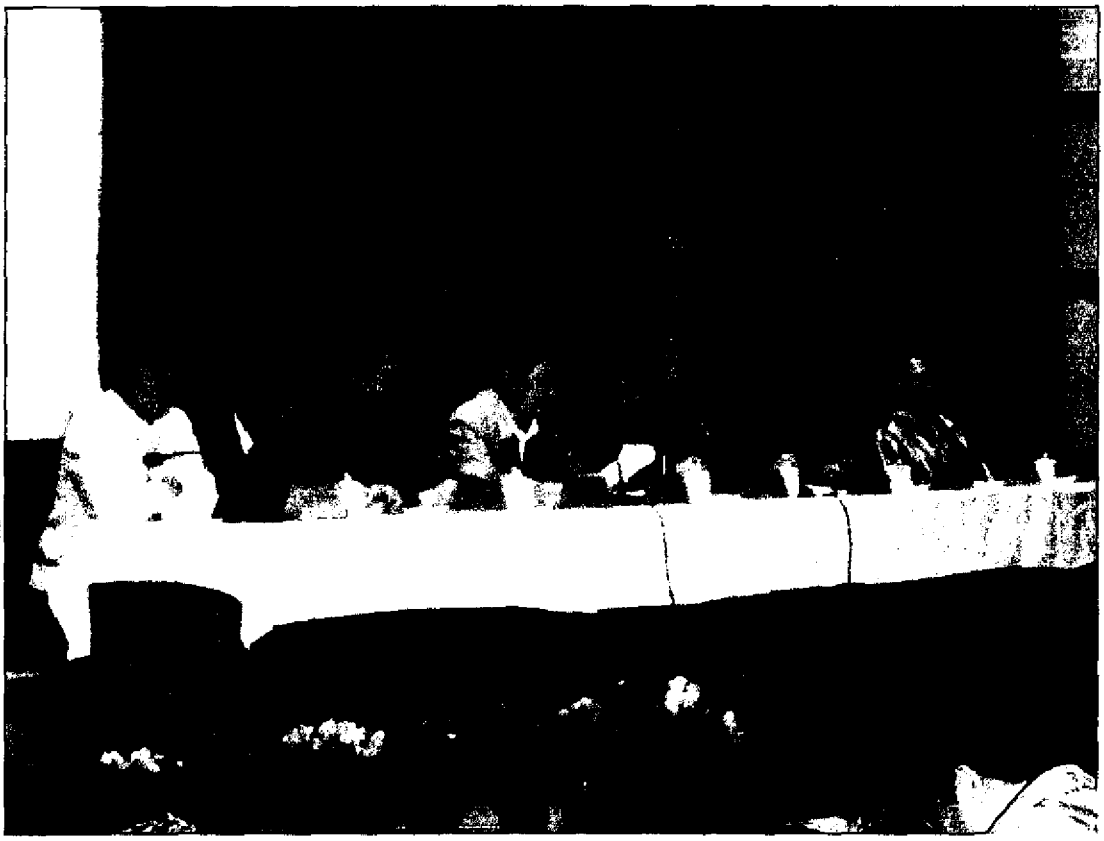
Contractors delivered the equipment demonstration to enhance the understanding of the usage of the equipments. Because almost all the foundry enterprises attended the training, it is a good chance to disseminate the equipments for the equipment plants in the aspects of the usage and advantage of the equipments for free The activities enhanced the active participation of the equipment plants. Moreover, other enterprises further learned the usage of the energy saving equipments and the outcome of the project.

Contractors helped the replication enterprises to install and test the equipment. The replication enterprise delivered a lecture on their own experience to promote the communication among the enterprises. This activity gets twice the result with half the

effort.

6 Photo of training






临汾市铸造业科学发展高层论坛

Annex 6 Training material

Content

Measure of Energy Conservation for Cupola

I Measure of Energy Conservation for Equipment

II Measure of Energy Conservation for Charging, Coke and Material of Scaleboard

III Measure of Energy Conservation for Oven and Smelting

IV Other Measure

Measure of Energy Conservation for Intermediate Frequency of Induction Furnace

I Measure of Energy Conservation for Furnace

A Choose the induction furnace with magnetic yoke

B Install the cover of furnace and reduce the opening frequency

C Choose logical capacity

D Choose logical inductor and water-cooling cable

F Increase the ratio of power

G Power supply with double furnace

H Choose proper thickness of scaleboard

I Choose proper thickness of adiabatic layer for crucible

J Use the roaster

K Constant power output in melting cycle

L Automatization management

II Measure of Energy Conservation for Smelting

A Proper block of charging.

B Clean charging

C Exact distribution

D Close-grained loading.

E Logical loading sequence

F Increase the power using rate.

G Control the end point.

III Measure of Energy Conservation for Management

A Smelting in night shift

B Continuous smelting

C high quality material of scaleboard furnace

Hot analysis implement in the metal casting

Hot analysis comes from the phase- chart theory. It is success example of the basic theory link with production process. Hot analysis is the most important for controlling and checking of molten iron and aluminium before the furnace. It is the indispensable examining method online. Front iron liquid quality apparatus is introduced in this training material.

Main content include: function and structure of the front iron liquid quality apparatus, specification of the front iron liquid quality apparatus, remark of the installment, implement of the front iron liquid quality apparatus, component survey, spherical transformable rate, daily maintenance, and so on.