Concluding report of UNIDO/ILO/WHO Joint Activity on Health and Safety for Chinese coal-gangue brick sector

UNIDO/ILO/WHO 中国煤矸石制砖企业职业安全健康交流活动项目研究报告

Cooperative Group of Gangue brick business exchange activities
Occupational Safety and Health Project

March 1, 2011

煤矸石制砖企业职业安全健康交流活动项目协作组

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Concluding report of UNIDO/ILO/WHO Joint Activity on Health and Safety for Chinese coal-gangue brick sector

UNIDO/ILO/WHO 中国煤矸石制砖企业职业安全健康交流活动项目结题报告

1. Background and purpose

研究背景与目的

Coal was one of the major energy used in the world. In China's energy production and consumption structure, coal accounts for about 70% share. The strategy of coal as the main energy in the future will not change for a long time. It is inevitable of coal-gangue-based solid waste to the process of coal mining and utilization.

煤炭是人类世界使用的主要能源之一。在我国的能源生产和消费结构中，煤炭比重约占 70%左右，以煤炭作为主要能源战略在未来相当长的时间内仍然不会改变。煤炭的开采与利用过程中产生大量的以煤矸石为主的固体废弃物是不可避免的。

Coal-gangue (also known as folder) is a kind of rock symbiotic or associated with coal in the process of coal formation. It accounts 12% of the total coal production. According to the incomplete statistics, the national coal-gangue dumps over the years were about 45 billion tons and it increases at a rate of 1.5-2.0 billion tons each year. There were mountains of coal-gangue in most coal mine of China. It not only occupied the land, but also causes serious environmental pollution. The overflow water of coal-gangue hill makes the groundwater high degree of mineralize and hardness, soil salinization and crop reduction even hundred. Coal-gangue may occur spontaneous combustion as a result of exposure to the air for a long time and emit large quantities of toxic gases, such as SO2, H2S, NOX, CO, CO2. It also can pollute the environment, destroy the ecological balance and seriously affect the health of residents in mining areas.

煤矸石（又称夹矸石）是煤形成过程中与煤伴生、共生的岩石，相当于煤炭产量的 12%左右。据不完全统计，全国历年累计堆放的煤矸石约 45 亿吨，而且每年仍以 1.5～2.0 亿吨的速度增加。煤矸石在我国大部分煤矿堆积如山，不但占用土地，而且造成严重的环境污染。煤矸石山溢流水使地下水呈现高矿度化、高硬度，导致土壤盐碱化，使农作物减产甚至绝收；煤矸石长时间露地堆积往往会发生自燃现象，并排放大量的有毒气体，如二氧化硫、硫化氢、氮氧化物、一氧化碳和二氧化碳等，污染周边环境，破坏生态平衡，严重影响矿区居民的身体健康。

Utilization of these wastes, not only resolves the problems of occupation of land, waste resources, pollute the water and air, destroy the ecological balance but also can save energy, protect land, environment and natural resources, improve building function and promote construction and building materials industry technological progress. So, it was paid attention to and supportted by all level governments. In recent years, utilization of coal- gangue develops rapidly. It is used in building materials, power generation, chemical, metallurgy, light industry and so on. Coal- gangue is as raw material used in brick-making, power generation, cement manufacturing and other production enterprises. China is one of the world's largest coal-producing countries. There is a large amount coal-gangue each year. As a result, fully understanding the problems about occupational safety, health and environmental hazards in the process of utilization of coal-gangue has great significance in

improvement of new energy, circular economy and the development of low-carbon economy.

综合利用这些废物，变废为宝，既解决了煤矸石长期存放侵占土地、浪费资源、污染水源和空气、破坏生态平衡的问题，又节约了能源，保护了耕地、环境和自然资源、改善建筑功能、促进建筑和建材工业的技术进步。因此，受到各级政府部门的高度重视和支持。近年来，煤矸石的综合利用得到了快速发展，已广泛应用于建材、发电、化工、冶金、轻工等行业领域，作为原料主要被用于制砖、发电、水泥制造等生产企业。我国是世界产煤大国，每年都产生大量的煤矸石，因此，充分认识煤矸石综合利用的过程中的职业安全、健康与环境危害，对促进我国新能源建设、循环经济和低碳经济的发展将具有重要的意义。

China's use of coal gangue brick went through four processes. The first phase before 1965, Sichuan and Liaoning provinces began to research coal-gangue brick industrial test products. The second stage from 1965 to 1985, China's coal-gangue brick industry was at a low stage of development. The characteristic of this stage was simple production processes and backward in equipment performance. A level of product quality can only meet the lowest requirements of national standards. The second stage from 1986 to 2000, China's coal-gangue brick industry developed quickly. Besides own research and develop coal-gangue brick equipment, integration and transformation was carried out on the basis of introduction of French, American, Italian, German facilities. Thus, comprehensive production capacity increased and machinery automation level has been considerable development. Since 2000, the forth stage has begun, the technology was to mature. The scale of enterprises of the maximum output rose from 60 million RMB to more than 100 million RMB. The single envelope was been changed in building. In 2006, the total production of coal-gangue brick reached to 1.422 billion. Now, 5000 enterprises engage coal-gangue brick production in 80 thousand brickfields. 60% of the 5000 enterprises were small businesses which annual output below 30 million. 20-30% of the 5000 enterprises were medium-sized enterprises which annual output from 30 to 100 million. And 10-20% of the 5000 enterprises were large-sized enterprises which annual output more than 100 million. Tunnel furnace was used in 10% enterprises.

A large amount of heat was produced in the process of hot roasting.

我国利用煤矸石制砖经历了四个发展过程。1965 年以前为第一阶段，四川省和辽宁省开始研究煤矸石制砖和生产工业性试验产品：第二个阶段为 1965～1985 年，我国的煤矸石制砖处于低水平发展阶段，生产工艺简单、设备性能落后，产品质量只能满足当时低水平国家标准的要求；第三阶段为 1986～2000 年，中国煤矸石制砖发展较快，实现了跨越式的发展。除了自行研发的煤矸石制砖设备外，还在引进法国、美国、意大利、德国等主要设备的基础上，进行了整合和改造，综合产能提高，机械自动化水平有了较大的发展。2000 年以来为第四阶段，技术上趋于成熟，企业的生产规模由上世纪最高年产量 6000 万块上升到了 1 亿块以上，并且改变了建筑中使用的单一围护结构。2006 年我国煤矸石制砖总数已达到了 14.22 亿块。目前，全国 8 万家砖厂中有 5000 家企业从事煤矸石制砖生产。其中，60%为年产量 3000 万块以下煤矸石砖的小型企业，20%～30%为年产量在 3000 万～1 亿块的中型企业，10%～20%为年产量在 1 亿块以上的大型企业，10%的企业使用隧道窑。

To let this heat out directly was a waste of energy and pollution to environment before. In recent years, some brickfields recover part of the roasting heat by hot water output in exhaust-heat boiler.Though the hot water was used to heating or bath, the efficiency of utilization was low. At the guidance of national energy conservation policy, coal-gangue brick sectors have tried cogeneration. It can not only develop the energy efficiency but also decreace the environmental pollution. China is at the research and development stage for the cogeneration technology in coal-gangue brick industry. In August 2008, the first ‘Gangue brick tunnel kiln waste heat

generator’ was on in Zaozhuang New Zhongxing industry Co., Ltd. In September, it combined to the grid. The installed capacity was 1500kW, more than 790 million degrees could be generated each year and 400 million RMB were saved for the enterprises.

煤矸石制砖项目在超热焙烧过程中，产生大量余热，早些时候被直接排放，既浪费能源、污染环境，又不符合国家的相关产业政策。近些年，有部分砖厂回收部分焙烧余热，主要是通过余热锅炉产出热水，用于采暖或提供洗浴用水，但是余热利用率很低。在国家节能减排政策的引导下，煤矸石制砖企业已经尝试利用余热发电，即提高了提高能效，有减少了环境污染。对于煤矸石制砖余热发电技术，我国尚处于研发和示范阶段。2008 年 8 月，国内首台“隧道窑煤矸石烧砖余热发电机组”在枣庄新中兴公司试运行，9 月并网发电，装机容量为 1500kW，每年可发电 790 余万度，为企业节支 400 余万元。

China - United Nations Climate Change Partnership Framework Project launched in October 2008, a period of 3 years, involving nine United Nations agencies and dozens of government departments. It is China's first joint project of class climate change, the Millennium Development Fund, the Government of Spain is also the largest project financing ($ 12,000,000). Aim to achieve support for climate change policies, while encouraging innovation and technology development and promotion. The joint project focuses on three broad areas:

中国-联合国气候变化伙伴框架项目于 2008 年 10 月启动，为期 3 年，涉及九个联合国机构和十个政府部门。它是中国第一个气候变化类联合项目，也是西班牙政府千年发展基金资助最大的项目（1200 万美元）。旨在为实现气候变化的政策提供支持，同时鼓励创新技术的开发与推广。该联合项目主要关注以下三大领域:

1) In the field of climate change policy, the project includes a concrete and operational content to support China's current policy framework. Specifically, include:

在气候变化政策领域，本项目所包括了具体的和可操作性的内容，以支持中国目前的政策框架。具体来说，包括:

a) China's international climate change policy,

中国国际气候变化政策，

b) Establishing of the Beijing International Center for Climate Change,

建立北京国际气候变化中心，

c) Development of China's new energy law, the low carbon approach into business development and partnerships.

制定中国新能源法，将低碳方法纳入企业的发展和伙伴关系。

2) Mitigation projects related to energy efficiency technologies, renewable energy in rural areas, agro-ecological farming systems to improve the efficiency of the management and planning. Specifically, include:

减缓项目涉及能效技术、农村可再生能源、农业生态系统的管理和提高耕种效率的规划。具体来说，包括:

a) Clean coal technology demonstration,

清洁煤技术的示范。

b) Coal gangue brick waste heat utilization and cogeneration technologies,

煤矸石制砖余热利用和热电联产技术的推广。

c) Rural biomass pellet technologies,

农村生物质颗粒技术的推广。

d) Through the Clean Development Mechanism funding for the protection of agriculture,

通过清洁发展机制为保护性农业筹措资金，

e) Electrification of rural renewable energy projects to support sustainable development.

农村可再生能源电气化可持续发展支持项目。

3) Adaptation projects in the following areas:

适应项目主要涉及以下领域:

a) Reduce poverty,

减少贫困，

b) Yellow River Basin development, vulnerability assessment and adaptation measures,

黄河流域农业发展，脆弱性评估和适应措施，

c) The Yellow River Basin Water Resources Management, to improve the groundwater monitoring system for high-risk areas, timely development of remedial measures,

黄河流域水资源管理，改善高风险地区地下水监测体系，及时制定补救措施，

d) Health: the development of Chinese health practice of planning and climate change strategy,

卫生：制定中国卫生领域规划和气候变化实践策略，

e) Employment: Assessing China's low carbon development and employment to improve the relationship between the policy recommendations.

就业：评估中国低碳发展和就业提高之间的关系，提出政策建议。

Coal-gangue brick waste heat power generation demonstration project was one of the key support items of China-United Nations Climate Change Partnership Framework Project. Cogeneration technology program has been developed and demonstrated and popularized in Xinrong New Building Material Co. Ltd. of Juyi Industrial Group. It is to be put into production in early 2011.

在“中国–联合国气候变化伙伴框架项目”中，煤矸石制砖余热发电示范项目作为重点支持项目之

一，已开发出一套余热发电技术方案，并拟在山西聚义实业集团进行技术方案示范和推广。此项目正在启动，拟于 2011 年初投入运行生产。

In 2010, UNIDO、ILO、WHO and China CDC carried out a project named ‘Health and Safety for Chinese coal-gangue brick sector’ in order to discuss the problems of occupational safety, health and environmental hazards in Chinese coal-gangue brick sectors and popularize coal-gangue cogeneration technology.

为探讨我国煤矸石制砖企业职业安全、健康和环境危害现状，推广煤矸石制砖余热发电技术，国际组织 UNIDO、ILO、WHO 与中国疾病预防控制中心合作于 2010 年下旬开展了“中国煤矸石制砖企业职业安全健康交流活动项目”。

The overall objective of the project: ①To discuss status and characteristics of occupational safety and health in HRPG of Chinese coal-gangue brick production. ②To evaluate status and characteristics of occupational safety and health in Chinese coal-gangue brick sector and the sufficiency and applicability of relative policies, regulations and standards in this industry. ③To raise management strategies of occupational safety and health environment in coal-gangue brick sectors and formate guideline to occupational safety and health management.

项目的总体目标：①探讨中国煤矸石制砖生产中余热发电系统（HRPG）的职业安全健康现状及其特点；②评估煤矸石制砖企业职业安全、健康和环境危害现状及其相关政策、法规、标准在该行业的充分性或适用性；③提出煤矸石制砖企业职业安全、健康和环境管理对策建议，初步形成煤矸石制砖生产及其 HRPG 系统职业安全健康管理工作指南。

2. Scope and Content

范围与内容

2.1 Research scope

研究范围

We should chose the 13 coal-gangue brick enterprises (including two enterprises covering heat recovery power generation systems at least) from Shanxi, Shandong, Hubei, Ningxia and Liaoning Provinces in China as the study objects of this joint activity. Of these factories, including 3 respectively in each of Shanxi, Shandong and Hubei Provinces, 2 in Hubei Province, 1 in Liaoning Province. Survey enterprise should include key support project of coal-gangue brick heat recovery power generation demonstration project in "Chinese - the UN climate change partner framework project", namely, Shanxi JuYi industrial group. This study conduct the comprehensive investigation and study for above contents through using the method of filling surveys, on-site detecting, access to documents and on-site verification. Survey enterprise and distribution see table 1-1 and figure 1-1.

选择煤炭企业分布比较集中的山西、山东、宁夏、湖北和辽宁五个省的 13 家煤矸石制砖企业（包含余热发电系统的企业 2 家）作为本次交流活动的研究对象。其中，各调查省兼顾了企业规模分布。调查企业包括“中国-联合国气候变化伙伴框架项目”中，煤矸石制砖余热发电示范项目重点支持的项目之一，即山西聚义实业集团。本次交流活动项目主要采用填表调查、现场检测、查阅文件和现场核查等相结合的方法，对上述研究范围的研究对象的如下内容进行调查与研究。调查企业及其分布表 1-1 和见图 1-1。

Table 1-1 The 13 research enterprise names and subordinate provinces

province	Serial number	enterprises name
shanxi	1	New building materials Co., Ltd.of Ju Yi Industrial Group in Shanxi（heat recovery power generation）
	2	New wall materials product factory in Shanxi Luan Mining Group
	3	Jincheng Kangxia Building Materials Engineering Co., Ltd.
shandong	4	Building materials company, Zaozhuang New Zhongxing industry Co., Ltd.（heat recovery power generation）
	5	Shandong Xinqi New building material Co., Ltd.
	6	Taian huatai building materials Co., Ltd.
ningxia	7	Ningxia Zhongjieneng New material Co.Ltd.
	8	Ningxia sichuan Thai new energy-saving building materials Co., LTD
	9	Ningxia gangue brick factory of HengYunda comprehensive industrial Co., LTD
hubei	10	Rock size brick field of Chen Xiongye in Hubei jingmen
	11	Hubei jingmen coal-gangue brick manufacturing Co., LTD
	12	Hubei jingmen YongTeng Coal Gangue brick factory
liaoning	13	TieMei group iron strong wall materials Co., LTD

表 1-1 13 家调研企业名单及所属省份

省份	序号	企业名称
山西	1	山西聚义实业集团新型建材有限公司（附余热发电系统）
	2	山西潞安集团新型墙体材料厂
	3	晋城康夏建材工程有限公司
山东	4	枣庄新中兴实业有限责任公司建材分公司（附余热发电系统）
	5	山东新齐新型建材有限责任公司
	6	泰安华泰建材有限公司
宁夏	7	宁夏中节能新材料有限公司
	8	宁夏川泰新型节能建材有限公司
	9	宁夏恒运达综合实业有限责任公司矸石砖厂
湖北	10	湖北省荆门市晨雄页岩砖厂
	11	湖北荆门市环新煤矸石砖制造有限公司
	12	湖北省荆门市勇滕砖厂
辽宁	13	铁法煤业集团铁强墙体材料有限公司

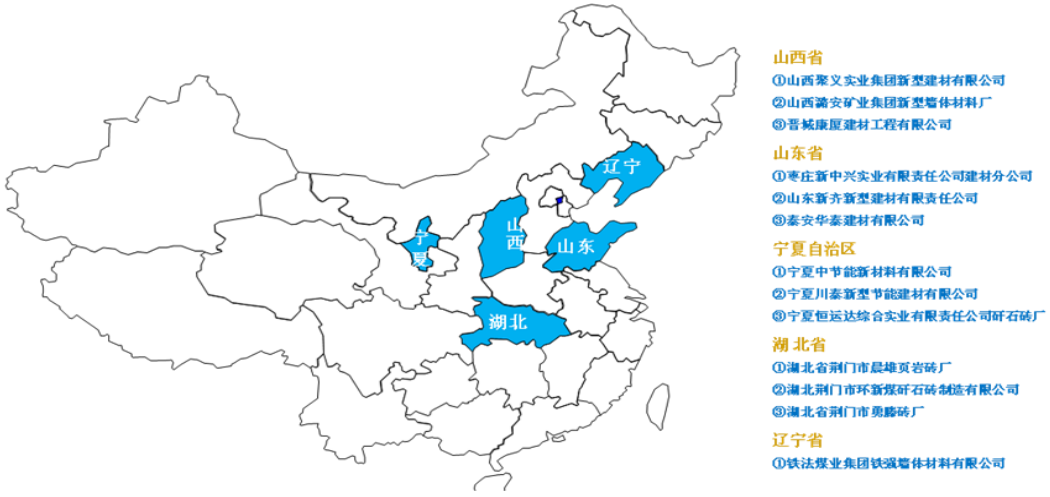


Figure 1-1 The distribution of 13 Coal-gangue enterprises in China

13 家煤矸石制砖企业分布图

2.2 Research content

研究内容

According to global objective of joint activity and project output requirements, define project Research Contents Include: ① The General Information Of Factories; ②E nterprise Engineering Status; ③ Identification, Analysis and Evaluation of Dangerous and Harmful Factors; ④S tatus and Evaluation of Occupational, Safety and Environmental Protective Equipments; ⑤ Status and Evaluation of Emergency Rescue Facilities; ⑥ Usage status and Evaluation of Personal Protective Equipment (PPE); ⑦ Status and Evaluation of Occupational Medical Examination; ⑧ Status and Evaluation of Sanitary Rooms and Facilities; ⑨ Status and Evaluation of Occupational safety, Health and Environmental Management; ⑩ Occupational Safety, Health and Environmental Management Strategy.

依据交流活动项目的总体目标和项目产出要求，确定项目研究内容包括：①企业基本情况；②企业工程现状；③危险、有害因素的识别、分析与评价；④职业安全、健康和环境防护设备现状及其评价；⑤应急救援设施现状及其评价；⑥个体防护装备（PPE）配备与使用现状及评价；⑦职业健康监护现状及其评价；⑧卫生用室及设施现状及其评价；⑨职业安全、健康和环境管理现状及其评价；⑩职业安全健康环境管理对策。

2.2.1 Enterprise Basic Situation

企业基本情况

Enterprise general information should include: the general condition and peripheral environment.

企业基本情况包括企业一般情况和企业周边环境情况。

2.2.1.1 Enterprise General Information

企业一般情况

The contents include: ① Enterprise Name; ② Enterprise address; ③ Economic Element; ④ The Factory Size; ⑤ Productive Capacity; ⑥ The Number of Employee of the Factory; ⑦ Project record. Enterprise basic situation survey details see attached Schedule 1.

内容包括：①企业名称；②企业地址；③经济成分；④企业规模；⑤生产规模；⑥员工总数；及⑦项目备案等情况。企业基本情况调查的详细内容见附表 1。

2.2.1.2 Enterprise peripheral Environment

企业周边环境

The contents include: ① Geography; ② Surrounding Environment(including geographical relationship of towns and the circumjacent dweller); ③ Climatic Conditions; ④ The Number Of Peripheral Residents; ⑤ Supply Of Drinking Water For Enterprise Life. Enterprise peripheral environment survey details see attached Schedule 2.

内容包括：①自然地理；②周边环境（包括城镇及周边居民的地理关系）；③气候条件；④所处地域的居民数；⑤企业生活饮用水供应等情况。企业周边环境调查的详细内容见附表 2。

2.2.2 Enterprise Engineering Status

企业工程现况

2.2.2.1 Enterprise Engineering Status

企业工程现状

The contents include: ① General Layout（Details see also attached Schedule 2）； ② Production Process（Details see also attached Schedule 2）; ③ Production Organization（Details see also attached Schedule 3）; ④ Raw Materials, Intermediate Products, Product, Dosage Or Capacity（Details see also attached Schedule 4）; ⑤ Main Productive Equipment, Mechanized and Automation（Details see also attached Schedule 5）.

内容包括：①总平面布置（详见附表 2）；②生产工艺流程（详见附表 2）；③生产组织（详见附表 3）；④原辅料、中间产品、产品、用量或产量（详见附表 4）；⑤主要生产设备及其机械化、自动化程度等（详见附表 5）。

2.2.2.2 Industrial Waste and Noise Production Situation

工业三废和噪声产生情况

The contents include: ① Production process whether to produce waste water and gas and waste residue and noise whether wastewater, waste gas, waste dregs and noise are produced in the production process; ② Production part of producing waste; ③ Waste disposal methods and processes; ④ Waste discharge destination. The survey details Industrial waste and noise see attached Schedule 2.

内容包括：①生产过程中是否产生废水、废气、废渣及噪声；②产生废物的工艺环节；③废物处置方式及工艺；④废物排放去向等。工业三废和噪声调查的详细内容见附表 2。

2.2.3 Identification, Analysis and evaluation of Dangerous and Harmful Factors

危险、有害因素的识别、分析与评价

2.2.3.1 The major hazard installations for dangerous chemicals

化学品重大危险源

The contents include: ①Identification of major hazard installations in production sites; ②Identification of major hazard installations in storage areas. Identification content of major hazard installations for dangerous chemicals see attached Schedule 6.1.

内容包括：①生产场所重大危险源的辨识；②贮存区重大危险源的辨识。化学品重大危险源的识别内容详见附表 6. 1。

2.2.3.2 Identification and Analysis of Dangerous and Harmful Factors

危险、有害因素的识别与分析

The contents include: ①Identification of Dangerous Factors; ②Identification of Occupational Hazards factor. Identification, analysis and evaluation of dangerous and harmful factors see attached Schedule 6.1.

内容包括：①危险因素的识别；②职业性有害因素的识别。危险、有害因素的识别、分析与评价的详细内容见附表 6.1。

2.2.3.3 Identification and Analysis of Environmental Pollution

环境污染源的识别与分析

The contents include: ① Waste generated during the production process, such as waste gas, wastewater, noiseand waste dregs; ② Discharge Method (organized or unorganized), durative of emissions (continuous or intermittent); ③ The Productive Processes Producing Wastes; ④ Types and title of environmental pollutants (example: heavy metals, such as cadmium, lead, mercury, chromium; polycyclic aromatic hydrocarbons, such as benzo[a]pyrene) Details see attached Schedule 6.2.

内容包括：①生产工艺、产生的废物（气、水、声、渣）；②排放方式（有组织或无组织）、排放持续性（连续或间歇）；③废物产生过程；④废物中优势或特征性环境污染物种类或名称（如：镉、铅、汞、铬等重金属，多环芳烃）。详细内容见附表 6.2。

2.2.3.4 Monitoring and Evaluation of dangerous and harmful factors and safety accidents and the occurrence occupational disease

危险、有害因素的监测与评价及安全事故与职业病发生情况

The contents include: ① Monitoring of Occupational and Environmental harmful factorss; ② Risk Classification; ③ Hazard Classification of Workplace; ④ Major Hazard Installations; ⑤ Safety accidence and occupational diseases; ⑥ Evaluation and detection for Environmental harmful factorss. Details see attached Schedule 7 and attached Schedule 8.

内容包括：①职业和环境有害因素监测；②危险性分级；③有害作业分级；④重大危险源；⑤安全事故及职业病发生情况；⑥环境有害因素监测与评估。详细内容见附表 7、附表 8。

2.2.4 Status and Evaluation of Occupational Safety, Health and Environmental Protective Equipments

职业安全、健康和环境防护设备现状及其评价

The contents include: ①Existing Occupational Safety; ②Investment and Distribution in Healthy and Environmental Protective Equipment; ③ Equipment work status；④ The periodic monitoring, evaluation and maintenance of the equipments' protective effect; ⑤ The related management systems and implementation status. Details see attached Schedule 9.

内容包括：①现有职业安全；②健康和环境防护设施投入及分布；③设施运行；④定期监测、评价与维护等情况；以及⑤相关管理制度与其执行情况等。详细内容见附表 9。

2.2.5 Status and Evaluation of Emergency Rescue Facilities

应急救援设施现状及其评价

The contents include: ①Emergency rescue facilities and facilities distribution,daily monitoring, maintenance; ③related management system; ④training system and implementation situations. Details see attached Schedule 9 and attached Schedule 12.

内容包括：①应急救援设施及其分布；②设施日常监测、维护情况；③相关管理制度；④演练制度及执行情况。详细内容见附表 9 和附表 12。

2.2.6 Selection,Equipped Situation and Evaluation of Personal Protective Equipment (PPE)

个体防护装备（PPE）选择、配置现状及其评价

The contents include: ① The selection of PPE; ② The type of equipped; ③ Should be equipped situation and the actual equipped situation; ④ Training; ⑤ Related management systems and implementation situation. Details see attached Schedule 10, attached Schedule 11 and attached Schedule 12.

内容包括：①PPE 选择情况；②配备类型；③应配备和实际配备情况；④培训情况；⑤相关管理制度及执行情况等。详细内容见附表 10、附表 11 和附表 12。

2.2.7 Status and Evaluation of Occupational Medical Examination

职业健康监护现状及其评价

The contents include: ① Occupational Health Care Personnel; ② Periods (Frequency) of Health Care; ③ Health Care Indicator; ④ The Results of Health Care. Details see also attached Schedule 12.

内容包括：①职业健康监护人群；②健康监护种类和周期；③健康监护指标；④健康监护结果等。详细内容见附表 12。

2.2.8 Status and Evaluation of Sanitary Rooms and Facilities

卫生用室及设施现状及其评价

The content include: Bathroom , dressing room/keep dressing room , toilet facilities , living room , woman health room and so on. Details see also attached Schedule 12.

内容包括：浴室、更/存衣室、盥洗设施、生活用室、妇女卫生室等情况。详细内容见附表 12。

2.2.9 Status and Evaluation of Occupational safety, Health and Environmental Management

职业安全、健康和环境管理现状及其评价

Contents of survey and Evaluation include: a. organization; b. rules and regulations; c. records management; d. early prevention; e. Materials and equipment management; f. workplace management; g. the monitoring of occupational hazards in workplaces; h. To execute the impartment obligation; i. protection facilities and personal protective equipment; j.occupational health care; k.emergency rescue and assistance for occupational-disease-inductive accidents; l. auxiliary sanitary rooms; m. occupational health training; n. occupational disease diagnosis and patient ensure; o. public supervision; p. The managements for environmental protective equipments. Details of the investigation and evaluation see also attached Schedule 12 and attached Schedule 13.

内容包括：①组织机构；②规章制度；③档案管理；④前期预防；⑤材料和设备管理；⑥工作场所管理；⑦工作场所职业病危害因素监测；⑧履行告知义务；⑨防护设施和个体防护装备；⑩职业健康监护；⓫职业病危害事故的应急救援；⓬辅助卫生用室；⓭职业健康培训；⓮职业病诊断与病人保障；⓯群众监督；⓰环境保护设施管理。详细内容见附表 12、附表 13。

2.2.10 Occupational Safety, Health and Environmental Management Strategy

职业安全健康环境管理对策

The contents include: ① The investigation of the external and internal factors that impact on occupational safety, health and the environment; ② The analysis of strengths and weaknesses, analysis of opportunities and threat for external and internal factors; ③ Giving advice to occupational safety, health and environmental improvement. The contents of investigation and analysis see also attached Schedule 13.

内容包括：对影响职业安全、健康和环境的外部因素调查和内部因素的调查；内外部因素优势和劣势分析，机遇和威胁分析；提出职业安全、健康和环境改善建议。

3. Method and Implementation

研究方法与实施

3.1 Research Method

研究方法

This study conduct the comprehensive investigation and study for above contents through using the method of filling surveys, on-site detecting, access to documents and on-site verification.Among them, GB18218 (Risk Identification of Major Hazards of Chemicals) and GB12268 (National Standards List of dangerous goods) is the mainly basis of the identification of the major hazards of dangerous chemicals. According to GB 6441 "Workers casualty classification criteria", the classification of Dangerous factor is be fill out. Occupational hazard factors is mainly based on the Categories directory of occupational disease dangerous factor which issued by the Ministry of Health (Health Law release supervision [2002] 63). Risk classification will be selected to the method of preliminary hazard analysis or the risk evaluation of the Operating conditions. The monitoring of Occupational and environmental hazards is in the main basis for GBZ 159 "the test specification of toxic substances detection in workplace air sampling", GBZ/T 189"Measurement of physical factors in workplace"and GB/T 17061"technical specification of Air sampling equipment in workplace". The occupational hazard factors in the Classification of hazard levels will adopt respectively GB 5817"hazard classification of workplace exposed to dust" , GBZ/T 229.2"hazard classification of workplace exposed to toxics", GBZ/T 229.3"hazard classification of workplace exposed to high-temperature"and LD 80"hazard classification of workplace exposed to noise" to analyse the harmful levels of occupational hazardous factors in Workplace. The evaluation of the validity for equipping PPE based mainly on: GB/T 11651 (The selection and Usage rules of Personal Protective Equipment), GB/T 18664 (Selection, Use and Maintenance of Respiratory Protective Device) and GB/T 23466 (Guide for Selection of Hearing Protectors) and so on.This study conduct the investigation and study for brick line of Ju Yi Industrial Group in Shanxi and Status and Strategy of Occupational Safety and Health management which HRPG installation before and after using SWOT.

采用填表调查、现场检测、查阅文件和现场核查等相结合的方法，对上述内容进行全面调查与分析。其中，危险化学品重大危险源的辨识主要依据 GB 18218《危险化学品重大危险源辨识》和 GB 12268《国家标准危险货物品名表》；危险因素类别主要依据 GB 6441《企业职工伤亡事故分类标准》；职业性有害因素划分主要依据卫生部《职业病危害因素分类目录》（卫法监发[2002]63 号）；危险性分级采用预先危险性分析或作业条件危险性评价法；职业病危害因素和环境有害因素监测主要依据 GBZ 159《工作场所空气中有毒物质检测的采样规范》、GBZ/T 189《工作场所物理因素测量》、GB/T 17061《作业场所空气采

样仪器的技术规范》等标准；接触职业性有害因素作业危害程度分级分别采用 GB 5817《粉尘作业场所危害程度分级》、GBZ/T 229.2《有毒作业分级》、GBZ/T 229.3《高温作业分级》与 LD 80《噪声作业分级》等分析方法对工作场所职业性有害因素危害程度进行分级分析；PPE 配备正确性评价主要依据 GB/T 11651《个体防护装备选用规范》、GB/T 18664《呼吸防护器用品的选择、使用与维护》和 GB/T 23466《护听器的选择指南》等；采用态势分析方法（SWOT）对山西聚义实业集团制砖线及 HRPG 安装前后的职业安全健康管理现状及对策进行调查与分析。

Basic research work will be commissioned by Center for Disease Control and Prevention at the provincial level, Occupational Disease Prevention Hospital is responsible for organizing and Expert group in charge of On-site audit. 11 coal-gangue brick enterprises have completed all based survey and field test data, except Ningxia sichuan Thai new energy-saving building materials Co., LTD and Ningxia gangue brick factory of HengYunda comprehensive industrial Co., LTD which was suspended the implementation as for technological innovation leading to on-site testing can not only report the basic research data.

基础调研工作委托各省级疾病预防控制中心、职业病防治院实施，现场审核工作由专家组实施。除宁夏川泰新型节能建材有限公司和宁夏恒运达综合实业有限公司实行停产技术改造，导致现场测试工作无法进行，只能上报基础调查资料外，其余 11 家煤矸石制砖企业均已完成全部基础数据调查与现场测试。

3.1.1 Filling surveys, on-site detecting

填表调查与现场测试

Investigator be trained and enterprise safety and health manager be research was Completed basic investigation form.The basic investigation form include attached Schedule 1 to 5 and attached Schedule 8 to 11. Enterprise safety and health manager andEnterprise employee representatives was Fill in attached Schedule 6.1 and 6.2 in the base of on-site inspection. Executive member fill out attached Schedule 7 after complish the Field testing in the region. Firstly, executive member have a investigestion in the site and reference related content of regulate attached Schedule 6.1 and 6.2, determine the test contents and test site, and main hazard factors of the occupational and environment in accordance with relevant national test standards, finally complete attached Schedule 7. Relevant content involved in attached table need to clear as follows.

由经过培训的调查人员和被调查企业安全健康管理人员完成基础调查表格的填写。填表调查的基础表格包括：附表 1～附表 5 和附表 8～附表 11。附表 6.1 和附表 6.2 首先由被调查企业安全健康管理人员会同企业劳动者代表对现场进行逐一核查的基础上填写。附表 7 主要由执行组成员在完成本地区企业现场测试后进行填写。执行组成员首先对现场进行调查并参考已调好的附表 6.1 和附表 6.2 的相关内容，确定测试内容和测试地点，对工作环境主要职业病危害因素和环境有害因素按照国家相关测试规范进行测试后，完成附表 7 的填写。附表中涉及并需要明确的相关内容如下。

3.1.1.1 Related definitions

相关定义

Dangerous chemicals: The chemicals which would be dangerous or harmful for personnel, facilities and environmental, and with characteristics of flammable, explosive, toxic and hazardous and so on.

危险化学品（dangerous chemicals）：具有易燃、易爆、有毒、有害等特性，会对人员、设施、环境噪声伤害或损害的化学品。

Major hazard installations for dangerous chemicals: the unit in which hazardous chemicals have been chronically or temporarily produced, processed, used and stored, and their dosage is equal to or exceeded the thresholds quantity.

危险化学品重大危险源（major hazard installations for dangerous chemicals)：长期地或临时地生产、加工、使用或贮存危险化学品，且危险化学品的数量等于或超过临界量(thresholds quantity)的单元。

Occupational hazards(or the occupational-disease-inductive factors): The factors or conditions that produce and/or exist in the occupational activities, and may create adverse impact on health, safety and operational capacity of employees, generally including chemistry, physics, biology and so on.

职业性有害因素：又称职业病危害因素，在职业活动中产生和（或）存在的、可能对职业人群健康、安全和作业能力造成不良影响的因素或条件，包括化学、物理、生物等因素。

Environmental harmful factors: The factors generated in the production process and be likely to to induce hazardous effects to environmental quality and non-occupational population health, including physical, chemical and biological factors.

环境有害因素：在生产过程中产生的对环境质量和非职业人群健康造成不良影响的因素，包括物理、化学和生物性因素。

3.1.1.2 Identification and Analysis of Major Hazard Installations for Dangerous Chemicals

危险化学品重大危险源的辨识与分析

Identification of major hazard installations for dangerous chemicals is based primarily on the hazardous properties and the quantity of dangerous chemicals existed in the unit, see GB12268 (List of dangerous goods) and GB18218 (Identification of major hazard installations for dangerous chemicals). If the amount of chemical existed in the unit is equal to or exceeds it's thresholds quantity, it should be regarded as major hazard installations. Identification of major hazard installations includes the identification for production sites and storage areas.

危险化学品重大危险源的辨识主要依据 GB18218（危险化学品重大危险源辨识）和 GB12268（国家标准危险货物品名表）中危险化学品的危险特性及其数量，单元内存在化学品的数量等于或超过规定的临界量，即被定位为重大危险源。重大危险源辨识包括生产场所重大危险源的辨识和贮存区重大危险源的辨识。

3.1.1.3 Identification and Analysis of Dangerous and Harmful Factors

危险有害因素的辨识与分析

We should distinguish occupational safety, health, environmental risks and harmful factors from three aspects that are the human, physical and environmental aspects. This study will divide the risk factors be into 16 categories by considering synthetically the origin objects, causes induced an accident, damage substances, mode of injury and according to on GB6441 (Workers casualty classification criteria), and divide Occupational Hazards factors into 10 categories according to Categories directory of occupational-disease-inductive factors promulgated by the Ministry of Health (Health Law release supervision [2002] 63) which follow occupational diseases categories. Detailed investigation and identification content of elements see also attached Schedule 6.1.

The dangerous and harmful factor in specific categories as follows.

从人、物和环境三方面识别职业健康安全和环境危险有害因素。危险因素类别主要依据 GB6441《企业职工伤亡事故分类标准》，综合考虑起因物、一起事故先发的诱导性原因、致害物、伤害方式等，将其划分为 16 类；职业性有害因素划分主要依据卫生部《职业病危害因素分类目录》（卫法监发[2002]63 号），按其可能导致的职业病类别将其划分为 10 类。详细调查与识别内容见附表 6.1。危险有害因素的具体类别如下：

①Categories of Risk Factors

危险因素类别

a. Objects beating; b. Vehicle injuries; c. Mechanical injury; d. Lifting injury; e. Electric shock; f. Drowning; g. Burnings; h. Fire; i. Fall from high places; j. Collapse; k. Blasting; l. Gunpowder explosion; m. Chemical explosion; n. Physical explosions; o. Poisoning and asphyxia; p. Other injuries.

a.物体打击；b.车辆伤害；c.机械伤害；d.起重伤害；e.触电；f.淹溺；g.灼烫；h.火灾；i.高处坠落；j.坍塌；k.放炮；l.火药爆炸；m.化学性爆炸；n.物理性爆炸；o.中毒和窒息；p.其他伤害。

②Categories of Occupational Hazards factor

职业性有害因素类别

a. Dust (13 species); b. Ionizing radiation/radiation; c. Chemicals (56 species); d. Physical factors (4 species); e. Biological factors (3 species); f. Risk factors that can cause occupational skin diseases (8 species); g. Risk factors that can lead to occupational eye disease (3 species); h. Risk factors that can lead to occupational ears, nose, throat and oral diseases (3 species); i. Risk factors that can cause occupational tumor (8, species); j. Other occupational hazards (5 species).

a.粉尘（13 种）；b.电离辐射/放射线；c.化学物质（56 种）；d.物理因素（4 种）；e.生物因素（3 种）；f.导致职业性皮肤病的危害因素（8 种）；g.导致职业性眼病的危害因素（3 种）；h.导致职业性耳鼻喉口腔疾病的危害因素（3 种）；i.职业性肿瘤的职业病危害因素（8 种）；j.其他职业病危害因素（5 种）。

3.1.1.4 Identification and analysis of environmental pollution

环境污染源识别与分析

To analysis and identify the waste generated during the production process, and its existing shape and sections and discharge methods. The characteristic contaminants in environmental media have been eliminated without orga Such as wastewater, waste gas, waste dregs and noise, and its concentration exceed relevant environmental standards, those contaminants and its emissions can be considered as environmental pollution.

分析、识别生产过程中产生废物的工艺流程环节及所产生废物的形式与排放方式。如生产过程中产生废水、废气、废渣及噪声。环境介质中特征污染物无组织排放，且超过国家相应环境标准，可视为环境污染源。

To analysis and identify the advantaging or featuring environmental pollutions. Specific investigations include: the production process, waste resulting in these production process (air, water, sound, Java), discharge method

(organized or unorganized), durative of emissions (continuous or intermittent), the productive processes producing wastes, types and title of environmental pollutants (example: heavy metals, such as cadmium, lead, mercury, chromium; polycyclic aromatic hydrocarbons, such as benzo[a]pyrene) (see attached Schedule 6.2).

分析、识别生产过程中产生的各环境介质中优势或特征性环境污染物。具体调查内容包括：生产工艺、产生的废物（气、水、声、渣）、 排放方式（有组织或无组织）、排放持续性（连续或间歇）、产生废物的生产过程、废物中优势或特征性环境污染物种类或名称（例如：重金属，如镉、铅、汞、铬；多环芳烃，如苯并 a 芘）（见附表 6.2）。

Environmental hazards categories: heavy metals, SO_2, NO_2, CO, polycyclic aromatic hydrocarbons, and noise.

环境有害因素类别：重金属、SO_2、NO_2、CO、多环芳烃、噪声等。

3.1.1.5 Monitoring and Evaluation of Dangerous and Harmful Factors

危险、有害因素的监测与评价

① Monitoring of Occupational and Environmental Hazards

职业和环境有害因素监测

To implement the Investigation or on-site detection for the occupational and environmental hazards factors that may cause occupational diseases or environmental hazards. The item of investigation and detection include: ① The monitoring of chemical factors such as dust, poisons, etc.; ② Monitoring of physical factors such as noise, vibration, heat, radiation. The dust, high temperature, noise , CO、SO2、NO2 and so on been ascertained as occupational hazards factors to detect. Heavy metals, SO2, NO2, CO, polycyclic aromatic hydrocarbons, and noise and so on been ascertained as environmental hazards factors to detect.

对可能导致职业病或环境危害的职业和环境有害因素进行调查或现场检测，具体调查与检测内容包括：①化学因素监测：粉尘、毒物等；②物理因素监测：噪声、振动、高温、辐射等。职业有害因素包括：粉尘、高温、噪声、CO、SO_2、NO_2等；环境有害因素包括：重金属(如镉、铅、汞、铬)、SO_2、NO_2、CO、多环芳烃（如苯并 a 芘）、噪声等。

The detailed content of Investigation or on-site detection include: Investigation or detection of the concentration or intensity of harmful factors（such as dust, high temperature, noise, CO、SO_2、NOX, free SiO_2 content in dust, etc.）, occupational exposure and environmental pollution thing (such as work Records etc.), etc. The detailed content see also attached Schedule 7.

调查和检测内容包括：职业和环境有害因素的浓度或强度、职业接触情况调查（工时记录内容）、环境污染情况调查、粉尘游离 Si02 含量测试等。调查及监测内容详见附表 7。

② Risk Classification

危险性分级

The preliminary risk analysis or operative risk assessment method will be selected to classify the risk from risk factors. The investigation and analysis include: the accidents caused by risk factors, degree of the harm; the scores of possibility of accidents occurring (L), frequency exposed to hazardous environmental (E), the scores of the consequences severity of an accident (C). Their result will be Fill in attached Schedule 6.

拟采用预先危险性分析或作业条件危险性评价法，对危险因素可能导致的危险程度进行分级分析。

其调查和分析内容包括：按照危险因素导致的事故、危害的危险（危害）程度；事故发生的可能性分值（L）、暴露于危险环境的频繁程度（E）、事故造成的后果分值（C）。填写内容详见附表 6。

③ Determining Risk of Occupational Hazards

接触职业性有害因素作业危害程度分级

The methods of risk assessment we should adopt including respectively: ① Hazard classification of workplace exposed to dust; ② Hazard classification of workplace exposed to toxics; ③ Hazard classification of workplace exposed to high-temperature; ④ Hazard classification of workplace exposed to noise.

分别采用：a.粉尘作业危害分级；b.有毒作业危害分级；c.高温作业危害分级；d.噪声作业危害分级等分析方法对工作场所职业性有害因素危害程度进行分级分析。

④ Major Hazard Installations

重大危险源

Analysis method of Fault Tree (FT) or Event Tree (ET) will be selected to conduct qualitative or quantitative evaluation for the major hazard installations. The contents of evaluation include: the determination of the initial event, the determination of security features, development and simplify FT or ET, and FT or ET analysis etc al.

拟采用事故树或事件树分析方法对重大危险源作定性或定量评价。其内容包括：初始事件的确定、安全功能判定、发展事件树和简化事件（故）树、事件（故）树分析等。

⑤ Safety accidence and occupational diseases

安全事故及职业病发生情况

Safety accidence (Casualty accidence): The accidence of injury occurring during producing and labouring, which include physical injury, acute poisoning and so on. The physical injuries include death, severe injury and slight injury.

安全事故（伤亡事故）：指企业职工在生产劳动过程中，发生的人身伤害(以下简称伤害)、急性中毒(以下简称中毒)。人身伤害包括死亡、重伤和轻伤。

Severe injury：The injuries which lose labour ability for more than 105 work days.

重伤：指相当于损失工作日等于和超过 105 日的失能伤害。

Slight injury：The injuries which lose labor ability for less than 105 workdays.

轻伤：指损失工作日低于 105 日的失能伤害。

Occupational diseases：Here under refers to the diseases incurred to the labourer of enterprises, institutions and private business units (hereinafter referred to as “Employer”) resulted from contacting with powder dust, radioactive substances, other poisonous and harmful substances in the work，including 115 kinds of 10 categories from the occupational disease list in China.

职业病：指用人单位的劳动者在职业活动中，因接触粉尘、放射性物质和其他有毒、有害物质等因素而引起的疾病。此处专指职业病名单中的 10 大类 115 种职业病。

The specific contents of investigating safety accidence and occupational diseases see also attached Schedule 8.

安全事故及职业病发生情况调查的具体内容详见附表 8。

⑥ Evaluation and detection for Environmental harmful factorss：To survey and detect the Environmental harmful factorss, and evaluate whether the air and water are polluted. The result detected is determined according to state related standards, the environments exceeded the state related standards is regarded as polluted one.

环境有害因素监测与评估：对生产过程中所产生废物中的优势或特征性环境有害因素进行调查、现场检测，评估大气、饮水（包括水源水）是否出现污染。检测结果按国家大气环境质量标准和饮水（包括水源水）卫生标准进行判定，超标者可视为出现污染。

3.1.2 Access to Documents and On-site Verification

查阅文件和现场核查

Members of the expert panel in all districts together with the investigators have fulfilled access to Documents by on-site verification, complete table 12 and table 13, and submit work executed group. Work executed group will drawn a certain percentage of enterprises from the 13 companies on the basis of actual work progress, and organize expert group to conduct On-site Verification for table 12 and table 13, verification way include on-site inspection, examination and verification for documents, and discussion with top management and workers.

查阅文件主要由各地区专家组成员会同本地区执行组成员对本地区被调查企业进行现场核查，并完成附表 12 和附表 13 的填写，上报工作执行组。工作执行组根据实际工作进度从 13 家企业中抽取一定比例的企业，组织专家组对其附表 12、13 内容进行现场核查，核查方式包括现场检查、文件审核、与企业最高管理者和劳动者座谈等方式进行。

3.2 Quality Control

质量控制

To ensure the reliability and facticity of data, unified survey questionare was chose. The invesgators were trainned. The questionare was revised on the basis of expert review and pilot survey. Secondary training system was used to invesgators trainning. The first phase: design staff took part in the trainning of invesgators. The second phase: Safety and health management members in sectors were trainned by invesgators.

为确保资料的可靠和真实，项目选用统一调查表格，并统一对调查人员进行培训。调查表格为在专家评审与试点调查基础上进行修订的调查表。调查或填表人员的培训采用二级培训制度。一级培训：方案设计人员对参与调查的执行组成员进行培训；二级培训：参与调查的执行组成员对被调查企业参与调查的安全健康管理人员进行培训。

Secondary system was used in audit and inspection. After examined by senior invesgators the datas from subordinate were then summary and report. At last, statistics and analysis has begun.

资料的审核与验收实行二级审核与验收制度。由上一级调查人员对下一级调查人员的调查资料进行审核汇总后上报。最后，由工作组人员统一汇总，统计与分析。

3.3 Project team composition and division of labor

项目组组成与分工

In accordance with the requirement of the project contents, we establish the expert group and implementation group of the project. Panel of experts from the WHO, the Chinese Center for Disease Control and Prevention Occupational Health and Poison Control experts and the provincial disease prevention and control center, consisting of leaders Occupational Disease Prevention Hospital; execution group from the provincial disease prevention and control centers and health supervision bureau / The Professional And the person in charge of corporate occupational health and so on. Expert Group and Executive Group members are as follows.

按照项目内容要求，项目实施时成立专家组和执行组。专家组由 WHO 专家、中国疾病预防控制中心职业健康与中毒控制所专家和各省级疾病预防控制中心、职业病防治院负责人组成；执行组由各省市疾病预防控制中心和卫生监督局/所专业人员以及企业职业健康负责人等组成。专家组和执行组成员组成如下。

3.3.1 Experts Group

专家组

Leader: Li Tao, Brent Powis

Members: Li Tao, Wang Zhongxu, Brent Powis, Mao Jixiang, Liaohai Jiang, Shao Hua, Guo support Hi, Ma Fuhai, Ling Ruijie.

组长：李涛、Brent Powis

成员：李涛、王忠旭、Brent Powis、毛吉祥、廖海江、邵华、郭支喜、马福海、凌瑞杰。

3.3.2 Executive Group

执行组

Leader: Wangzhong Xu, Li Tao (China Center for Disease Control and Prevention, Occupational Health and Poison Control)

组长：王忠旭、李涛（中国疾病预防控制中心职业卫生与中毒控制所）

Participating units, the responsible person and members

参加单位、负责人及成员：

⑴ Lead unit-responsible for project implementation activities, program development, organization and implementation

Chinese Center for Disease Control and Prevention Occupational Health and Poison Control

Person in charge: Li Yuzhen

Members: Qin Ruli, Farmers, Zhang Xueyan, Ning.

⑵ Participating units - responsible for the investigation of the region and training the survey unit

① Institute of Occupational Disease Prevention, Shandong Province

Leader: Shao Hua

Members: Single Wing-lok, Zhangzhi Hu, Feng Bin, Zhang Fang, Liu Shangjun, Douguang Wei, Liu Zhigang

② Center for Disease Control and Prevention in Shanxi Province

Leader: Guo support hi

Members: Xiu-Ping Li, Guo Hongmei, Cao Hongbing (Center for Disease Control and Prevention in

Shanxi Province)

Lian Chang (Shanxi Luan Mining Group Co. Health Department)

Zhi-Ming Zhou (Shanxi Jincheng Anthracite Coal Mining Group Co., Ltd. General Hospital)

Yang Haizhen (Shanxi Lingshi City Health Authority)

③ Ningxia Hui Autonomous Region Center for Disease Control and Prevention

Leader: Mafu Hai, Ji-Xiang Liu

Members: Wangguan Mei, Geng Jingdong, Sun Wei, Lihong Cheng (Ningxia Hui Autonomous Region Center for Disease Control and Prevention)

Zu Liping, Min Hua Ning, side ho (Shizuishan CDC)

Li Yinshan, Qu Li-ping, take Zhi Dong, Meng Yuru (Shizuishan City Health Authority)

④ Occupational Disease Prevention Hospital in Hubei Province

Contact: Ling Ruijie

Members: Sun Jingzhi, Xu sand, yellow Development (Occupational Disease Prevention Hospital in Hubei Province)

Huashan Xie, Yangdong Yue, FAN Li (Center for Disease Control and Prevention Jingmen)

Cengfan Liang (Jingmen City Health Supervision Bureau)

⑤ Occupational Disease Prevention Hospital in Liaoning Province

Contact: Li Gang, Li Fengtong

Members: Zhang Ke, Li Ran, Zhen Baoning, Hong Jing (Center for Disease Control and Prevention Tieling)

⑴牵头单位-负责活动项目实施方案的制定、组织与实施

中国疾病预防控制中心职业卫生与中毒控制所

负责人：李玉珍

成　员：秦汝莉、李玉珍、张雪艳、贾宁。

⑵参加单位-负责对本地区被调查单位的调查与培训工作

①山东省职业病防治研究院

负责人：邵华

成　员：单永乐、张志虎、冯斌、张放、刘尚军、窦广伟、刘志刚

②山西省疾病预防控制中心

负责人：郭支喜

成　员：李秀萍、郭红梅、曹红兵（山西省疾病预防控制中心）

李安昌（山西潞安矿业集团有限责任公司卫生处）

周志明（山西晋城无烟煤矿业集团有限责任公司总医院）

杨海珍（山西省灵石市卫生监督所）

③宁夏回族自治区疾病预防控制中心

负责人：马福海、刘吉祥

成　员：王冠梅、耿敬东、孙伟、李鸿成（宁夏回族自治区疾病预防控制中心）

祖丽萍、闵宁华、边浩(石嘴山市疾控中心)

李银山、曲丽萍、冒志东、孟玉茹(石嘴山市卫生监督所)

④湖北省职业病防治院

负责人：凌瑞杰

成　员：孙敬智、徐沙、黄开发（湖北省职业病防治院）

解华山、杨东岳、范丽（荆门市疾病预防控制中心）

曾凡亮（荆门市卫生监督局）

⑤辽宁省职业病防治院

负责人：李刚、李凤桐

成　员：张克、李晓然、甄宝宁、洪静（铁岭市疾病预防控制中心）

3.4 The main activities of the project

项目进行的主要活动

3.4.1 May 12-13, 2010, start meeting of UNIDO/ILO/WHO Joint Activity on Health and Safety for Chinese coal-gangue brick sector begun in Beijing. The Implementing protocol and division of work had been determined during meeting.

2010 年 5 月 12 日-13 日在北京召开 UNIDO/ILO/WHO 中国煤矸石制砖企业职业安全健康交流活动项目启动会，确定项目实施方案并进行任务分工。

3.4.2 May 14, 2010, a pilot survey had begun in two sectors from Shandong and Liaoning Province. By the end of May, the pilot survey had conpleted and initial implementing protocol had been reformulated . On June 10th, the survey had carried out overall.

2010 年 5 月 14 日，对山东、辽宁的两家企业开展试点调查，5 月底完成试点调查，修订原实施方案，并于 6 月 10 日在 5 省开展全面调查。

3.4.3 July 8-10, 2010, Members from Institute of Occupational Health and Poison Control, China Centre for Disease Control and Prevention and Shandong Research Academy of Prevention and Treatment of Occupational Diseases investigated in Shan Dong Building Materials Company, Zaozhuang New Zhongxing industry Co., Ltd.

2010 年 7 月 8 日-10 日，中国疾病预防控制中心职业健康与中毒控制所和山东省职业病防治院项目组成员对山东省枣庄市新中兴实业公司建材分公司进行现场考察。

3.4.4 July 12-14, 2010, Members from Institute of Occupational Health and Poison Control, China Centre for Disease Control and Prevention, Liaoning Institute of Occupational Health and Tieling City CDC investigated in Tieling Coal Group Tieqiang Wall Material Co., Ltd.

2010 年 7 月 12 日-14 日，中国疾病预防控制中心职业健康与中毒控制所、辽宁省职业病防治院和铁岭市疾病预防控制中心项目组成员对辽宁省铁岭市铁煤集团铁强墙体材料有限责任公司进行现场考察。

3.4.5 August 3-6, 2010, Members from Institute of Occupational Health and Poison Control, China Centre for Disease Control and Prevention and Ningxia Centre f or Diseases Control and Prevention（NXCDC） investigated in Ningxia Chuantai New Jieneng building material Co., Ltd.

2010 年 8 月 3 日-6 日，中国疾病预防控制中心职业健康与中毒控制所和宁夏自治区疾病预防控制中心项目组成员对宁夏石嘴山市中节能新材料有限公司进行现场测试和现场考察。

3.4.6 August 17, 2010, Members from Institute of Occupational Health and Poison Control, China Centre for Disease Control and Prevention and WHO team made a summary to the pre-exchange activities.

2010 年 8 月 17 日在 WHO 驻中国办事处中国疾病预防控制中心职业健康与中毒控制所和 WHO 项目组成员对前期交流活动情况进行阶段性工作总结。

3.4.7 September 1-4, 2010, key members of the project group of experts (including the WHO experts, the Chinese Center for Disease Control and Prevention experts, Liaoning, Occupational Disease Prevention Hospital experts) Tieling City, Liaoning Province Strong Iron Coal Iron Wall Materials Co., Ltd. On-site visits, verified the preliminary research data, and organize workers in the workshop discussion.

2010 年 9 月 1 日-4 日，项目专家组主要成员（包括 WHO 专家、中国疾病预防控制中心专家、辽宁职业病防治院专家）对辽宁省铁岭市铁煤集团铁强墙体材料有限责任公司进行现场考察，对初步调研资料进行核查，并组织各车间工人进行座谈。

3.4.8 September 13-16, 2010, key members of the project group of experts (including the WHO experts, ILO experts, the Chinese Center for Disease Control and Prevention experts, experts in Occupational Disease Prevention Hospital, Shandong Province) of Shandong Province, Zaozhuang City, National Chung Hsing Industrial Company Building Materials Branch Site visit, the expert verification, and to occupational health, safety and environment-related issues and business representatives and workers to carry out discussion.

2010 年 9 月 13 日-16 日，项目专家组主要成员（包括 WHO 专家、ILO 专家、中国疾病预防控制中心专家、山东省职业病防治院专家）对山东省枣庄市新中兴实业公司建材分公司现场考察、专家核查，并就职业健康、安全和环境相关问题与企业代表和工人开展座谈。

3.4.9 September 9, 2010, one after another to collect the basic research of the companies surveyed data and on-site verification information.

2010 年 9 月 20 日开始，陆续收集各被调查企业基本调研资料和现场核查资料。

3.4.10 October 18, 2010, the WHO China Office China Center for Disease Control and Prevention, Occupational Health and Poison Control and the WHO project team members on the preliminary investigation and data summary.

2010 年 10 月 18 日，在 WHO 中国办事处中国疾病预防控制中心职业健康与中毒控制所和 WHO 项目组成员对前期调研资料进行总结。

3.4.11 November 2010 ~ January 2011, all the research data have been check and accepted, settled, done statistics, and completed report-writing and so on.

2010 年 11 月～2011 年 1 月，对所有调研资料进行验收、整理、统计、报告的撰写等。


Gangue brick activities start, the implementation of program evaluation and training session photos
活动项目启动、实施方案评审及培训会议照片



Building materials company, Zaozhuang New Zhongxing industry Co., Ltd -site visits, service organizations, workers seminars related photos
山东省枣庄市新中兴实业公司建材分公司现场考察、服务机构、工人座谈相关照片



TieMei group iron strong wall materials Co., LTD- site visits, service organizations, workers seminars related photos
铁岭市铁煤集团铁强墙体材料公司进行现场考察、服务机构、工人座谈相关照片



Ningxia Zhongjieneng New material Co.Ltd.. On-site investigation, testing, site inspections
宁夏石嘴山市中节能新材料有限公司进行现场调查、测试、现场检查相关照片

4. Rresults

研究结果

4.1 Basic information

基本情况

The survey selected 13 coal gangue brick companies, and completed all the survey forms filling. Two companies had the additive heat recovery power generation (HRPG) systems, including the new ZTE Zaozhuang Industrial Co., Ltd. and New building materials Co., Ltd.of Ju Yi Industrial Group in Shanxi, the former had been put into production use at the end of 2008, the latter as the "China - United Nations Climate Change Partnership Framework Project "- coal gangue brick heat recovery power generation (HRPG) systems demonstration projects focus on supporting enterprises, the construction phase of the project was under construction, to be put into production in early 2011. The survey only conducted the investigation in the existing coal gangue brick company of Shanxi branch building of new building materials Ju Yi Industrial Group Co., Ltd.

本调查选择的 13 家煤矸石制砖企业，所有调查表格均被收集，并符合要求。其中 2 家企业设有余热发电系统，包括枣庄新中兴实业有限责任公司建材分公司和山西聚义实业集团新型建材有限公司，前者已于 2008 年年底投入生产使用,后者作为“中国-联合国气候变化伙伴框架项目”-煤矸石制砖余热发电示范项目重点支持企业，项目正在施工建设阶段，拟于 2011 年初投入运行生产。本次调查仅对山西聚义实业集团新型建材有限公司现有煤矸石制砖企业进行了调研。

The basic situation of the enterprises see also table 4-1. 13 coal gangue brick-making enterprises were distributed in the five provinces, including 3 companies of each province in Shanxi, Shandong and Hubei Province, and Ningxia Hui Autonomous Region, 1 company in Liaoning Province. The earliest commissioning time was in 2003, and the latest was in 2010. They are composed of 5 state-owned enterprises, 2 collective enterprises, and 6 private enterprises. In accordance with ‘the statistical approach by large and small enterprises (Provisional)’ developed by the National Statistics Bureau in 2003, based on the total number of employees to determine the scale of enterprises, 12 companies of small enterprise, and 1 company of medium-sized enterprise. Among them, the small enterprise that had less than 100 employees was regarded as smaller enterprise, 6 companies of smaller enterprise. The main products were perforated brick and hollow brick. The production scale of 5 companies were the annual production of 100 million bricks, 6 companies of 10 million~100 million bricks, 2 companies of less than 10 million bricks.

企业基本情况见表 4-1。13 家煤矸石制砖企业分布在 5 个省份，包括山西省、山东省、宁夏回族自治区、湖北省各 3 家，辽宁省 1 家。投产时间最早的为 2003 年，最晚为 2010 年。国有企业 5 家，集体企业 2 家，私营企业 6 家。按照国家统计局 2003 年制定的《统计上大中小型企业划分办法（暂行）》，依据企业员工总数确定企业规模，13 家企业中小型企业 12 家，中型企业 1 家。将小型企业，再以员工人数 100 名为基数，少于 100 人的企业为小小型企业，有 6 家。主要产品多为多孔砖和空心砖。从生产规模来看，年产 10000 万块砖的企业有 5 家，年产 1000～10000 万块砖的有 6 家，年产 1000 万块以下的企业有 2 家。

13 enterprises employed altogether 1953 workers. Among them, there are 1,050 workers of permanent worker, 742 of itinerant worker, and 156 of others. The minimum number of employees was 20 workers, and the largest

number was 366 workers. There 11 companies which had employed the itinerant worker, including 1 enterprise had entirely hired the itinerant workers. The itinerant workers accounted for 37.99% of the total employees. 10 companies set up the staff in charge of security, health and environmental management, 2 companies only set up the staff in charge of security management, 1 enterprise failed to set up the staff in charge of security, health and environmental management. The 3 enterprises that failed to set up full-time staff in charge of health and environment management were all the smaller enterprise.

13 家企业共有员工 1953 人。其中，固定工 1050 人，流动工 742 人，其他 156。最小的企业仅有 20 人，最大的企业有 366 人。11 家企业雇佣了流动工，其中 1 家企业全部为流动工人。流动工人占员工总数的 37.99%。10 家企业均设立了安全、健康和环境管理负责人，2 家企业只设立了安全管理负责人，1 家企业未设立安全、健康和环境管理负责人。未设立健康和环境专职人员的 3 家企业均为小小型企业。

4.2 The site selection and the general layout plan

选址和总平面布局

The location, surrounding zone, water supply and general layout of enterprises was shown in table 4-2. The locations of all the 13 enterprises were not the epidemic focus and natural disasters areas. There were no scenic area and nature reserve around the enterprises. The surrounding zone of 5 enterprises exist the residential areas, the number of residents were 1076, 1000, 2300, 100 and 20 respectively. All 13 of enterprises had clear function partitioning. Except 2 enterprises, the left ones were reasonable of general layout layout. The reason of unreasonable layout was that office and living area located the down wind direction of roasting plant of prevailing wind direction. Production and domestic water were from groundwater, surface water and central water supply, 8 enterprises used groundwater, 2 used surface water and 3 used central water supply.

表 4-2 列出了企业所在地、企业周边及供水和总平面布置情况。13 家企业所在地均不是自然疫源地和存在自然灾害的区域，企业周边均无风景区、自然保护区。5 家企业周边存在居民区，居民人数分别为：1076 人、1000 人、2300 人、100 人和 20 人。13 家企业均有明确的功能分区，11 家企业建筑布局合理，2 家建筑布局不合理。布局不合理的原因为办公区布置在焙烧车间的全年主导风向的下风向和办公及生活区在焙烧车间的全年主导风向的下风向。企业生产、生活用水分为地下水、地表水、集中供水（自来水）3 类， 8 家采用地下水，2 家采用地表水，3 家集中供水。

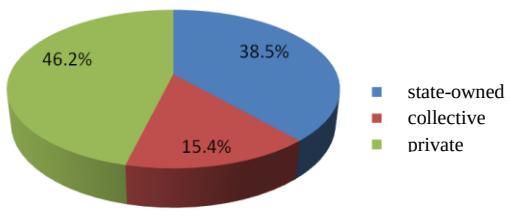


Figure 4-1 Ownership form of enterprise
企业成分构成图

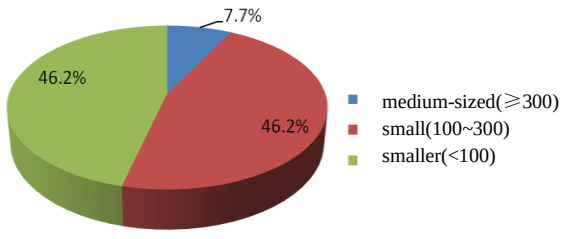


Figure 4-2 Scale of enterprise
企业规模构成（以人数计）

Table 4-1 Background information of 13 coal-gangue brick sectors

No.*	Time to go into operation	Professional manegement			Ownership	Scale of enterprise					Number of worker			Main product
		safe	health	Environ.		scale	Num. of employees	sale (10^4 RMB)	total assets (10^4 RMB)	scale of production (10^4 RMB)	permanent worker	joad	total	
1	2007.3	√	√	√	private	small	138	1300	6200	11000	97	24	121	perforated brick
2	2003.8	√	√	√	nationalized	small	279	1500	7350	13000	80	180	260	perforated brick、hollow brick
3	2005.9	√	√	√	nationalized	smaller	92	537	3852	6500	1	91	92	perforated brick、hollow brick
4	2003.12	√	√	√	nationalized	small	191	1117	100	6000	185	0	185	perforated brick
5	2010.3	√	√	√	private	small	326	2471	4421	7060	281	45	326	perforated brick、hollow brick
6	2005.12	√	√	√	nationalized	small	194	1100	2300	6000	182	0	182	Coal-gangue brick
7	2007.9	√	√	√	collective	middle	366	4131	24113	32000	70	216	286	gangue brick、kaolin
8	2009.9	√	√	√	private	smaller	70	540	10600	18000	14	56	70	perforated brick
9	2006.8	√	√	√	private	smaller	58	228	580	5000	25	33	58	gangue brick、kaolin
10	2009.11	√			private	smaller	34	300	500	4000	8	14	22	perforated brick、shale brick、High insulation modulus brick、Dry wall brick
11	2008.11	√			private	smaller	35	60-80	500	300-400	0	29	29	Standard brick
12	2009.10				private	smaller	20	180	300	900	12	4	16	Coal-gangue brick
13	2007.7	√	√	√	nationalized	small	150	160	9998	16000	100	50	150	hollow brick、perforated brick

Note: Enterprises with a * were seen in attached table.

The scale of enterprises: ①large，more than 2000.②middle, 300～2000.③small，less than 300.④smaller，less than 100.

表 4-1　　13 家煤矸石制砖企业基本情况

序号*	投产时间	专业管理人员			经济成分	企业规模					工人数(人)			主要产品
		安全	健康	环境		规模	员工总数(人)	销售额(万元/年)	资产总额(万元)	生产规模(万块/年)	固定工	流动工	合计	
1	2007.3	√	√	√	私有	小型	138	1300	6200	11000	97	24	121	多孔砖
2	2003.8	√	√	√	国有	小型	279	1500	7350	13000	80	180	260	多孔砖、空心砖
3	2005.9	√	√	√	国有	小小型	92	537	3852	6500	1	91	92	多孔砖、空心砖
4	2003.12	√	√	√	国有	小型	191	1117	100	6000	185	0	185	多孔砖
5	2010.3	√	√	√	私有	小型	326	2471	4421	7060	281	45	326	多孔砖、空心砖
6	2005.12	√	√	√	国有	小型	194	1100	2300	6000	182	0	182	煤矸石砖
7	2007.9	√	√	√	集体	中型	366	4131	24113	32000	70	216	286	矸石砖、高岭土
8	2009.9	√	√	√	私有	小小型	70	540	10600	18000	14	56	70	多孔砖
9	2006.8	√	√	√	私有	小小型	58	228	580	5000	25	33	58	矸石砖、高岭土
10	2009.11	√			私有	小小型	34	300	500	4000	8	14	22	多孔砖、页岩砖、高保温模数砖、清水墙砖
11	2008.11	√			私有	小小型	35	60-80	500	300-400	0	29	29	标砖
12	2009.10				私有	小小型	20	180	300	900	12	4	16	煤矸石砖
13	2007.7	√	√	√	国有	小型	150	160	9998	16000	100	50	150	空心砖、多孔砖

注：*序号代表的企业见附表 1-1。企业规模划分：①大型，2000 及以上人数；②中型，300～2000 人；③小型，300 人以下；④小小型，100 人以下。

Table 4-2 Location and overall arrangement of 13 coal-gangue brick sectors

No.	location		Enterprise circun and water resource					general layout			
	epidemic focus	natural disasters	populated area	Number of population	scenic area	domestic water	production water	Function partition	Build arrangement	predominant wind direction	remarks
1	×	×	×	0	×	groundwater	groundwater	clear	reasonable	south wind	
2	×	×	√	1076	×	surface water	surface water	clear	reasonable	south wind	
3	×	×	×	0	×	surface water	surface water	clear	reasonable	West northwest wind	
4	×	×	√	1000	×	central water supply	groundwater	clear	reasonable	East wind	
5	×	×	√	2300	×	Mine Running water	Mine Running water	clear	reasonable	south wind	
6	×	×	√	100	×	groundwater	groundwater	clear	unreasonable	Southeast wind	office were under the dominant wind direction of roasting plant
7	×	×	×	0	×	groundwater	groundwater	clear	reasonable	Northwest wind	
8	×	×	×	0	×	central water supply	central water supply	clear	reasonable	Northwest	
9	×	×	×	0	×	groundwater	groundwater	clear	reasonable	Northwest	
10	×	×	√	20	×	groundwater	groundwater	clear	reasonable	North wind	
11	×	×	×	0	×	groundwater	groundwater	clear	unreasonable	North wind	office and living area were under the dominant wind direction of roasting plant
12	×	×	×	0	×	groundwater	groundwater	clear	reasonable	North wind	
13	×	×	×	0	×	Mine Running water	Mine Running water	clear	reasonable	North wind	

表 4-2　　13 家煤矸石制砖企业选址和总平面布局情况

序号	企业所在地		企业周边及水资源					总平面布置			
	自然疫源地	自然灾害	居民区	居民人数	风景区	生活用水	生产用水	功能分区	建筑布局	全年主导风向	备注
1	×	×	×	0	×	地下水	地下水	明确	合理	南风	
2	×	×	√	1076	×	地表水	地表水	明确	合理	南风	
3	×	×	×	0	×	地表水	地表水	明确	合理	西北西风	
4	×	×	√	1000	×	集中供水	地下水	明确	合理	东风	
5	×	×	√	2300	×	矿井自来水	矿井自来水	明确	合理	南风	
6	×	×	√	100	×	地下水	地下水	明确	不合理	东南风	办公区在焙烧车间的下风向
7	×	×	×	0	×	地下水	地下水	明确	合理	西北风	
8	×	×	×	0	×	集中供水	集中供水	明确	合理	西北风	
9	×	×	×	0	×	地下水	地下水	明确	合理	西北风	
10	×	×	√	20	×	地下水	地下水	明确	合理	北风	
11	×	×	×	0	×	地下水	地下水	明确	不合理	北风	办公及生活区在焙烧车间的下风向
12	×	×	×	0	×	地下水	地下水	明确	合理	北风	
13	×	×	×	0	×	大兴矿自来水	大兴矿自来水	明确	合理	北风	

4.3 The main raw and auxiliary materials, production facility, process flow and organization structuring

主要原辅料、生产设备、生产工艺流程及组织机构设置

The main raw materials of brick-making were coal gangue and shale. Of these, five companies simply used the coal gangue as a feedstock. The major products were perforated brick, baked brick, floor tile, baked hollow bricks and blocks, hollow brick, shale solid brick, shale brick, high-modulus thermal insulation tiles, water wall brick and so on. By-products were mainly lime, electricity, and kaolin. Detailed information see also table 4-3.

制砖原料主要为煤矸石和页岩。其中，有 5 家企业单纯使用煤矸石作为原料。产品主要有多孔砖、烧结砖、地面砖、烧结空心砌块、空心砖、页岩实心砖、页岩砖、高保温模数砖、清水墙砖等。副产品主要是白灰、电和高岭土。具体情况见表 4-3。

Due to the enterprises' own scale and their different production lines, the production facilities and specification were also different. The facilities of the raw material workshop were mainly crusher/kibbler, feeder and screening machine. The facilities of the molding workshop were mainly multibucket excavator, conveyor, mixer, extruder/vacuum brick extrusion, cutter/slitter, turn unburned brick machine, setting machines and loaders. The facilities of the firing workshop were tractor, pusher, drying chamber/ dry kiln, ferry push, kiln car and roasting kiln. Detailed information was in Table 4-4.

各企业因自身规模和引进的生产线不同，其使用的生产设备及规格略有不同。原料车间设备主要有破/粉碎机、给料机和筛分机；成型车间设备主要有多斗挖掘机、输送机、搅拌机、挤出/砖机、切坯/条机、翻坯机、码坯机和装载机；烧成车间设备主要有牵引机、顶车机、干燥室/窑、摆渡车、烧成窑车和焙烧窑。具体情况见表 4-4。

Because the raw materials and production facilities of different brick-making enterprises were different, the detailed production processes were also different. The survey results from 13 companies are synthesize as the four technical processes : powdering rew materials, mixing, molding, and firing. The detailed processes were: rew materials→feedstock→coarse shredding→thin shredding→screening→water mixing→ageing→multibucket excavator feedstock→secondary water mixing→third water mixing→extrusion→cutting to strips→blanking→unburned brick turning→unburned brick setting→drying, sweetening→roasting, sweetening→checking after dring→finished products storing. The waste heat produced by roasting can be used for brick drying, heat recovery power generation, plants heating, staff scouring bathing and hot water for canteen. Detailed technological process see also figure 4-3.

各煤矸石制砖企业因生产原料和生产设备存在差异，详细工艺过程略有不同。综合 13 家被调查企业结果，其工艺过程均包括：原料粉碎、搅拌、成型、烧成四个生产工序。各工序及所包含的的工艺过程为：原料→给料→粗破→细破→筛分→加水搅拌→陈化→多斗给料→二次加水搅拌→三次加水搅拌→挤出→切条→切坯→翻坯→码坯→干燥、脱硫→焙烧、脱硫→出窑检验→成品堆场。焙烧产生的余热可被用于砖坯干燥、余热发电、车间取暖、职员洗浴和食堂热水。具体流程见图 4-3。

Integrated the findings of 13 enterprises, coal gangue brick-making enterprises were generally set up 15 workshops or departments, and 75 jobs. 15 workshops or departments included: raw material workshop, molding workshop, firing workshop, management department, safety supervision department, financial department, transport ministry, repairshop, unloading brick workshop, product department, sales department, goods yard department, central laboratory department, central control room and cleaning sector. Jobs covered

by the departments were shown in table 4-5.

综合 13 家企业的调查结果，煤矸石制砖企业一般设置 15 个车间或部门 75 类工种。15 个车间或部门包括：原料车间、成型车间、烧成车间、管理部、安监部、财务部、运输部、维修车间、卸砖车间、生产部、销售部、货场部、中控化验部、中央控制室和清洁部门。各部门涵盖的工种详见表 4-5。

Table 4-3 Main raw and complement materials and productsof 13 coal gangue brick-making enterprises

No.	Main raw and complement materials		Products and intermediate Products		By products	
	Name	annual consumption	Name	Annual output	Name	Annual output
1	Coal gangue	5260 tons	Coal gangue perforated brick	100,000,000 pieces	Lime	2400 tons
	Shale	5260 tons				
2	Coal gangue	30 million tons	Coal gangue brick	130,000,000 pieces	—	—
	Shale	4.5 million tons				
3	Coal gangue	10 million tons	perforated brick, floor tile etc	65,000,000 pieces	—	—
	Shale	5 million tons				
4	Coal gangue	16.3 million tons	Coal gangue perforated brick	58,000,000 pieces	Electricity	4.2 million degrees
5	Coal gangue	30 million tons	perforated brick	70,600,000 pieces	—	—
6	coal gangue	18 tons	Coal gangue perforated brick	60,000,000 pieces	—	—
7	Coal gangue	214157 tons	Coal gangue brick	17768 pieces	Kaolin	3886 tons
	Shale	280890 tons				
	Kaolinite	4600 tons				
8	Coal gangue	2250 million tons	Coal gangue perforated brick	18,000,000 pieces	—	—
	Shale	750 million tons				
9	Coal gangue	13 million tons	Coal gangue perforated brick	30,000,000 pieces	—	——
			Coal gangue brick, Hollow block	10,000,000 pieces		
10	Coal gangue	1000 tons	Shale brick, shale hollow brick, solid brick shale, shale brick, high-modulus thermal insulation tiles, water tile	40,000,000 pieces	—	—
	Shale	10 million cubic				
	Bituminous coal	10 tons				
	Electricity	165000 degrees				
	Water	3 million tons				
11	Coal gangue	1 million tons	Coal gangue brick	4000000 pieces	—	—
	Shale	4000 tons				
12	Coal gangue	2 million tons	Coal gangue brick	9000000 pieces	—	—
	Shale	8000 tons				
13	Coal gangue	39 million tons	baked brick	160,000,000 pieces	—	—

表 4-3　　13 家煤矸石制砖企业原辅料和产品情况

序号	主要原、辅料		产品、中间产品		副产品	
	名称	年用量	名称	年产量	名称	年产量
1	煤矸石	5260 吨	煤矸石烧结多孔砖	10000 万块	白灰	2400 吨
	页岩	5260 吨				
2	煤矸石	30 万吨	煤矸石烧结砖	1.3 亿块	—	—
	页岩	4.5 万吨				
3	煤矸石	10 万吨	多孔砖、地面砖等	6500 万块	—	—
	页岩	5 万吨				
4	煤矸石	16.3 万吨	煤矸石多孔砖	5800 万块	电	420 万度
5	煤矸石	30 万吨	多孔砖	7060 万块	—	—
6	煤矸石	18 吨	煤矸石多孔砖	6000 万块	—	—
7	煤矸石	214157 吨	矸石砖	17768 块	高岭土	3886 吨
	页岩	280890 吨				
	高岭石	4600 吨				
8	煤矸石	2250 万吨	煤矸石烧结多孔砖	1800 万块	—	—
	页岩	750 万吨				
9	煤矸石	13 万吨	煤矸石烧结多孔砖	3000 万块	—	——
			煤矸石、空心砌块	1000 万块		
10	煤矸石	1000 吨	页岩烧结多孔砖、页岩空心砖、页岩实心砖、页岩砖、高保温模数砖、清水墙砖	4000 万块	—	—
	页岩	10 万立方				
	烟煤	10 吨				
	电	16.5 万度				
	水	3 万吨				
11	煤矸石	1 万吨	标砖	400 万块	—	—
	页岩	4000 吨				
12	煤矸石	2 万吨	煤矸石砖	900 万块	—	—
	页岩	8000 吨				
13	煤矸石	39 万吨	烧结砖	1.6 亿块	—	—













Raw materials

(coal gangue)

Feedstock

Coarse shredding

Thin shredding

Screening

Water mixing

Ageing

Multibucket excavator feedstock

Secondary water mixing

Third water mixing

Extrusion

Cutting to strips, Blanking

Unburned brick turning

Unburned brick coding

Drying, Sweetening

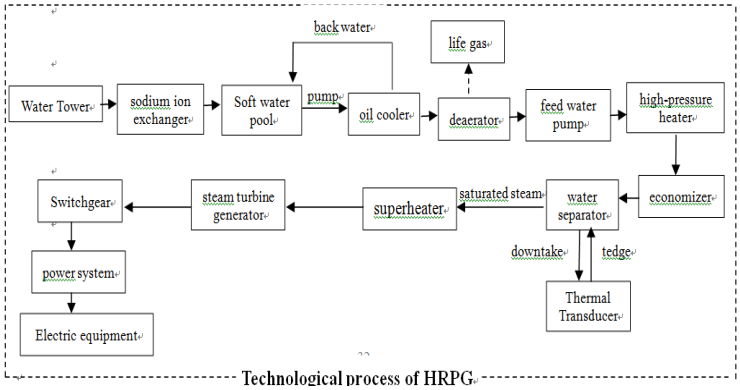
Roasting, Sweetening

Checking after dring

Finished products storing.

HRPG device, Shanxi branch building of new building materials Ju Yi Industrial Group Co., Ltd.

HRPG device, the new ZTE Zaozhuang Industrial Co., Ltd.



residual-heat utilization

Heat recovery power generation (HRPG)

plants heating

staff scouring bathing

hot water for canteen

Figure 4-1 Technological process of coal gangue brick













原料
（煤矸石）

给　料

粗　破

细　破

筛　分

加水搅拌

陈　化

多斗给料

二次加水搅拌

三次加水搅拌

挤　出

切条、切坯

翻　坯

码　坯

干燥、脱硫

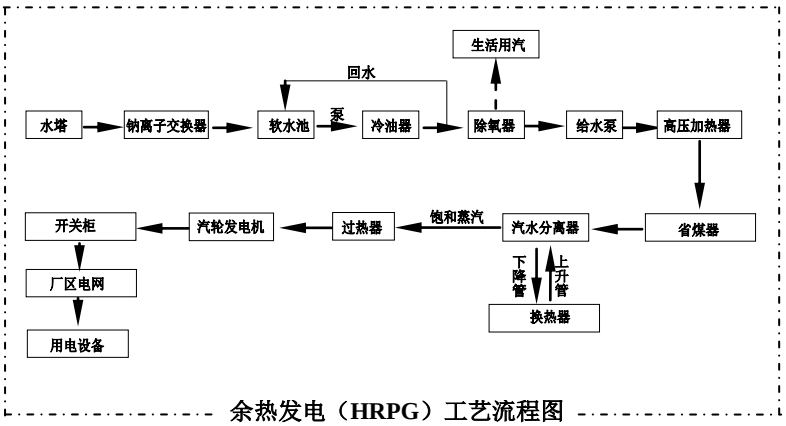
焙烧、脱硫

出窑检验

成品堆场

山西聚义实业集团新型建材有限公司余热发电装置

山东省枣庄市新中兴实业公司建材分公司余热发电装置



余热发电（HRPG）工艺流程图

余　热　利　用

余热发电
(HRPG)

车间取暖

车间取暖

车间取暖

图 4-3　煤矸石制砖工艺流程图

Table 4-4 Production equipments of 13 coal gangue brick-making enterprises

Workshop	Name of major equipments		Specifications
Raw Materials Workshop	crusher/kibbler	Hammer mill	CPF900×900/￠1100*1000/CPX1000*800/Φ1100×1000-2PB-04/GP900×900/PC100*80/Φ1000×1000
		Jaw Crusher	PE×250×1000/PEF500×1000/PEX250*1200Ⅱ/PEX250X1000
		Cage Mill	LP1000*300
	feeder	Chain feeder	BG120×400
		Apron feeder	Y123W-4/BG120×400/GBQ80-4/BG120×30
		Box feeder	XAD1000/XG80/XGD*80
		Disc feeder	YG-100
	screening machine	Shaker	MVS2345/MVS/235/MVS2035/MVS2435
		Rolling Screen	400*150
Molding Workshop	excavator	Multibucket excavator	WTJ60/DWY60-900/DWY40-950
	conveyor	Scraper conveyor	B500×28500
		Belt Conveyor	B500×14737
	mixer	Single Mixer	DJ400
		Biaxial mixer	Y225S-4/SJ300*42/SJJ300-40/SJ70/GG6000/SJ300×40
	extruder/ vacuum brick extrusion	Mixing extruder	DJJ300A
		Double-stage vacuum extruder	JZK75Y-35/75AD/JZK50/45-30
		Hard plastic extruder	BED600-XHP
		Vacuum extruder	BED650/650/J KB50/45-3.0/JZK75y-35/JKY60/60-4.0
	cutter/slitter	White King or programmable cutter	ZQP24
		Vertical cutting machine	GXW1(16M)
		Cutter	Multifunction
		Push plate cutter	ZP-14
		Automatic cutter	ZTP-E-1
	turn unburned brick machine	Automatic turning blank machine	FP-8
	code unburned brick Machines	Automatic code adobe machine	ZMP900×3/ZMP
	loaders	loaders	龙Ⅰ-50/ZL40
Firing Workshop	tractor	tractor	TL-4
	pusher	pusher	YBS30-16/5T
	drying chamber/ dry kiln	Tunnel kiln drying room /dry kiln	L=61.70m/4.6×2.5×70m
	ferry push	Hydraulic car ferry	BDS264
	kiln car	Kiln cars	—
	roasting kiln	Tunnel kiln calcination	4.6×2.5×40m/L=144.35m/164.45×9.2×1.45m/144.35×4.6

表 4-4　　13 家煤矸石制砖企业生产设备情况

车间	主要设备名称		规格
原料车间	破/粉碎机	锤式粉碎机	CPF900×900 或∅1100*1000 或 CPX1000*800 或 Φ1100×1000-2PB-04 或 GP900×900 或 PC100*80 或 Φ1000×1000
		鄂式破碎机	PE×250×1000 或 PEF500×1000 或 PEX250*1200Ⅱ或 PEX250X1000
		笼式粉碎机	LP1000*300
	给料机	链式给料机	BG120×400
		板式给料机	Y123W-4 或 BG120×400 或 GBQ80-4 或 BG120×30
		箱式给料机	XAD1000 或 XG80 或 XGD*80
		圆盘给料机	YG-100
	筛分机	振动筛	MVS2345 或 MVS/235 或 MVS2035 或 MVS2435
		滚动筛	400*150
成型车间	挖掘机	多斗挖掘机	WTJ60 或 DWY60-900 或 DWY40-950
	输送机	刮板输送机	B500×28500
		胶带输送机	B500×14737
	搅拌机	单轴搅拌机	DJ400
		双轴搅拌机	Y225S-4 或 SJ300*42 或 SJJ300-40 或 SJ70 或 GG6000 或 SJ300×40
	挤出/砖机	搅拌挤出机	DJJ300A
		双级真空挤砖机	JZK75Y-35 或 75AD 或 JZK50/45-30
		硬塑挤出机	BED600-XHP
		真空挤出机	BED650/650 或 J KB50/45-3.0 或 JZK75y-35 或 JKY60/60-4.0
	切坯/条机	白劲或程控切坯机	ZQP24
		垂直切条机	GXW1(16M)
		切坯机	多功能
		推板式切坯机	ZP-14
		自动切坯机	ZTP-E-1 型
	翻坯机	自动翻坯机	FP-8 型
	码坯机	自动码坯机	ZMP900×3 或 ZMP 型
	装载机	装载机	龙Ⅰ-50 或 ZL40
烧成车间	牵引机	牵引机	TL-4
	顶车机	顶车机	YBS30-16 或 5T
	干燥室/窑	隧道干燥室或干燥窑	L=61.70m 或 4.6×2.5×70m
	摆渡车	液压摆渡车	BDS264
	窑车	烧成窑车	—
	焙烧窑	隧道焙烧窑	4.6×2.5×40m 或 L=144.35m 或 164.45×9.2×1.45m 或 144.35×4.6

Table 4-5 Distribution of WorkShop/department and craft/post of 13 coal gangue brick-making enterprises

Workshop/Department	Name of craft/post(Number)
Raw Materials Workshop	management (1-4), feeding workers (8), maintenance workers (2-7), feeding workers (1-4), cutting workers (2-9), first stir operatives (1-8) , vibration sieve workers (1-8), main workers (2-4), material removal workers (1-4), loading work (2-5), crushing workers (1-8), breaking the cage workers (1 - 4), welding cage workers (4-6), forklift driver (1-4), belt driver (2-3), Chen Chemical (1), plus hydraulic (1), reversible fabric Machine Operator (8).
Molding Workshop	management (1-8), conveyor operator (2), multi-bucket operator (2-8), second mixing operator (2-8), third mixing operator (2-6), maintenance worker (1-6), plus hydraulic (4), stirring the driver (2-4), the master operator (2-8), extrusion operators (2-10), cut blanks Operator (1-8), Casting operator (6), frame blank operator (8), code adobe operator (8-32), cutting workers (2-8), electrical (1)
Firing Workshop	management (1-3), ferry workers (6-12), sintering workers (2-10), running (2-12), tile repair (9), maintenance workers (1-6), oiling workers (3 -6), in the control room operator (3-12), the furnace control workers (4), sweeper (3), artificial unloading (70), desulfurization Operator (3)
ManagementDepartment	management (1-10)
Safety Supervision Department	clerks (2)
Finance Department	accounting (2), billing staff (4)
Transport Ministry	driver (3-28)
Repairshop	management (1-4), electrical (1-7), welders (2-3), bench (11), Foreman (1), maintenance workers (1-6), inspection workers (2)
Unloading Brick Workshop	management (1), loading and unloading workers (6-36)
Product Department	clerks
Sales Department	statisticians (1), site work (1), salespeople (3-9)
Goods Yard Department	quality inspector (3), assessment staff (1), laboratory technician (2), warehouse storage (1-2), guard (2-4), electrical (3)
Central Laboratory Department	contral control engineering (3), laboratory technician (4)
Central Control Room	production scheduling (3), production control (6)
Cleaning Sector	cleaners (1-3)

表 4-5　　13 家煤矸石制砖企业车间或部门与工种或岗位分布

车间或部门	工种或岗位名称（人数）
原料车间	管理人员(1-4)、给料工(8)、维修工(2-7)、上料工(1-4)、下料工(2-9)、一搅操作工(1-8)、振筛工(1-8)、主控工(2-4)、清料工(1-4)、装载工(2-5)、破碎工(1-8)、笼破工(1-4)、焊笼工(4-6)、铲车司机(1-4)、皮带司机(2-3)、陈化工(1)、加水工(1)、可逆布料机操作工(8)。
成型车间	管理人员(1-8)、带式输送机操作工(2)、多斗操作工(2-8)、二搅操作工(2-8)、三搅操作工(2-6)、维修工(1-6)、加水工(4)、搅拌司机(2-4)、主控操作工(2-8)、挤出操作工(2-10)、切坯操作工(1-8)、拉坯操作工(6)、架坯操作工(8)、码坯操作工(8-32)、下料工(2-8)、电工(1)。
烧成车间	管理人员(1-3)、摆渡工(6-12)、烧结工(2-10)、运行工(2-12)、面砖修理工(9)、维修工(1-6)、注油工(3-6)、中控室操作工(3-12)、窑炉监控工(4)、清扫工(3)、人工卸车(70)、脱硫操作工(3).
管理部	管理人员(1-10)。
安监部	科员(2)。
财务部	会计(2)、开票员(4)。
运输部	司机(3-28)。
维修车间	管理人员(1-4)、电工(1-7)、电焊工(2-3)、钳工(11)、管工(1)、维修工(1-6)、检验工(2)。
卸砖车间	管理人员(1)、装卸工(6-36)。
生产部	科员
销售部	统计员(1)、场地工(1)、销售员(3-9)。
货场部	质检员(3)、考核员(1)、化验员(2)、仓库保管(1-2)、门卫(2-4)、电工(3)。
中控化验部	中控工(3)、化验员(4)。
中央控制室	生产调度(3)、生产控制(6)。
清洁部门	清洁工(1-3)。

4.4 Main occupational dangerous, hazards factors and distribution

主要职业危险、有害因素及其分布

4.4.1 Occupational dangerous factors

职业危险因素

According to GB 6441 'Workers casualty accidents classification criteria', the occupational dangerous factors were classified into 16 categories in line with origin objects, the reasons for the accident-induced, virulence properties, mode of injury and so on. Specific categories see also the third part of report.

职业危险因素类别主要依据 GB 6441《企业职工伤亡事故分类标准》，综合考虑起因物、一起事故先发的诱导性原因、致害物、伤害方式等，将其划分为 16 类，具体类别见本报告的第三部分。

By means of the survey and analysis of the 13 enterprises, 7 occupational dangerous factors had been identified. They were mechanical injury, compression injury, burnings, electric shock, vehicle injuries, poisoning and asphyxia and crushing. Improper operation or illegal operations may is the mainly reasons result in injuries. According to GB18218 'Major hazards of hazardous chemicals identified' and GB12268 'National standards of dangerous goods', there was no 'Major hazards of dangerous chemicals' existed in 13 enterprises. No event tree analysis for the non-major hazards. For the 7 occupational hazards, operating conditions risk assessment method (LEC method) was applied to evaluate the degree of risk. The main basis of determing the LEC assessment results were: ①Likelihood scores(L) for occuring Accident . ②The frequency(E) for exposure to the risk environment. ③Score for the consequences of the accident(C). According to the formula: D = L × E × C, risk scores D was calculated. D was divided into 5 grades, including that grades 5 is extremely dangerous which can not continue to work, grades 4 is high risk need to be immediate rectified and reformed. grades 3 is significant risk need to be rectified and reformed, grades 2 is general risk needed to be attented, grades 1 is slightly acceptable dangerous. Risk judging according to D see also table 4-6. The resulte for identification, analysis and evaluation of the risk of occupational dangerous factors were shown in table 4-7.

通过对 13 家煤矸石制砖企业的调查、现场检查与分析，共确定可能存在 7 种职业危险因素，分别为：机械伤害、挤压伤害、烧伤/灼烫、触电/电击、车辆伤害/撞击、中毒和窒息和砸伤。可能导致这些伤害的原因主要是操作不当或违规操作。依据国家标准 GB18218《危险化学品重大危险源辨识》和 GB12268《国家标准危险货物品名表》中危险化学品的危险特性及其数量判定，13 家企业未发现有“危险化学品重大危险源”存在，按照实施计划方案的要求，非重大危险源未进行事故树或事件树分析。针对已识别的 7 类职业危险因素，应用作业条件危险性评估法（LEC 法）对其危险程度进行了分析与评估。LEC 风险评估结果的判定主要依据：①事故发生的可能性分值（L）；②暴露于危险环境的频繁程度（E）和③事故造成的后果分值（C）三项指标，按照公式：D=L×E×C，计算出危险性 D 分值大小，将其划分为 5 个危险等级，即 5 级-极其危险，不能继续作业；4 级-高度危险，需立即整改；3 级-显著危险，需要整改；2 级-一般危险，需要注意；1 级-稍有危险，可以接受。依据 D 分值的危险性判定参见表 4-6。职业危险因素的识别、分析与评估结果详见表 4-7。

Table 4-6　D score and determination of risk

D score	grade	degree	Risk management
＞20	1	slightly	acceptable
20～	2	general	attention was needed
70～	3	dignificant	rectification was needed
160～	4	high	immediate rectification was required
＞320	5	extremely	work can not be continued

表 4-6　　D 分值及其危险性结果的判定

D 分值	危险等级	危险程度	危险性管理
＞20	1	稍有危险	可以接受
20～	2	一般危险	需要注意
70～	3	显著危险	需要整改
160～	4	高度危险	需要立即整改
＞320	5	极其危险	不能继续作业

Risk to be judged as grades 3, 4 and 5 were regarded as not acceptable risk. This dangerous operstion should be need to be rectified and reformed or stopped. According to table 4-7, the all risk grades of the 13 enterprises were 1 and 2. Because of the differences of machinery automation and management, the same risk may result to different consequences in different plant, jobs and work post. Even same jobs or post in different enterprises was exposed to same occupational dangerous factor may lead to different risk grades between various enterprises. Mechanical injury always occurred in raw material workshop, molding workshop, firing workshop and maintenance workshop. Squeeze injury often took place in molding workshop. Burns injuries only exsited in firing and maintenance workshop. The electric shock injuries mainly occur in the molding workshop and maintenance workshop. Vehicle damage/impact mainly occurr in materials shop and the department of transportation. Poisoning and asphyxia happened in the firing workshop. Injuries leaded by a crashing object may take place in loading and unloading brick operation. The distribution and characteristic of different risk were shown in table 4-7.

根据分值大小判定的危险等级 3 级、4 级、5 级为危险源，确定为不可接受风险，需要企业整改或停止这种危险作业。从表 4-7 中可见，13 家煤矸石制砖企业的职业危险因素的危险等级均为 1 级或 2 级，属于稍有危险或一般危险。同一危险种类在不同车间、工种或岗位，由于机械自动化程度及其管理方式的不同，各有不同。即使同一工种或岗位暴露于同一职业危险因素，在不同的企业，其危险程度也略有差异。机械伤害主要存在于原料车间、成型车间、烧成车间和维修车间。挤压伤害主要存在于成型车间。烧伤/灼烫主要存在于烧成车间和维修车间。触电/电击伤害主要存在于成型车间和维修车间。车辆伤害/撞击主要存在于原料车间和运输部。中毒和窒息主要存在于烧成车间。砸伤主要存在于卸砖车间工。不同职业危险因素在不同车间、工种或岗位的分布及其危险性等级详见表 4-7。

Table 4-7 Results of survey and analysis for the risk factors

NO.	Occupational risk	plant/department	craft/post	Grade of risk	hazards	reason	remarks
1	Mechanical injury	raw material	Cutting worker	2	×	Improper operation	Shanxi Juyi
			Clear worker	1	×	Improper operation	Shanxi Juyi
			Add water worker	1	×	Improper operation	Shanxi Juyi
			Breaking worker	2	×	Illegal operations	Shanxi Juyi、Shanxi Luan、Shanxi Jincheng
				2	×	Illegal operations	Ningxia Chuantai、Ningxia Hengyunda、Tieling Tieqiang
			Belt Driver	2	×	Illegal operations	Shanxi Luan、Shanxi Jincheng
			Maintenance man	1	×	Improper operation	Ningxia Zhongjieneng
			First stir operator	2	×	Illegal operations	Ningxia Zhongjieneng、Tieling Tieqiang
				1	×	Illegal operations	Ningxia Chuantai
			Vibrating screen works	1	×	Illegal operations	Ningxia Chuantai
				2	×	Illegal operations	Tieling Tieqiang
			Feeding Workers	2	×	Improper operation	Tieling Tieqiang
			Reversible Fabric machine operator	2	×	Illegal operations	Tieling Tieqiang
		molding	Blanking operator	2	×	Illegal operations	Shanxi Juyi
				2	×	Illegal operations	Shanxi Luan、Shanxi Jincheng
			Add water worker	1	×	Improper operation	Shanxi Juyi
			Multi-bucket excavator operator	1	×	Illegal operations	Shanxi Juyi、Ningxia Zhongjieneng
				2	×	Illegal operations	Tieling Tieqiang
			Stir driver	2	×	Illegal operations	Shanxi Luan、Shanxi Jincheng
			Extrusion operator	2	×	Illegal operations	Shanxi Luan、Shanxi Jincheng
				2	×	Illegal operations	Ningxia Chuantai、Ningxia Hengyunda、Tieling Tieqiang
			Second stir operator	2	×	Illegal operations	Ningxia Zhongjieneng、Tieling Tieqiang
				1	×	Illegal operations	Ningxia Chuantai
			Third stir operator	1	×	Illegal operations	Ningxia Chuantai
				2	×	Illegal operations	Tieling Tieqiang
		firing	operator	1	×	Improper operation	Ningxia Chuantai
				2	×	Improper operation	Tieling Tieqiang
		maintenance	Maintenice man	1	×	Improper operation	Shanxi Juyi、Ningxia Chuantai
			Tongman	2	×	Improper operation	Tieling Tieqiang
2	Squeeze injury	molding	Code adobe operator	2	×	Illegal operations	Shanxi Juyi、Ningxia Chuantai、Tieling Tieqiang
				2	×	Illegal operations	Shanxi Luan、Shanxi Jincheng
				1	×	Illegal operations	Ningxia Zhongjieneng
3	Burns/scalding	firing	Sintering worker	2	×	Improper operation	Shanxi Juyi
				1	×	Improper operation	Shanxi Luan、Shanxi Jincheng
				2	×	Improper operation	Ningxia Chuantai、Ningxia Hengyunda、Tieling Tieqiang
			Ferry worker	1	×	Improper operation	Ningxia Zhongjieneng
			Operator	2	×	Improper operation	Ningxia Chuantai

			Oiling worker	2	×	Improper operation	Tieling Tieqiang
		maintenance	Electric welder	2	×	Improper operation	Shanxi Juyi
				1	×	Improper operation	Ningxia Chuantai
4	Shock	molding	Master Operator	1	×	Illegal operations	Ningxia Zhongjieneng
		maintenance	Electrician	2	×	Illegal operations	Shanxi Juyi、Tieling Tieqiang
				1	×	Illegal operations	Ningxia Chuantai
5	Vehicle damage / impact	raw material	Forklift driver	1	×	Improper operation	Ningxia Zhongjieneng
		Transportation	Driver	2	×	Improper operation	Shanxi Juyi
6	Poisoning and asphyxia	firing	Ferry workers	1	×	Improper operation	Ningxia Zhongjieneng
7	Injured by a crashing object	Unloading brick	stevedore	2	×	Illegal operations	Shanxi Juyi

表 4-7　职业危险因素调查与分析结果

序号	职业危险因素名称	车间/部门	工种/岗位	危险等级	危险源	形成原因	备注
1	机械伤害	原料车间	下料工	2	×	操作不当	山西聚义
			清料工	1	×	操作不当	山西聚义
			加水工	1	×	操作不当	山西聚义
			破碎工	2	×	违规操作	山西聚义、山西潞安、山西晋城
				2	×	违规操作	宁夏川泰、宁夏恒运达、铁岭铁强
			皮带司机	2	×	违规操作	山西潞安、山西晋城
			维修工	1	×	操作不当	宁夏中节能
			一搅操作工	2	×	违规操作	宁夏中节能、铁岭铁强
				1	×	违规操作	宁夏川泰
			振筛工	1	×	违规操作	宁夏川泰
				2	×	违规操作	铁岭铁强
			给料工	2	×	操作不当	铁岭铁强
			可逆布料机操作工	2	×	违规操作	铁岭铁强
		成型车间	切坯操作工	2	×	违规操作	山西聚义
				2	×	违规操作	山西潞安、山西晋城
			加水工	1	×	操作不当	山西聚义
			多斗操作工	1	×	违规操作	山西聚义、宁夏中节能
				2	×	违规操作	铁岭铁强
			搅拌司机	2	×	违规操作	山西潞安、山西晋城
			挤出操作工	2	×	违规操作	山西潞安、山西晋城
				2	×	违规操作	宁夏川泰、宁夏恒运达、铁岭铁强
			二搅操作工	2	×	违规操作	宁夏中节能、铁岭铁强
				1	×	违规操作	宁夏川泰

			三搅操作工	1	×	违规操作	宁夏川泰
				2	×	违规操作	铁岭铁强
		烧成车间	运行工	1	×	操作不当	宁夏川泰
				2	×	操作不当	铁岭铁强
		维修车间	维修工	1	×	操作不当	山西聚义、宁夏川泰
			钳工	2	×	操作不当	铁岭铁强
2	挤压伤害	成型车间	码坯操作工	2	×	违规操作	山西聚义、宁夏川泰、铁岭铁强
				2	×	违规操作	山西潞安、山西晋城
				1	×	违规操作	宁夏中节能
3	烧伤/灼烫	烧成车间	烧结工	2	×	操作不当	山西聚义
				1	×	操作不当	山西潞安、山西晋城
				2	×	操作不当	宁夏川泰、宁夏恒运达、铁岭铁强
			摆渡工	1	×	操作不当	宁夏中节能
			运行工	2	×	操作不当	宁夏川泰
			注油工	2	×	操作不当	铁岭铁强
		维修车间	电焊工	2	×	操作不当	山西聚义
				1	×	操作不当	宁夏川泰
4	触电/电击	成型车间	主控操作工	1	×	违规操作	宁夏中节能
		维修车间	电工	2	×	违规操作	山西聚义、铁岭铁强
				1	×	违规操作	宁夏川泰
5	车辆伤害/撞击	原料车间	铲车司机	1	×	操作不当	宁夏中节能
		运输部	司机	2	×	操作不当	山西聚义
6	中毒和窒息	烧成车间	摆渡工	1	×	操作不当	宁夏中节能
7	砸伤	卸砖车间	装卸工	2	×	违规操作	山西聚义

4.4.2 Occupational hazards factors

职业性有害因素

According to ‘Categories of occupational hazards factors’ and ‘occupational diseases categories’ , the occupational hazards factors existed in 13 enterprises were divided into 4 category, dust, noise, high temperature and harmful gas, such as SO_2、CO and NO_2. Among these, high temperature and harmful gas existed in firing workshop, for example the dry kiln, calcining kiln, firing control room. High temperature, SO_2, CO and NO_2 were measured in this workplace in line with national standards. The results exceeded exposure limit. The affected jobs were Sintering worker, running operator and operator in center control room.

依据卫生部《职业病危害因素分类目录》（卫法监发[2002]63 号），按 13 家企业可能导致的职业病类别将其划分为 4 大类，主要有：粉尘、噪声、高温和有害气体（如 SO_2、CO、NO_2）。其中，高温和有害气体主要存在于烧成车间，如干燥窑旁、干燥窑窑顶、焙烧窑旁、烧成控制室、焙烧窑窑顶、烧成窑顶保温带、烧成窑顶烧成带、烧成窑顶预热带、烧成窑顶中控室、烧成窑头进口和出窑口，并对上述作业场所高温和 SO_2、CO、NO_2等有害气体按照国家相关测试标准进行了测试与分析。测试结果均为超出国家职业接触限值的要求，可能受其影响的主要工种有：车间烧结工和运行工、中控室操作工。

The table 4-8 showed the measurement results of dust and noise in different workshop, types and post of work. Dust and noise mainly occurred in raw material, molding and firing workshops. For dust hazard, raw material workshop was the most serious, next were molding and firing workshops. For noise hazard, raw material and molding wokshops were the most serious.

表 4-8 列出了 13 家企业粉尘和噪声在不同车间、工种或岗位的分布及其检测结果。表中可见，粉尘和噪声危害主要存在于原料车间、成型车间和烧成车间。其中，粉尘危害以原料车间最为严重，其次为成型和烧成车间。噪声危害以成型和原料车间最为严重。

There were 5 places that the dust measurement result was not exceeded the limit, such as raw material shelter in raw material workshop, and roaster side, kiln head imports, kiln roof insulation and kiln burning zone in firing worlshop. However, the dust concentrations in the left 20 workplaces exceeded the limit, including rough crusher, shaker, operation-room in raw meterial workshop, first blender, cutting and code adobe operating post and operation room in firing worlshop. Otherwise, in the broken post in raw meterial workshop, operator and belt driver in aging library, second blender in molding workshop, raw meterial mixing and kiln roof in firing workshop, the their rate of exceeded limit was 50%. The rate of exceeded limit in third blender post was 33.3%. The causes of exceeded limit for dusts on cutting and code adobe operating post and operation room in firing worlshop need to do further study.

粉尘危害除原料车间的原料棚，烧成车间的焙烧炉旁、烧成窑头进口、窑顶保温带和烧成带等 5 处粉尘检测结果未超标外，其余 20 处工作地点粉尘检测结果均存在超标现象。其中，原料车间的粗破碎机旁（下料、清料岗位）、振动筛旁（清料、皮带司机、振筛岗位）、原料车间操作间（主控、给料岗位）、一次搅拌机旁（加水、操作岗位）；成型车间的切坯和码坯岗位和烧成车间烧成控制室（中控室操作岗位），这些工作场所或操作岗位的粉尘接触均超过国家职业接触限值标准（超标率为 100%）。粉尘超标率达 50%以上的工作岗位还有 6 处，包括：原料车间粗破碎机旁的破碎岗位、陈化库操作位和皮带司机，成型车间二次搅拌机旁的二搅操作岗位，原料混料转载岗位和烧成车间窑顶。成型车间的三搅操作岗位也存在粉尘超标现象（超标率为 33.3%）。成型车间的切坯和码坯岗位和烧成车间烧成控制室的粉尘超标原因有

待进一步研究。

The table 4-8 showed that noise level of 22 posts or workplaces were below the limit. They were raw material mixture loading, crude crusher baiting in raw meterial workshop, master control operating, feeding, belt driver, first blender and water, aging operating, multi-bucket excavator operating and cutting adobe and all the posts in firing workshop. The most serious post of the Noise hazards were broken, clearing material and belt driver in raw meterial workshop, the second and third blender in molding workshop. The posts which exceeded rate of noise level was above 50% include the broken posts around fine crusher side and extrusion operating post in molding worshop. Other posts such as code adobe operator and adobe frame operator in molding workshop and forklift driver in raw meterial workshop, their rate of exceeded limit were below 50%.

表中显示，噪声符合国家职业接触限值要求的工作地点或操作岗位有 22 处，包括：原料车间的原料混料装载、粗破碎机下料、车间控制室主控、给料室给料、原料皮带头旁的皮带司机、一次搅拌机旁的一搅操作和加水、陈化操作，成型车间的多斗挖掘机操作工、切坯机旁的切坯操作，和烧成车间的所有岗位等。噪声危害最为严重（超标率达 100%）的工作岗位有：原料车间的粗破碎机旁的破碎、细破碎机旁的清料、振动筛旁的清料和皮带司机，和成型车间的二、三搅搅拌机旁的操作；噪声超标率超过 50%的岗位主要有：原料车间的细破碎机旁的破碎岗位和成型车间的挤出操作岗位；此外尚有成型车间的码坯机旁的码坯操作和翻车机旁的架坯操作岗位、原料车间原料棚铲车司机操作岗位存在噪声超标情况，超标率低于 50%。

Table 4-8 Distribution and test results of dust and noise

risk	plant/ department	Measurement post	craft/post	Result range	Rate of exceeding (%)	Exceeding result range	NO. of enterprise	Degree of hazard
Dust	Raw material plant	Raw material shack	Forklift driver	0.72-0.96	0	—	—	reach the standard
		Raw material mixing	Load engineering	0.93-2.46	50	2.46	1	out of limits
		Around cough crusher	Cutting and clear worker	2.12-15.79	100	2.12-5.56	8	out of limits seriously
			brokener	0.76-5.39	83.3	1.25-15.79	2	out of limits seriously
		Around the shaker	clear、vibrating screen worker	1.53-5.98	100	1.53-5.98	3	out of limits seriously
		Operation room	Center control、feeding	1.22-19.05	100	1.22-19.05	5	out of limits
		First blender	First blender、water worker	1.24-4.86	100	1.24-4.86	3	out of limits seriously
		Operator in aging libary	Aging library worker	0.94-2.45	66.7	1.21-2.45	2	out of limits
		Around belt	Belt driver	0.48-8.35	66.7	1.02-8.35	2	out of limits
	Molding workshop	Second blender	Second blender	0.97-7.9	66.7	1.44-7.9	2	out of limits
		Third blender	Third blender	0.94-1.1	33.3	1.1	1	reach the standard
		Around cutting blank	cutting blanker	4.58-13.4	100	4.58-13.4	2	out of limits seriously
		Code adobe	Code adobeer	1.26-3.08	100	1.26-3.08	2	out of limits
	Firing worshop	Around roaster	Monitor	0.64-0.915	0	—	—	reach the standard
		Control room	operator	1.05-7.24	100	1.05-7.24	5	out of limits seriously
		Kiln firing imports	—	0.87	0	—	—	reach the standard
		Top of kiln firing	—	0.95-1.009	50	1.009	1	reach the standard
		Kiln with roof insulation	—	0.169	0	—	—	reach the standard

		Kiln burning zone of the top	—	0.165	0	—	—	reach the standard
Noise	Raw material workshop	Raw material mixing	Load Engineering	74.3	0	—	—	reach the standard
		Raw material shock	Forklift driver	75.6-85.3	25	85.3	1	
		Around rough crusher	Cutting working	80.3	0	—	—	reach the standard
			Broken worker	87.6-89.4	100	87.6-89.4	3	Damage slightly
		Around fine crusher	Clear worker	88.4	100	88.4	1	Damage slightly
			Broken worker	70.0-90.5	66.7	88.9-90.5	2	Damage slightly
		Around shaker	Clear worker、belt driver	87.3	100	87.3-88.3	2	Damage slightly
		Operation room	Center controler	77.5	0	—	—	reach the standard
		Operation room	feeding	77.1-84.5	0	—	—	reach the standard
		Around material belt head	Belt driver	50.0-81.5	0	—	—	reach the standard
		First blender	First blender、water worker	80.6-84.7	0	—	—	reach the standard
		Operation in aging libary	Aging library worker	76.1-76.4	0	—	—	reach the standard
	Molding workshop	Multi-bucket excavator	Multi-bucket operator	83-83.6	0	—	—	reach the standard
		Second blender	Second blender operator	86.0-94.2	100	86.0-94.2	3	medium Damage
		Third blender	Third blender operator	86.1-88.1	100	86.1-88.1	3	Damage slightly
		Around extruder	Extrusion operator	70.0-87.6	60	86.2-87.6	3	Damage slightly
		Around code adobe	Code adobe operator	77.5-88.0	42.9	85.7-88.0	2	Damage slightly
		Around cutting blank	cutting blank operator	81.3-84.6	0	—	—	reach the standard
		Around turning blank	Frame blank operator	82.5-86.6	25	86.6	1	Damage slightly
	Firing workshop	Around klin	operation、firing operator	76.1-79.2	0	—	—	reach the standard
		Around roasting kiln	operation、firing operator	69.0-78.5	0	—	—	reach the standard
		Firing control room	Center control room operator	64.7-72.5	0	—	—	reach the standard
		Top kiln	—	74.7	0	—	—	reach the standard
		Kiln with roof insulation	—	74.7	0	—	—	reach the standard
		Kiln burning zone of the top	—	67.0	0	—	—	reach the standard
		Top kiln preheating zone	—	66.3	0	—	—	reach the standard
		Road of hot air	—	72.7	0	—	—	reach the standard
		Desulfurization fan	—	82.7	0	—	—	reach the standard
		Kiln firing imports	—	81.3	0	—	—	reach the standard

表 4-8　　粉尘、噪声分布与检测结果

因素名称	车间/部门	测试地点	工种/岗位	结果范围	超标率(%)	超标结果范围	超标企业数	危害程度
粉尘	原料	原料棚	铲车司机	0.72-0.96	0	—	—	达标

	车间	原料混料	装载工	0.93-2.46	50	2.46	1	超标
		粗破碎机旁	下料、清料工	2.12-15.79	100	2.12-5.56	8	严重超标
			破碎工	0.76-5.39	83.3	1.25-15.79	2	严重超标
		振动筛旁	清料、振筛工	1.53-5.98	100	1.53-5.98	3	严重超标
		原料车间操作室	主控、给料工	1.22-19.05	100	1.22-19.05	5	超标
		一次搅拌机旁	一搅操作、加水工	1.24-4.86	100	1.24-4.86	3	严重超标
		陈化库操作位	陈化工	0.94-2.45	66.7	1.21-2.45	2	超标
		原料皮带旁	皮带司机	0.48-8.35	66.7	1.02-8.35	2	超标
	成型车间	二次搅拌机旁	二搅操作工	0.97-7.9	66.7	1.44-7.9	2	超标
		三次搅拌机旁	三搅操作工	0.94-1.1	33.3	1.1	1	达标
		切坯机旁	切坯操作工	4.58-13.4	100	4.58-13.4	2	严重超标
		码坯机旁	码坯操作工	1.26-3.08	100	1.26-3.08	2	超标
	烧成车间	焙烧炉旁	窑炉监控工	0.64-0.915	0	—	—	达标
		烧成控制室	中控室操作工	1.05-7.24	100	1.05-7.24	5	严重超标
		烧成窑头进口	—	0.87	0	—	—	达标
		焙烧炉顶	—	0.95-1.009	50	1.009	1	达标
		烧成窑顶保温带	—	0.169	0	—	—	达标
		烧成窑顶烧成带	—	0.165	0	—	—	达标
噪声	原料车间	原料混料	装载工	74.3	0	—	—	达标
		原料棚	铲车司机	75.6-85.3	25	85.3	1	
		粗破碎机旁	下料工	80.3	0	—	—	达标
			破碎工	87.6-89.4	100	87.6-89.4	3	轻度危害
		细破碎机旁	清料工	88.4	100	88.4	1	轻度危害
			破碎工	70.0-90.5	66.7	88.9-90.5	2	轻度危害
		振动筛旁	清料工、皮带司机	87.3	100	87.3-88.3	2	轻度危害
		原料车间控制室	主控工	77.5	0	—	—	达标
		原料车间操作室	给料工	77.1-84.5	0	—	—	达标
		原料皮带头旁	皮带司机	50.0-81.5	0	—	—	达标
		一次搅拌机旁	一搅操作、加水工	80.6-84.7	0	—	—	达标
		陈化库操作位	陈化工	76.1-76.4	0	—	—	达标
	成型车间	多斗挖掘机	多斗操作工	83-83.6	0	—	—	达标
		二次搅拌机旁	二搅操作工	86.0-94.2	100	86.0-94.2	3	中度危害
		三次搅拌机旁	三搅操作工	86.1-88.1	100	86.1-88.1	3	轻度危害
		挤出机旁	挤出操作工	70.0-87.6	60	86.2-87.6	3	轻度危害
		码坯机旁	码坯操作工	77.5-88.0	42.9	85.7-88.0	2	轻度危害
		切坯机旁	切坯操作工	81.3-84.6	0	—	—	达标
		翻坯机旁	架坯操作工	82.5-86.6	25	86.6	1	轻度危害
	烧成车间	干燥窑旁	运行、烧结工	76.1-79.2	0	—	—	达标
		焙烧窑旁	运行、烧结工	69.0-78.5	0	—	—	达标
		烧成控制室	中控室操作工	64.7-72.5	0	—	—	达标
		烧成窑顶	—	74.7	0	—	—	达标
		烧成窑顶保温带	—	74.7	0	—	—	达标
		烧成窑顶烧成带	—	67.0	0	—	—	达标
		烧成窑顶预热带	—	66.3	0	—	—	达标
		窑顶热风道	—	72.7	0	—	—	达标
		脱硫风机	—	82.7	0	—	—	达标
		烧成窑头进口	—	81.3	0	—	—	达标

4.4.3 Environmental harmful factorss

环境有害因素

The main Environmental harmful factorss in coal-gangue brick enterprises were the noise, waste gas (SO_2), waste residue (Bricks of raw materials and waste residue) and waste water. Noise was mainly produced in the process of raw meterial grinding in raw meterial workshop and the process of brick making in molding

workshop, and was organized intermittent discharge. Waste gas (SO_2) produced in the roasting process of brick baking in firing workshop, and was organized continuous emission. Waste residue was generated from raw meterial mixing process in raw meterial workshop and unloading bricks process in unloading workshop respectively, and was organizated recycling and intermittent discharge. Waste water was from mixing process in raw meterial workshop and the clearing process of ground, and was organized intermittent discharge. Detailed information see also table 4-9.

煤矸石制砖企业存在的环境有害因素主要有：噪声、废气（SO_2）、废渣（原料渣和废砖）和废水。噪声产生于原料车间原料粉碎过程（破碎、筛分、搅拌、给料、陈化）和成型车间制砖过程（多斗、搅拌、挤出、切坯、码坯），均为有组织间歇排放。废气（SO_2）产生于烧成车间的砖坯焙烧，为有组织连续排放。废渣（原料渣）产生于原料车间原料搅拌和卸砖车间的卸砖过程，为有组织地回收利用和间歇排放。废水产生于原料车间原料搅拌过程和清洗车间地面时，为有组织间歇排放。具体情况见表 4-9。

Table 4-9 Distrition and emission of environmental risks

NO.	risk（or waste）	plant/department	Technology	process	emission	persistence
1	niose	raw meterial workshop	Raw material grinding	Crushing, screening, mixing, feeding, aging	orgnized	intermittent
		Molding workshop	bricking	Multi-bucket, mixing, extrusion, cut blanks, code adobe	orgnized	intermittent
2	Waste gas（SO_2）	Firing workshop	Brick baking	baking	orgnized	continued
3	Waste	raw meterial workshop	mixing	Raw material mixing	orgnized	intermittent
4	Waste bricks	Unloading bricks workshop	Unloading bricks	Unloading bricks	orgnized	intermittent
5	Waste water	raw meterial workshop	mixing	Raw material mixing	orgnized	intermittent
		All the workshop	Clear workshop	Clear ground	orgnized	intermittent

表 4-9 环境有害因素分布及其排放处理方式

序号	因素（或废物）名称	车间/部门	生产工艺	产生过程	排放方式	排放持续性
1	噪声	原料车间	原料粉碎	破碎、筛分、搅拌、给料、陈化	有组织	间歇
		成型车间	制砖	多斗、搅拌、挤出、切坯、码坯	有组织	间歇
2	废气（SO_2）	烧成车间	砖坯焙烧	焙烧	有组织	连续
3	废渣（原料渣）	原料车间	搅拌	原料搅拌	有组织	间歇
4	废渣（废砖）	卸砖车间	卸砖	卸砖	有组织	间歇
5	废水	原料车间	搅拌	原料搅拌	有组织	间歇
		所有车间	清洗车间	清洗车间地面	有组织	间歇

4.4.4 Ergonomic risk factors

工效学危险因素

Work-related musculoskeletal injury (WMSDs) was the common work-related diseases in morden industry. The main reason of it was exposure to adverse ergonomic factors, including ①Biomechanical factors (force/load force, static load, work posture, repetitive movements, etc.), ②Environmental factors (vibration, noise, temperature, size of human-machine interface, etc.), ③ work organization factors (work and rest time

allocation, operating methods, operating time and repeat rate, production rate, etc.), ④ social and psychological factors (mental stress, fast-paced work, monotonous work, life stress, etc.) and ⑤ individual factors (gender, age, length of service, body size, etc.).

工作相关肌肉骨骼损伤（WMSDs）是现代工业活动常见的工作相关疾病，主要是工作中暴露于不良的工效学因素造成的，主要包括：①生物力学因素（用力/受力负荷、静力负荷、作业体位、重复动作等），②环境因素（振动、噪声、温度、人机界面尺寸等），③工作组织因素（作息时间分配、作业方式、作业时间、重复动作频率、生产速率等），④社会心理因素（精神紧张、工作快节奏、单调工作、生活压力等），⑤个体因素（性别、年龄、工龄、人体尺寸等）。

According to results of this survey, the type and post of work which exposed to adverse ergonomic factors were forklift driver, multi-bucket and code adobe operating, tile repair and manual loading and unloading, and transport driver. Biomechanics, psychology, and individual factors may be the adverse factors. They were shown in table 4-10 and figures below.

从本次调查及现场检测与核查的结果，存在不良工效学因素暴露的工种或岗位有：原料车间的铲车司机，成型车间的多斗或码坯操作，烧成车间的面砖修理和人工装卸车，卸砖车间的装卸和运输部的运输司机。不良因素主要有生物力学、心理学和个体因素，见表 4-10 和图 4-4。

Table 4-10 Unhealthy Ergonomics Factor and Exposure Post/Job

Department	Jobs/Positions	Biomechanics Factors	Work Organization Factors	Psychosocial Factors	Individual Factors
Raw materials	Forklift driver	Static Loading			
Molding	Multi-bucket operation	Long-term Seats		Monotonous Work	
	Code adobe Operation	Force Loading, Poor Posture, Repetitive Movements	High Frequency Repetitive Movements	Monotonous Work	Height Does Not Match Working Table
Firing	Tile Repair	Poor Posture		Monotonous Work	
	Manual Unloading	Force Loading, Repetitive Movements			Height Does Not Match Working Table
	Desulfurization Operation	Force Loading			
Unloading bricks	Stevedore	Force Loading			
Department of Transportation	Driver	Poor Posture		Monotonous Work	

表 4-10 不良工效学因素及其暴露岗位或工种

车间或部门	工种或岗位	生物力学因素	工作组织因素	社会心理因素	个体因素
原料	铲车司机	静力负荷			
成型	多斗操作	长期坐位		单调工作	
	码坯操作	用力负荷、不良体位、重复动作	高频率重复动作	单调工作	身高与工作台面不匹配
烧成	面砖修理	不良体位		单调工作	
	人工卸车	用力负荷、重复动作			身高与工作台面不匹配
	脱硫操作	用力负荷			
卸砖	装卸工	用力负荷			
运输部	司机	不良体位		单调工作	

The Picture of Forklift Driver
铲车司机

The Picture of Multi-bit Image Forming Bucket Operation
成型多斗操作

Code adobe Spaces Operation
码坯操作

Manual Unloading Operation
人工装卸操作

Desulfurization Feeding Operation
脱硫加料操作

4.4.5 The happening situation of Safety accidents and occupational disease

安全事故及职业病发生情况

After investigation and the on-site inspection, production safety accidents, inductrial injury accident, occupational disease have not been found in 13 enterprises.

经调查和现场核查，13 家企业均未发生安全生产事故、工伤事故，也为发现职业病的发生。

4.5 The Protective Equipments and warning signs of workplaces

防护设施及工作场所警示标识

Table 4-11 lists the configuration protective equipments of 13 coal gangue brick enterprises. From the table, the configuration of the protective equipment mainly aims at the dedusting and spray facilities preventing dust pollution of crusher and conveyor in raw material workshop, and desulphurization and dust removal facilities for roaster flue gas emissions. Dedusting facilities almost use bag filter, flue gas desulphurization and dust removal facilities all adopt the gypsum flue gas desulphurization and dust removal technology. Dedusting facilities are arranged in the crusher, vibrating screen, belt feed opening and first blender, and spray facilities are placed in the each belt and discharge flue of the molding workshop. In order to reduce the plant temperature, the induced draft fans are placed in every cave openning. Soot desulfurization precipitators are all arranged in the exhaust fan outlet. For the daily maintenance of protective equipments, the operation rate of these facilities is good, but still several enterprises haven't established their daily maintenance system and implemented the regular protective checks of the dust collector and the fans such as dust collectors arranged in the crusher, first blender, belt feed opening and the fans placed in every cave openning, and so on. According to the testing result of occupational hazards factors, although the dedusting facilities or spray facilities were arranged in these workplace, the dust concentration in the air in these workplaces is still not able to reduce to the national occupational exposure limit below. The noise generated by the crushers, vibrating screens, blenders, extruders and other facilities is rather serious. All of the 13 enterprises have not mentioned the Sound-proofing and noise protection facilities, and related facilities couldn't be found through on-site inspection. Most enterprises fail to

provide hearing protectors for the operators in these workplaces. In limestone add post, no relevant protective equipments were equipped. Most enterprises have not set warning marks in the workplaces that exist occupational harmful factors, several enterprises only equip with safety labeling. Equipments and workstations and other arrangements have enough space for maintenance, and all operation components are shielded. The emergency stop switch is located next to the machine in case of emergency; In the place of transportation equipment and piping etc, necessary pedestrian ladder should be considered to set. Activities railing have be installed in the Staircases, corridors and pool, and the trench covered with board. For substation, high-voltage protection and separate railings should be installed to prevent electrical injury. Workplaces with safety and warning signs see also picture 4-5.

表 4-11 列出了 13 家煤矸石制砖企业配置的防护设施。从表中可见，配置的防护设施主要是针对原料车间防止破碎机和皮带机粉尘污染的除尘设施、喷淋设施和炉窑烟气排放的脱硫、除尘设施。除尘设施几乎均采用布袋除尘器，烟气脱硫、除尘设施均采用目前已成熟使用的石膏法烟气脱硫除尘技术。除尘设施布置在破碎机、振动筛、皮带下料口、一次搅拌机，喷淋设施布置在成型车间各皮带及烧成排烟道处。为了减少车间高温，在各窑洞口布置了引风机。烟尘脱硫除尘器均布置在排烟风机出口处。从防护设施的日常维护来看，其防护设施的运转率较好，但个别企业为对其建立日常维护制度，未实施对除尘器和风机的防护效果进行定期检测，如布置在破碎机、一搅、皮带下料口处的除尘器和各窑洞口的风机等。从本报告职业性有害因素的测试结果来看，产生粉尘的工作场所虽然布置了除尘设施或喷淋设施，仍不能将工作场所空气中的粉尘浓度降低到国家职业接触限值以下。破碎机、振动筛、搅拌机、挤出机等设施产生的噪声比较严重，13 家企业均为提及隔声降噪防护设施，现场核查结果也未见相关设施，大多数企业没有为这些场所的操作人员配置护听器。在石灰石添加岗位未布置相关防护设施。多数企业未在存在职业性有害因素的工作场所设置警示标识，个别企业仅设有安全标识。设备和工作台等布置均留有足够的检修空间，运行部件均设置防护罩。机旁设置紧急停车开关，以应急需；输送设备、管道等处考虑必要的人行过梯。楼梯、走廊及池边等装设活动栏杆，地沟上加盖板。对变电所设高压保护，设置隔离栏杆，防止电伤。设有安全设施与警示标识的工作场所参见附图 4-5。

Table 4-11 Protective equipments and related survey results

Workshop/ Departments	Name of protective equipments	model	location	number	Operational aspects		The number of periodic inspection				Protective effect			Total input (million RMB) / year maintenance
					The number of operation	Operation rate (%)	year	Half year	no	Detection rate(%)	good	general	poor	
Raw material workshop	dust collector	-	Crusher, vibrating screen	1	1	100		1		100%		1		280/6
	bag filter	Blowback flat bag	Crusher, first blender, belt feed opening	1	1	100			1	0%	1			20/4.8
	Bag filter	dust collector	Crusher, belt conveyor	1	1	100	1			100%		1		260/8
	Bag filter	XMC120-Ⅱ	Crusher	1	1	100		1		100%		1		250/8
	Pulse bag filter	PPC96-5	Crusher	1	1	100		1		100%	1			160/8
	Pulse bag filter	XLPM-7C	Crusher, first blender, belt feed opening	3	3	100			3	0%		3		220/30
	Bag filter	LJP26-10	First crusher , Second Crusher	4	4	100		4		100%			4	120
Molding Workshop	Spray facilities	-	each belt in molding workshop	1	1	100		1		100%		1		280/6
Firing Workshop	fans	Y-73-IINO180	Each mouth of the cave	3	3	100			3	0%		3		60/20
	Spray facilities	(Self-installation)	Discharge flue	1	1	100		1		100%	1			100/5
	Spray facilities	-	Discharge flue	1	1	100		1		100%	1			200/10
	Desulfurization tower	-	Tail of roasting kiln	1	1	100		1		100%		1		280/6
	Desulfurization precipitator	WM336-16	the exhaust fan outlet	1	1	100		1		100%	1			250/8
	Desulfurization precipitator	SPT/T	the exhaust fan outlet	2	2	100		2		100%	2			100/5
	Desulfurization precipitator	DCL-75	the exhaust fan outlet	1	1	100		1		100%	1			160/8
	Desulfurization precipitator	XSM-Ⅱ—30	the exhaust fan outlet	1	1	100		1		100%	1			136/20

表 4-11　　防护设施及其相关调查结果

车间/部门	防护设施名称	型号	布置地点	布置台数	运行情况		定期检测台数				防护效果			总投入(万元)/年维护
					运行台数	运转率(%)	年	半年	无	检测率(%)	好	一般	差	
原料车间	除尘器	-	破碎机、振动筛	1	1	100		1		100%		1		280/6
	布袋除尘器	反吹扁袋式	破碎机、一搅、皮带下料口	1	1	100			1	0%	1			20/4.8
	布袋除尘器	除尘器	破碎机、皮带机	1	1	100	1			100%		1		260/8
	布袋除尘器	XMC120-Ⅱ	破碎机	1	1	100		1		100%		1		250/8
	脉冲袋式除尘器	PPC96-5	破碎机	1	1	100		1		100%	1			160/8
	脉冲袋式除尘器	XLPM-7C	破碎机、一搅、皮带下料口	3	3	100			3	0%		3		220/30
	布袋除尘器	LJP26-10	一次、二次破碎机	4	4	100		4		100%			4	120
成型车间	喷淋设施	-	成型车间各皮带	1	1	100		1		100%		1		280/6
烧成车间	风机	Y-73-IINO180	各窑洞口	3	3	100			3	0%		3		60/20
	喷淋设施	(自行安装)	排烟道	1	1	100		1		100%	1			100/5
	喷淋设施	-	排烟道	1	1	100		1		100%	1			200/10
	脱硫塔	-	焙烧窑尾部	1	1	100		1		100%		1		280/6
	脱硫除尘器	WM336-16	排烟风机出口处	1	1	100		1		100%	1			250/8
	脱硫除尘器	SPT/T	排烟风机出口处	2	2	100		2		100%	2			100/5
	脱硫除尘器	DCL-75	排烟风机出口处	1	1	100		1		100%	1			160/8
	脱硫除尘器	XSM-Ⅱ—30	排烟风机出口处	1	1	100		1		100%	1			136/20

Picture 4-5 Part of the workplace safety facilities and warning signs
图片 4-5　　工作场所部分安全设施及警示标识

4.6 Personal protective equipment (PPE)

个体防护装备

4.6.1 Selection

选择情况

Table 4-12 show that PPE selected by 13 enterprises mainly include dust masks, eye and face protectors (hand-held goggles, welding caps), skin care products (hand-washing production) and protective gloves (such as insulating gloves, general protective gloves). In these PPE, "302 anti-particle self-absorption filter respirators" produced by Rising Protection Equipment Co., Ltd. Shandong NingYang and "insulating gloves" produced by Tianjin Red Alliance Rubber Company fail to own the safety certificate. Two "dust masks(ST-AX, ST-AG)" produced by Hubei Jingzhou sichuang Science and Technology Development Co., Ltd and the "hand-held goggles" and "welding hat" which the manufacturers are unknown all don't get the security identification mark. These products should be determinged as waste products which the enterprise should be not allowed to use. All enterprises fail to equip with the hearing protectors.

表 4-12 可见，13 家企业选择的个体防护装备主要包括防尘口罩、眼面护具（手持护眼罩、电焊帽）、劳动护肤品（洗手净）和防护手套（如绝缘手套、一般防护手套）。这些个体防护装备中，山东宁阳瑞星防护器材有限公司生产的“302 型自吸过滤防颗粒物呼吸器” 和天津红联橡胶公司生产的“绝缘手套”

为无安全鉴定证书产品，湖北荆州思创科技开发有限公司生产的两款“防尘口罩（ST-AX、ST-AG）”和无生产厂家的“手持护眼罩”和“电焊帽”均为无安全鉴定标志产品。这些产品均为判废产品，企业不得使用。所有企业均未配置防噪声的护听器。

4.6.2 Configuration

配置情况

Table 4-13 show that the dust masks used in almost half of enterprises should be sentenced to waste productions, the issuing quatity of the insulation glove is not sufficient and also do not satisfy the requirement of validity. PPE deployed to workers in nearly half of companies fail to meet the requirement of national relevant standards. In many workplaces (such as crushing, clean materials, mixing, extrusion, billet aircraft, code adobe, etc) , the noise level exceeds the national occupational exposure limits and workers must be equipped with hearing protectors, however all surveyed enterprises provide no any hearing protection products to the workers.

表 4-13 显示，近半数企业使用应为判废的防尘口罩产品，绝缘手套发放数量不足，不满足有效期的要求。近半数企业配置不符合国家相关标准要求的个体防护用品。煤矸石生产的许多作业场所（如破碎、清料、搅拌、挤出、架坯、码坯等）噪声水平超过国家职业接触限值的要求，必须为劳动者配备护听器，而调查的所有企业均未为劳动者提供护听产品。

Table 4-12 Select condition of PPE

NO	Product categories	Product name	model	Name of manufacturer	Key Performance Indicators	Implementation of standards	Use period (months)	Security identification card	Whether the product description	Using Enterprise	Waste product
1	Dust mask	Dust mask	3M	3M China Ltd.	Efficiency dust resistance 100%	-	-	Yes	Yes	Shangdong XinQi	
2		Single filter tank mask	3M-3200	3M China Ltd.	Efficiency dust resistance 95%	Japan Ministry of Labour, South Korea Department of Labor, Australia / New Zealand Standard No. 1716	according to the breakthrough curve and actual situation in the workplace	Yes	Yes	Nixia zhongjieneng,TeLing TieQiang	
4		Self-absorption filter respirators against particles	302type	Rising Protection Equipment Co., Ltd. Shandong Ningyang	Efficiency dust resistance 95%	LD29-92	0.5	No	Yes	ShanXi LuAn	waste
5		Duplex dust masks	301type	Shandong Province, HongWei Protective Equipment Co., Ltd. Ningyang	Efficiency dust resistance 95%	LD29-92	3	LA-2008-0872	Yes	Shanxi Jicheng、Shanxi Juyi	
6		Dust mask	Duplex301、302type	Shandong Hongyuan Ningyang Protection Products Co., Ltd.	Efficiency dust resistance≥95.7%	GB/T2626-92	-	Yes	Yes	Ningxia ChuanTai	
7		Dust mask	WuAn-301type	Tangshan Tang Fung Industrial Protective Products Co., Ltd.	Efficiency dust resistance≥95%	GB/T2626-92	-	Yes	Yes	Ningxia ChuanTai	
8		Dust mask	ST-AX	JingzhouSiChuang Science and Technology Development Co., Ltd.	Efficiency dust resistance 98.3%	GB2626-2006	3	No	Yes	Shandong ZaoZhuang、ShanDong TaiAn	Waste
9		Dust mask	ST-AG	JingzhouSiChuang Science and Technology Development Co., Ltd.	Efficiency dust resistance 98.3%	GB2626-2006	3	No	Yes	Shandong ZaoZhuang、ShanDong TaiAn	Waste
10		6 layer dust masks	-	-	-	-	2	Yes	Yes	Ningxia HengYunDa	
11	Eye and face protection	Handheld goggles	Unknown	No	-	-	-	No	-	Shanxi juyi	Waste
12		Welding cap	DQ4-300	-	15 level	-	24	-	Yes	Shanxi LuAn	Waste
13	Labor skin care products	Hand sanitizer	Unknown	No	-	-	-	No	-	Shanxi JuYi	
14		Insulated gloves	-	Tianjin Red Alliance Rubber Company	Unspecified	LD34.1-92	3	No	No	Shanxi LuAn	Waste

15	Other Personal Protection	Glove	Unknown	No	-	-	No	-	-	Shanxi JuYi	

表 4-12　　个体防护装备的选择情况

序号	产品类别	产品名称	型号	生产企业名称	主要性能指标	执行标准	使用期限(月)	安全鉴定证	有无产品使用说明	使用企业	判废产品
1	防尘口罩	防尘口罩	3M	3M 中国有限公司	阻尘效率 100%	-	-	有	有	山东新齐	
2		单过滤罐面罩	3M-3200	3M 中国有限公司	阻尘效率 95%	日本劳工部、韩国劳工部、澳大利亚/新西兰标准 1716 号	根据穿透曲线和工作场所实际情况确定	有	有	宁夏中节能、铁岭铁强	
4		自吸过滤防颗粒物呼吸器	302 型	山东宁阳瑞星防护器材有限公司	阻尘效率 95%	LD29-92	0.5	无	有	山西潞安	废
5		复式防尘口罩	301 型	山东省宁阳宏伟防护用品有限公司	阻尘效率 95%	LD29-92	3	LA-2008-0872	有	山西晋城、山西聚义	
6		防尘口罩	复式 301、302 型	山东省宁阳宏源防护品有限公司	阻尘效率≥95.7%	GB/T2626-92	-	有	有	宁夏川泰	
7		防尘口罩	武安-301 型	唐山市唐丰工业防护制品有限公司	阻尘效率≥95%	GB/T2626-92	-	有	有	宁夏川泰	
8		防尘口罩	ST-AX	荆州思创科技开发有限公司	阻尘效率 98.3%	GB2626-2006	3	无	有	山东枣庄、山东泰安	废
9		防尘口罩	ST-AG	荆州思创科技开发有限公司	阻尘效率 98.3%	GB2626-2006	3	无	有	山东枣庄、山东泰安	废
10		6 层防尘口罩	-	-	-	-	2	有	有	宁夏恒运达	
11	眼面部防护	手持护眼罩	未知	无	-	-	-	无	-	山西聚义	废
12		电焊帽	DQ4-300	-	15 级	-	24	-	有	山西潞安	废
13	劳动护肤用品	洗手液	未知	无	-	-	-	无	-	山西聚义	
14		绝缘手套	-	天津红联橡胶公司	未说明	LD34.1-92	3	无	无	山西潞安	废
15	其他个体防护	手套	未知	无	-	-	无	-	-	山西聚义	

Table 4-13 Configuration of PPE

PPE name	Name of harmful factors	Department / workshop	Jobs/Post	Using Enterprise	Contact Number	Number of configurations	Configuration cycle (one / year • person)	Whether Meet the requirements
Dust mask	Dust	Raw materials workshop	Feeding Workers	Tieling TieQiang	8	48	6	Yes
			Cutting workers	Shanxi JuYi	2	24	12	Yes
				Shandong ZaoZhuang	8	32	4	Using the waste products
				Shandong TaiAn	9	36	4	Using the waste products
			First mixing operator	Ningxia ChuanTai	1	12	12	Yes
				Tieling TieQiang	8	48	6	Yes
			Vibrating screen workers	Ningxia ChuanTai	1	12	12	Yes
				Tieling TieQiang	8	48	6	Yes
			Waste removal worker	Shanxi JuYi	1	12	12	Yes
			Loading worker	Shanxi LuXi	8	48	6	Using the waste products
				Shandong XinQi	2	8	4	Yes
			burster	Shanxi LuAn	8	48	6	Using the waste products
				Shanxi JinCheng	34	85	3	Yes
				Shandong ZaoZhuang	4	16	4	Using the waste products
				Shandong TaiAn	2	8	4	Using the waste products
				Ningxia ChuanTai	2	24	12	Yes
				Tieling TieQiang	8	48	6	Yes
			Belt Drivers	Shanxi LuAn	16	96	6	Using the waste products
			Precipitation worker	Shanxi JuYi	1	12	12	Yes
				Shanxi LuAn	8	48	6	Using the waste products
				Ningxia ChuanTai	1	12	12	Yes
			Water adding worker	Shanxi JuYi	1	12	12	Yes
		Molding Workshop	Second mixing operator	Shanxi JuYi	2	24	12	Yes
				Ningxia ChuanTai	2	24	12	Yes
			Third mixing operator	Shanxi JuYi	2	24	12	Yes
				Ningxia ChuanTai	2	24	12	Yes
			Mixing driver	Shandong ZaoZhuang	2	8	4	Using the waste products
				Shandong ZaoZhuang	4	16	4	Using the waste products
			Extrusion Operator	Ningxia ChuanTai	2	24	12	Yes
			Code adobe Operator	Ningxia ChuanTai	14	168	12	Yes
				Shandong TaiAn	22	88	4	Using the waste products

				Shandong ZaoZhuang	32	128	4	Using the waste products
	Soot	Firing Workshop	Transport workers	Shandong ZaoZhuang	12	48	4	Using the waste products
				Shandong TaiAn	12	48	4	Using the waste products
Insulated gloves	High Temperature		Sintering work	Shanxi LuAn	7	21	3	Using the waste products、the amount is not enough

表 4-13　个体防护装备的配备情况

PPE 名称	有害因素名称	部门/车间	工种/岗位	使用企业	接触人数	配置数量	配置周期（个/年•人）	是否满足要求
防尘口罩	粉尘	原料车间	给料工	铁岭铁强	8	48	6	是
			下料工	山西聚义	2	24	12	是
				山东枣庄	8	32	4	使用判废产品
				山东泰安	9	36	4	使用判废产品
			一搅操作工	宁夏川泰	1	12	12	是
				铁岭铁强	8	48	6	是
			振筛工	宁夏川泰	1	12	12	是
				铁岭铁强	8	48	6	是
			清料工	山西聚义	1	12	12	是
			装载工	山西潞安	8	48	6	使用判废产品
				山东新齐	2	8	4	是
			破碎工	山西潞安	8	48	6	使用判废产品
				山西晋城	34	85	3	是
				山东枣庄	4	16	4	使用判废产品
				山东泰安	2	8	4	使用判废产品
				宁夏川泰	2	24	12	是
				铁岭铁强	8	48	6	是
			皮带司机	山西潞安	16	96	6	使用判废产品
			陈化工	山西聚义	1	12	12	是
				山西潞安	8	48	6	使用判废产品
				宁夏川泰	1	12	12	是
			加水工	山西聚义	1	12	12	是
		成型车间	二搅操作工	山西聚义	2	24	12	是
				宁夏川泰	2	24	12	是
			三搅操作工	山西聚义	2	24	12	是
				宁夏川泰	2	24	12	是
			搅拌司机	山东泰安	2	8	4	使用判废产品
				山东枣庄	4	16	4	使用判废产品
			挤出操作工	宁夏川泰	2	24	12	是
			码坯操作工	宁夏川泰	14	168	12	是
				山东泰安	22	88	4	使用判废产品

				山东枣庄	32	128	4	使用判废产品
	烟尘	烧成车间	运转工	山东枣庄	12	48	4	使用判废产品
				山东泰安	12	48	4	使用判废产品
绝缘手套	高温		烧结工	山西潞安	7	21	3	判废产品、数量也不满足

4.7 Waste heat power generation system (HRPG) occupational safety, health and the environment

余热发电系统（HRPG）的职业安全、健康与环境

13 enterprises, there are two coal gangue brick with HRPG system, but the HRPG owned by the new ZTE Zaozhuang Industrial Co., Ltd. Building Materials Branch is only in use. The main equipment composed in HRPG in this enterprise includes: softened water treatment system, water-supply deoxidation system, heating system, waste heat boiler systems, turbine system and electric generator (QF1.5-400 / 4)。

13 家企业中，有两家煤矸石砖厂附有 HRPG 系统，但仅有山东枣庄新中兴实业有限责任公司建材分公司煤矸石制砖厂的 HRPG 系统投入使用。该厂 HRPG 系统的主体设备包括：软化水处理系统（包括钠离子交换器、再生装置、软水池），给水除氧、加热系统（包括给水泵、面式换热器、除氧器等设备）、余热锅炉系统（包括省煤器、汽包、蒸汽发生器、过热器、减温器等设备）、汽轮机（包括汽轮机本体、凝汽器、循环冷却水系统、凝结水系统和真空系统）和发电机（QF1.5-400/4）各 1 台。

The occupational dangerous factors from the waste heat power generation system is the electric shock; occupational hazard factors are mainly the noise and high temperature, almost have no contain the toxic substances; environmental harmful factors mainly is the noise. Noise come mainly from the steam turbine, boiler blowing off, a variety of feed water pump, etc., high temperature come from the boiler, steam piping, turbine and other equipment. The protective facilities have equipment to install noise insulation itself, and the anti-noise earplugs weared by workers in the possible case of exposed to noise.

余热发电系统的职业危险因素主要为电击伤害；职业性有害因素主要有噪声和高温，基本不含有毒物质；环境有害因素主要为噪声。噪声主要来自汽轮机、锅炉排污、各种给水泵等，高温来自锅炉、蒸气管道、汽轮机等设备。其防护设施有设备本身加设隔声隔热层，工人在可能暴露噪声的情况下佩戴防噪声耳塞。

There are the 6 of workers in HRPG system, they have divided into 3 work shifts, 2 workers of each shift, in charge of routing inspection and the data records work for eqipments.

余热发电共有工人 6 名，分 3 班，每班 2 人，为巡检工，负责设备的巡视，数据记录。

4.8 The results of on-site verification for occupational safety, health and environmental management from enterprises

职业安全、健康与环境管理的现场核查结果

4.8.1 Organization

组织机构

4.8.1.1 The management of the top management of enterprise for occupational safety and health status

最高管理者对企业的职业安全健康管理情况　遵守

A on-site inspection for the aetting of occupational safety and health administrative Organization, collocation of related personnel, top management commitments for observing the national laws, regulations and standards and so on in a total of 13 enterprises have been conducted, the result of this inspection see also table 4-14. Of the 13

enterprises inspected, only one enterprise has not the top management commitment for Occupational safety, health and environmental regulations and standards. In 12 companies which have commitment, there are 11 enterprises which informed the commitment of workers, 8 enterprises have conducted a management review. Thus, the top management of few enterprises was absence of administration for occupational safety and health.

共对 13 家企业是否设立职业安全健康管理机构、配置相关人员、最高管理者对国家相关法规、标准的承诺等情况进行了现场核查（表 4-14）。核查结果显示，13 家企业中仅有 1 家无最高管理者对国家职业安全健康环境法规、标准的承诺。有承诺的 12 家企业中，有 11 家将这种承诺告知了劳动者，8 家进行了管理评审。由此可见，少数企业最高管理者对企业的职业安全健康管理缺位。

4.8.1.2 Organization setup and staffing configuration

机构设置及人员配置情况

Table 4-14 shows that the 9 enterprises from surveied 13 enterprises have set up the occupational safety and health leader and administrative institutions, and configure the part-time personnels. Among them, the the all enterprises which have set up leader institutions have the clear and definite occupational safety leader and administrative responsibilities, unclear occupational health leader responsibilities has only one eterprises, unclear occupational health administrtive responsibilities have four ones. Of 3 enterprises of not set occupational safety and health leader and management institution, only one commissioned the occupational safety and health technical services, there are two did not carry out the daily work of occupational safety and health. For the question whether part-time personnel was configurated, the 9 companies which have established related institutions are equipped with part-time occupational safety professional and technical personnel, there are 3 enterprise have not configured the part-time occupational health professionals and technical personnel. There are 8 enterprises which have also configurated part-time occupational safety and health in plant and group and have the clear work responsibilities.

本报告对 13 家企业进行的职业安全健康领导机构、管理机构及其人员配置情况的调查结果（表 4-14）显示，13 家企业中有 9 家设立了职业安全健康领导机构和管理机构，并配置了专兼职的管理人员。其中，设立领导机构的企业均明确了职业安全领导职责和管理职责，未明确职业健康领导职责的企业仅有 1 家，未明确职业健康管理职责的企业有 4 家。未设置职业安全健康领导和管理机构的 3 家企业中，仅有 1 家委托了职业安全健康技术服务，尚有 2 家未开展职业安全健康技术服务工作。从是否配置专兼职人员来看，设立机构的 9 家企业均配置了专兼职的职业安全专业技术人员，尚有 3 家企业未配置专兼职的职业健康专业技术人员。车间及班组配置兼职的职业安全健康管理人员并明确其职责的企业有 8 家，仅有 1 家未配置兼职人员。

Table 4-14 Results of the verification organization

Content Verification	Verification of results (number of enterprises)	
	Have/Yes	%
1.Whether top management to comply with national regulations and standards written commitments?	12	92.3
1.1 Subject: Is this working?	11	91.7
1.2Whether the annual management review?	8	66.7
2. Whether to set up occupational safety and health lead agency?	9	69.2
2.1Such as the establishment of occupational safety management responsibilities are clear?	9	100
2.2 Occupational health management responsibilities are clear?	8	88.9
3. Is set occupational safety and health administration?	9	69.2

3.1 Such as setting, is a clear occupational safety management responsibilities?	9	100
3.2 Such as setting, is a clear occupational health management responsibilities?	5	55.6
3.3If not set, is commissioned to provide safety and occupational health services?	1	33.3
4. Staffing	9	69.2
4.1 Whether part-time job with health professionals?	9	100
4.2 Whether part-time job with health professionals?	6	66.7
5. Whether the workshop and the team with part-time safety and health management?	8	66.7
5.1 such as equipment, are clear responsibilities of the Occupational Safety and Health Management	8	100

表 4-14　　组织机构核查结果

核查内容	核查结果(企业数)	
	有/是	%
1.最高管理者是否具有遵守国家法规、标准的书面承诺？	12	92.3
1.1 如有：是否告知劳动者？	11	91.7
1.2 是否进行了年度管理评审？	8	66.7
2. 是否设立职业安全健康领导机构？	9	69.2
2.1 如设立，是否明确职业安全管理职责？	9	100
2.2 是否明确职业健康管理职责？	8	88.9
3. 是否设置职业安全健康管理机构？	9	69.2
3.1 如设置，是否明确职业安全管理职责?	9	100
3.2 如设置，是否明确职业健康管理职责?	5	55.6
3.3 如未设置，是否委托提供安全生产和职业健康服务？	1	33.3
4. 人员配置	9	69.2
4.1 是否配备专职安全生产管理人员？	9	100
4.2 是否配备专兼职的职业健康专业人员？	6	66.7
5. 是否为车间及班组配备兼职的安全健康管理人员？	8	66.7
5.1 如配备，是否明确职业安全健康管理职责	8	100

4.8.2 Rules and regulations

规章制度情况

Table 4-15 lists the verification result of 13 companies on occupational safety, health and environmental rules and regulations, include: the responsibility and target responsibility system for safety production, safty production and occupational disease prevention and cure planning, occupational safety, health and environmental management regulations, post standard operation procedures, management systems of testing, evaluation and health care, occupational safety, health and environmental financial input and injury Insurance and so on.

表 4-15 列出了 13 家企业职业安全、健康和环境规章制度的核查结果，包括：安全生产责任制，目标责任制度，安全生产和职业病防治规划，职业安全、健康和环境管理制度，岗位操作规程，检测、评价及健康监护管理制度，职业安全、健康和环境经费投入和工伤保险等情况。

13 enterprises, there are 12 established a special safe production responsibility system, but number of enterprises with occupational disease prevention and cure responsibility have only 8 ones. The enterprises which bring the occupational safety, health and environmental objectives into the target management responsibility of the legal representative have 11 companies, of which, the business objectives down to every level only 6. The enterprises which have established safe production and occupational disease prevention and

cure planning have only 7 ones (53.8%), established occupational safety, health and environmental management system of enterprises only 8 ones (61.5%). 13 enterprises have set up post safe operative programme and have the clear and definite safe production contents, but enterprises which have clear and definite occupational health contents have only 5 ones (38.5%). For occupational safety, health and environmental monitoring, assessment and health care systems, there are half of the enterprises have not established the relevant system. 12 enterprises have established safety equipment inspection, maintenance and maintain system, all enterprises have joined the work injury insurance. Most enterprises have able to ensure the input of funds on safety, but only half of the enterprises ensure the input of funds on occupational diseases prevention and cure.

13 家企业中，有 12 家建立了专门的安全生产责任制，但含有职业病防治责任内容的仅有 8 家。职业安全、健康和环境工作目标纳入法定代表人目标管理责任的企业有 11 家，其中，将工作目标层层分解的企业仅有 6 家。建立安全生产和职业病防治规划的企业仅有 7 家（占 53.8%），建立职业安全、健康和环境管理制度的企业仅有 8 家(占 61.5%)。13 家企业均设置了岗位安全操作规程并明确了安全生产内容，但明确职业健康内容的企业仅有 5 家（占 38.5%)。就职业安全、健康和环境监测、评价及健康监护管理制度而言，有半数企业未建立相关制度。12 家企业建立了安全设备检测、维护和保养制度，所有企业都加入了工伤保险。多数企业确保了安全生产的经费投入，但仅有半数企业确保了针对职业病防治经费的投入。

Table 4-15 Results of the verification rules

Content Verification	Verification of results (number of enterprises)	
	Have/Yes	%
1.is there a special safe production responsibility system?	12	92.3
1.1 Such as the establishment, whether it contains the contents of occupational disease prevention	8	66.7
2. Occupational safety, health and environmental work is incorporated into the legal representative of target management responsibility?	11	84.6
2.1If so, whether down to every level of their responsibilities	6	54.5
3.Whether the development of safe production and occupational diseases prevention and control plan and implementation plan?	7	53.8
4.Whether the establishment of occupational safety, health and environmental management system?	8	61.5
4.1Such as building, its contents are clear	7	87.5
5. Practice is set to post?	13	100
5.1 If set, the contents are clear safety	13	100
5.2 Such as setting, is clearly the content of occupational health	5	38.5
6.Detection, evaluation and health care management system		
6.1 Whether the occupational hazards of workplace inspection and evaluation system	7	53.8
6.1.1 Such as the establishment, whether to establish a secure identification of risk factors and evaluation system	6	85.7
6.2 Whether the establishment of environmental harmful factors testing and evaluation system	6	46.2
6.3 If so, whether to secure the necessary funding for investment in prevention and treatment of o Is there a health care management system ccupational diseases	7	53.8
6.4If so, whether to secure the necessary funding for investment in prevention and treatment of occupational diseases	12	92.3
7. If so, whether to secure the necessary funding for investment in prevention and treatment of occupational diseases	11	84.6
7.1 If so, whether to secure the necessary funding for investment in prevention and	7	63.6

treatment of occupational diseases		
8. Whether the work injury insurance law?	13	100

表 4-15　规章制度核查结果

核查内容	核查结果(企业数)	
	有/是	%
1.是否建立专门的安全生产责任制？	12	92.3
1.1 如建立，是否含有职业病防治内容	8	66.7
2.职业安全、健康和环境工作是否纳入法定代表人目标管理责任制？	11	84.6
2.1 如是，其责任是否进行层层分解	6	54.5
3.是否制定安全生产和职业病防治计划和实施方案？	7	53.8
4.是否建立职业安全、健康和环境管理制度？	8	61.5
4.1 如建立，是否明确其内容	7	87.5
5.是否设置岗位操作规程？	13	100
5.1 如设置，是否明确安全生产内容	13	100
5.2 如设置，是否明确职业健康内容	5	38.5
6.检测、评价及健康监护管理制度		
6.1 是否建立工作场所职业病危害因素检测及评价制度	7	53.8
6.1.1 如建立，是否建立安全危险因素的识别与评价制度	6	85.7
6.2 是否建立环境有害因素检测及评价制度	6	46.2
6.3 是否建立健康监护管理制度	7	53.8
6.4 是否建立对安全设备的检测、维护和保养制度	12	92.3
7.是否确保必要的安全生产经费投入？	11	84.6
7.1 如有，是否确保必要的职业病防治经费投入	7	63.6
8.是否依法参加工伤保险？	13	100

4.8.3 Related records management

相关档案的管理

Table 4-16 lists the results of records verification of the 13 companies. Nearly half of the enterprise, no occupational health archives nor laborers' health surveillance archives, the contents of archives which have been built are relatively complete, but the information is not regularly updated, only 4 of 7 companies regularly updated the contents of archives. A few enterprises have no medical examination records, most enterprises no follow-up record after leaving post.

表 4-16 列出 13 家企业相关档案管理的核查结果。表中显示，近半数企业即无职业卫生档案也无劳动者健康监护档案，已建档案其内容比较全，但信息的定期更新不好，7 家建档企业仅有 4 家进行了定期更新。个别企业无上岗前体检和离岗时体检记录，多数企业无离岗后随访记录。离开

Table 4-16 The relevant results of the verification file management

verification of the content	Verification of results (number of enterprises)	
	Have/Yes	%
1. whether to establish occupational health file?	7	53.8

1.1 If established, the content is comprehensive	6	85.7
1.2Is regularly updated	4	57.1
2.Is there a laborer health records?	7	53.8
2.1 If established, the presence of pre-service	5	71.4
2.2Such as the establishment, whether included in the post period	7	100
2.3 Such as the establishment, whether with time undergo	5	71.4
2.4Such as the establishment, whether or not containing undergo follow-up after	1	14.3

表 4-16　相关档案管理核查结果

核查内容	核查结果(企业数)	
	有/是	%
1.是否建立职业卫生档案？	7	53.8
1.1 如建立，其内容是否全面	6	85.7
1.2 是否定期更新	4	57.1
2.是否建立劳动者健康监护档案？	7	53.8
2.1 如建立，是否含有上岗前	5	71.4
2.2 如建立，是否含在岗期间	7	100
2.3 如建立，是否含离岗时	5	71.4
2.4 如建立，是否含离岗后随访	1	14.3

4.8.4 Early prevention management

前期预防管理情况

Table 4-17 shows that in 13 companies, On the occupational-disease-inductive factors declare enterprise only 5, 8 companies developed safety assessment of construction projects, 4 companies developed the pre-evaluation and control ffect evaluation on occupational hazards for construction project. A few enterprises have neither occupational hazards declaration nor safety evaluation and occupational hazards evaluation for construction project. The enterprises which have done declaration and evaluation finished application and pass investigation from executive branch.

从表 4-17 可见，13 家企业中，进行职业病危害因素申报的企业仅有 5 家，8 家企业进行了建设项目安全性评价，4 家企业进行了建设项目职业病危害预评价和控制效果评价。个别企业既未进行职业病危害因素申报，也未进行安全评价和职业病危害评价。进行了申报和评价的企业，均按法规要求申请并通过行政部门审查。

Table 4-17 Ear prevention of verification results

Content Verification	Verification of results (number of enterprises)	
	Have/Yes	%
1. Has the occupational hazard program?	5	38.5
1.1Such as reporting, reporting of occupational hazards are complete	5	100
2. Construction project is evaluated for safety?	8	61.5
2.1 If so, is reviewed by the relevant departments	8	100
2.2 Such as the review, whether by	8	100
3. Project evaluation of whether occupational hazard?	4	30.8
3.1If so, whether the administrative department of health through	4	100
3.2Such as the review, whether to adopt?	4	100
4.Serious occupational hazards in construction projects are reviewed by the administrative department of health?	4	30.8
4.1 Such as the review, whether to adopt?	3	75.0

5. Before the final acceptance of construction projects whether occupational hazards assessment?	4	30.8
5.1If so, after the administrative department of health do	4	100
5.2 Such as the review, whether by	4	100
5.3 whether occupational hazards in construction projects for health protection facilities inspection	4	30.8
5.4 Such as acceptance, whether qualified	4	100

表 4-17　前期预防核查结果

核查内容	核查结果(企业数)	
	有/是	%
1.企业是否进行职业病危害项目申报？	5	38.5
1.1 如申报，申报的职业病危害因素是否齐全	5	100
2.建设项目是否进行安全性评价?	8	61.5
2.1 如是，是否经过有关部门审查	8	100
2.2 如审查，是否通过	8	100
3.建设项目是否进行职业病危害预评价？	4	30.8
3.1 如是，是否经过卫生行政部门审查	4	100
3.2 如审查，是否通过？	4	100
4.严重职业病危害建设项目是否经卫生行政部门审查？	4	30.8
4.1 如审查，是否通过？	3	75.0
5.建设项目竣工验收前是否进行职业病危害控制效果评价？	4	30.8
5.1 如是，经过卫生行政部门审查了吗	4	100
5.2 如审查，是否通过	4	100
5.3 建设项目是否进行职业病危害防护设施的卫生验收	4	30.8
5.4 如验收，是否合格	4	100

4.8.5 Safety and management of Workplace, materials and equipment

工作场所、材料和设备的安全管理情况

In the 13 enterprises surveyed (see table 4-18), the cases of use of techniques, technology and materials prohabited and eliminated by the state and producting, management, import and use the equipment and materials prohibited by the state and may to cause occupational hazards were not found out. There is no radiation hazard and high toxic substances are used. Among them, the production layout of 1 enterprise is unreasonable, 2 companies existed the situation which the harmful and no harnful operating are not separate, 2 enterprises fail to lay down the warning signs in Chinese at the full position of workplace and equipment generating occupational dangerous and hazards factors. In workplace, most enterprises only lay down safety-related signs, lack of occupational hazardous related warning signs.

在被调查的 13 家企业中（见表 4-18），均未发现使用国家禁止或淘汰的工艺、技术和材料，均不存在生产、经营、进口和使用国家明令禁止产生职业危害的设备和材料，均不存在放射性危害和高毒物品使用。其中，1 家企业生产布局不合理，2 家企业存在有害作业与无害作业未分开的情况，2 家企业未按法规要求在产生职业危险、有害因素的工作场所或设备（如破碎机、搅拌机、给料切坯机、焙烧窑等处）的醒目位置设置警示标示和中文警示说明。工作场所中，多数企业仅布置了安全相关的标识，缺乏职业性有害因素相关的警示标识。

Table 4-18 Results of the verification of materials and equipment management

verification of the content	verification of results (number of enterprises)	
	Have/Yes	%
1. whether to use the national ban or phase out the use of technology, technology, materials?	0	0
2. whether the production, operation, import and use prohibited by the state to cause occupational hazards of equipment and materials?	0	0
3. occupational hazards of the intensity or concentration of compliance with national occupational health standards?		
3.1 meet	6	46.2
3.2. part of the compliance	6	46.2
3.3 o not meet	1	7.7
4. production layout is reasonable?	12	92.3
5. Harmful and harmless operations are separated?	11	84.6
6. The existence of radiation in the workplace	0	0
7.The presence of high toxic substances in the workplace	0	0
8.Prominently in its warning signs have not set and Chinese warning that the risk of hazardous equipment?	2	15.4
8.11 If there is, what	Crushing machine, mixer, feeder cutter, baking kiln	

表 4-18　材料和设备管理核查结果

核查内容	核查结果(企业数)	
	有/是	%
1.是否使用国家禁止或淘汰使用的工艺、技术、材料?	0	0
2.是否生产、经营、进口和使用国家明令禁止产生职业危害的设备和材料?	0	0
3.职业病危害因素的强度或者浓度是否符合国家职业健康标准?		
3.1 符合	6	46.2
3.2 部分符合	6	46.2
3.3 不符合	1	7.7
4.生产布局是否合理?	12	92.3
5.有害和无害作业是否分开?	11	84.6
6.是否存在放射性工作场所	0	0
7.是否存在高毒物品工作场所	0	0
8.在其醒目位置是否有未设置警示标识和中文警示说明的危险、有害设备?	2	15.4
8.1 如存在，有哪些	破碎机、搅拌机、给料机切坯机、焙烧窑	

4.8.6 Monitoring management of occupational hazards

职业病危害因素监测管理情况

Table 4-19 shows that in 13 enterprises, there are 8 enterprises in which daily monitoring of occupational hazards have no personnel management, 6 enterprises have not implemented the regular monitoring and evaluation for occupational hazards factors in the workplace, there are 8 enterprises fail to report monitoring and evaluation results to health administrative department.

13 家企业中（表 4-19），有 8 家企业职业病危害因素日常监测无专人管理，6 家企业未实施对工作场所职业病危害因素进行定期监测与评价，有 8 家企业未按法规要求将监测结果定期上报卫生行政部门。

Table 4-19 Management of occupational hazards monitoring results of the verification

verification of the content	Verification of results

	(number of enterprises)	
	Have/Yes	%
1. Is there someone responsible for the daily monitoring of occupational hazards?	5	38.5
2. whether the regular occupational hazards in the workplace monitoring and evaluation?	7	53.8
3.. Monitoring, evaluation and corrective measures whether the result of occupational health files stored in the employer?	7	53.8
4. Monitoring and evaluation results are regularly reported to the local health authority?	5	38.5

表 4-19　职业病危害因素监测管理情况核查结果

核查内容	核查结果(企业数)	
	有/是	%
1. 是否有专人负责职业病危害因素日常监测？	5	38. 5
2. 是否定期对工作场所职业病危害因素进行监测与评价？	7	53. 8
3. 监测、评价与整改措施结果是否存入用人单位职业卫生档案？	7	53. 8
4. 监测与评价结果是否定期向所在地卫生行政部门报告？	5	38. 5

4.8.7 Performance status of Harm inform obligation

危害告知义务履行情况

Table 4-20 shows that more than half of enterprises are not prominently published the rules and regulations related occupational diseases prevention and cure in full positons, 2 enterprises have not signed labor contracts with workers, in remaining 11 enterprises, the labor contracts, the labor contracts of 5 enterprises have not state clearly occupational hazards and their possible consequences, protective measures and related labor protection benefits. The enterprises which announce occupational safety and health standard operation programme in full position have 11 ones, the enterprises to announce emergency rescue measures only 6 ones. Only half of the enterprises inform the results of measuring and evaluation to workers。

表 4-20 显示，半数以上的企业未在醒目位置公布职业病防治相关规章制度，2 家企业未同劳动者签订劳动合同，签订劳动合同的 11 家企业中，有 5 家企业在其签订的劳动合同中未按要求载明可能产生的职业病危害及其后果、职业病防护措施和相关劳动保护待遇。在其醒目位置公布安全健康操作规程的企业有 11 家，公布职业病危害事故应急救援措施的企业仅有 6 家。仅半数企业未将职业病危害因素监测与评价结果和职业健康体检结果告知劳动者。

Table 4-20 Performance result of Harm inform obligation

Content Verification	Verification of results (number of enterprises)	
	Have/Yes	%
1. Is prominently published in the relevant rules and regulations on occupational disease prevention?	6	46.2
2. Whether the labor contract?	11	84.6
2.1A labor contract specify that the possible occupational hazards and their consequences	6	54.5
3. Set forth in the labor contract if protective measures and treatment of occupational diseases?	6	46.2
4.Is prominently published in the Health and Safety Practice?	11	84.6
5.Is prominently published in the occupational hazards emergency rescue measures?	6	46.2
6. Occupational hazards in the workplace monitoring and evaluation results are the laborers?	6	46.2
7.Whether the employee occupational health examination results to the workers?	7	53.8
8.For occupational disease or occupational contraindication workers should inform me whether the enterprise?	Does not exist	

表 4-20　告知义务履行情况核查结果

核查内容	核查结果(企业数)	
	有/是	%
1. 是否在醒目位置公布职业病防治相关规章制度？	6	46.2
2. 是否签订劳动合同？	11	84.6
2.1 劳动合同中是否载明可能产生的职业病危害及其后果	6	54.5
3. 是否在劳动合同中载明职业病防护措施和待遇？	6	46.2
4. 是否在醒目位置公布安全健康操作规程？	11	84.6
5. 是否在醒目位置公布职业病危害事故应急救援措施？	6	46.2
6. 工作场所职业病危害因素监测与评价结果是否告知劳动者？	6	46.2
7. 是否将劳动者职业健康体检结果告知劳动者？	7	53.8
8. 对于患职业病或职业禁忌证的劳动者企业是否应告知本人？	不存在	

4.8.8 Occupational hazards prevention equipment and personal protective equipment management

职业危害防护设施和个体防护装备管理

Table 4-21 shows that occupational safety, health and environment protection facilities and management account table in more than half enterprises is the complete, and most of the configured protection facilities are operating effectively, nearly half of companies were not to formulate and implement the select, use and configure plans of personal protective equipment, However, most enterprises are equipped with personal protective equipment for workers and with regist and distribution records, only half of the enterprises have not developed the regular inspection and timely maintenance for occupational safety, health and environmental protection equipment, emergency rescue facilities and personal protective equipment.

从表 4-21 可见，半数以上企业职业安全、健康和环境防护设施配备与管理台账齐全，大多数企业配置的防护设施运行有效，近半数企业未制定个体防护装备选用、配置计划并组织实施，但大多数企业为劳动者配备了个体防护装备并备有其登记和发放记录，仅半数企业未对职业安全、健康和环境防护设备、应急救援设施和个体防护装备进行定期检测和及时维护。

Table 4-21 Protective equipment and personal protective equipment, results of the verification

verification of the content	Verification of results (number of enterprises)	
	Have/Yes	%
1.. occupational safety, health and environmental protection facilities are complete accounting?	7	53.8
2. occupational safety, health and environmental facilities with equipment?	8	61.5
3. occupational safety, health and environmental protection facilities effective?	10	76.9
4. is to develop an individual plan and organize the implementation of protective equipment?	7	53.8
5. is consistent with the requirements of occupational diseases prevention and control of individual protective equipment?	8	61.5
6. Are there personal protective equipment issued registration records?	10	76.9
7. the timely maintenance and regular inspection of occupational safety, health and environmental protection equipment?	8	61.5
8. is timely maintenance and regular testing emergency rescue facilities?	7	53.8
9. is timely maintenance of personal protective equipment, regular tests together?	7	53.8

表 4-21　防护设施和个体防护装备核查结果

核查内容	核查结果(企业数)	
	有/是	%

1. 职业安全、健康和环境防护设施台帐是否齐全？	7	53.8
2. 职业安全、健康和环境设施配备是否齐全？	8	61.5
3. 职业安全、健康和环境防护设施是否有效？	10	76.9
4. 是否制定个体防护装备计划并组织实施？	7	53.8
5. 是否配备符合防治职业病要求的个体防护装备？	8	61.5
6. 是否有个体防护装备发放登记记录？	10	76.9
7. 是否及时维护和定期检测职业安全、健康和环境防护设备？	8	61.5
8. 是否及时维护和定期检测应急救援设施？	7	53.8
9. 是否及时维护合定期检测个体防护装备？	7	53.8

4.8.9 Occupational health surveillance

职业健康监护情况

Table 4-22 shows that in 13 enterprises, 6 enterprises have provided pre-service, post-on, during post-off occupational health surveillance for workers, 5 enterprises have not gaven the proper job subsidies to workers exposed to occupational hazards. 13 enterprises do not have patients with occupational contraindication, found no the phenomenon to arrangements child to take part in occupational disease hazards work.

表 4-22 显示，13 家企业中有 6 家未按规定组织劳动者进行上岗前、在岗期间和离岗时的职业健康检查，5 家企业未对接触职业病危害的劳动者给予适当的岗位津贴。13 家企业均不存在职业禁忌证患者，未发现安排未成年工从事接触职业病危害作业的现象。

Table 4-22 Results of verification for occupational health surveillance

Content Verification	Verification of results (number of enterprises)	
	Have/Yes	%
1. Whether the requirement to organize posts before, during and undergo in the post when the occupational health examination?	7	53.8
2. Contraindication for workers suffering from occupational whether the posts were removed from the processing operations taboo?	Does not exist	
3. If there is not to undergo occupational health screening and lifting of the phenomenon or the termination of labor contracts?	Does not exist	
4. Occupational health record and retain for compliance?	7	53.8
5. Whether the occupational hazards of workers suffering from acute health checks and medical observation?	Does not exist	
6. Whether the arrangements for child labor to the occupational hazards of the job?	Does not exist	
7. Whether exposure to occupational hazards in the operation of workers, pay appropriate post allowance?	8	61.5

表 4-22　职业健康监护情况核查结果

核查内容	核查结果(企业数)	
	有/是	%
1. 是否按规定组织上岗前、在岗期间和离岗时的职业健康检查？	7	53.8
2. 对患有职业禁忌证的劳动者是否进行了调离禁忌作业岗位的处理？	不存在	
3. 是否存在未进行离岗职业健康检查而解除或者终止劳动合同的现象？	不存在	
4. 职业健康监护档案是否符合要求并妥善保管？	7	53.8
5. 是否对遭受急性职业病危害的劳动者进行健康检查和医学观察？	不存在	
6. 是否安排未成年工从事接触职业病危害的作业？	不存在	

7. 是否对从事接触职业病危害的作业劳动者，给予适当岗位津贴？	8	61.5

4.8.10 Emergency Rescue Management

应急救援管理

Table 4-23 shows that there are 9 enterprises which have established nine emergency rescue plan in 13 enterprises, but the emergency rescue facilities of 1 enterprises in them is the owe intact, two ones did not regularly exercise.

表 4-23 显示，13 家企业中有 9 家建立了应急救援预案，但其中有 1 家应急救援设施欠完好，2 家未进行定期演练。

Table 4-23 Verification of the results of emergency rescue

Content Verification	Verification of results (number of enterprises)	
	Have/Yes	%
1.Is there a plan for emergency rescue occupational disease?	9	69.2
2.Emergency rescue facilities are in good condition?	8	61.5
3. Do you regularly exercise emergency rescue occupational hazard?	7	53.8

表 4-23　应急救援情况核查结果

核查内容	核查结果(企业数)	
	有/是	%
1. 是否建立职业病危害事故应急救援预案？	9	69.2
2. 应急救援设施是否完好？	8	61.5
3. 是否定期演练职业病危害事故应急救援预案？	7	53.8

4.8.11 Auxiliary health facilities

辅助卫生设施

Table 4-24 shows that there are 12 enterprises equipped with auxiliary healths room in 13 enterprises, 10 enterprises with cloakroom room and bathroom, toilet facilities, 8 enterprises with women's health room. A few enterprises fail to configure the relevant health facilities, although having configuration in a few enterprises, but still not in line with national regulations and standards requirements, such as bathrooms, more/cloakroom room, life room.

表 4-24 显示，13 家企业中有 12 家配置了辅助卫生用室、浴室，10 家配置了更/存衣室、盥洗设施，8 家配置了妇女卫生用室。仍有少数企业未按国家要求配置相关卫生设施，个别企业虽配置了，但仍不符合国家法规和标准的相关要求，如浴室、更/存衣室、生活用室。

Table 4-24 Verificating results of the auxiliary health room

Verification Contents	results of Verification (numbers of enterprises)	
	have/yes	%
1. Is configured to use a secondary health room?	12	92.3
2. Is configured to the bathroom?	12	92.3
2.1 If so, whether to meet the requirements	11	91.7
3. Is configured more / cloakroom room?	10	76.9
3.1 If so, whether to meet the requirements	9	90.0

4. Is equipped with toilet facilities?	10	76.9
4.1 If so, whether to meet the requirements?	10	100
5. Is configured with a room of life?	10	76.9
5.1 If so, whether to meet the requirements	9	90.0
6. Whether the configuration of the women's health clinic?	8	61.5
6.1 If so, whether to meet the requirements	8	100

表 4-24　辅助卫生设施核查结果

核查内容	核查结果(企业数)	
	有/是	%
1. 是否配置了辅助卫生用室？	12	92.3
2. 是否配置了浴室？	12	92.3
2.1 如是，是否符合要求	11	91.7
3. 是否配置了更/存衣室？	10	76.9
3.1 如是，是否符合要求	9	90.0
4. 是否配置了盥洗设施？	10	76.9
4.1 如是，是否符合要求	10	100
5. 是否配置了生活用室？	10	76.9
5.1 如是，是否符合要求	9	90.0
6. 是否配置了妇女卫生室？	8	61.5
6.1 如是，是否符合要求	8	100

4.8.12 Occupational Health Training Management

职业健康培训管理

Table 4-25 shows that there are still the main leaders and managers of a few companies (3) which is fail to be trained on occupational health related law and regulations according to the demand of "Occupational Disease Prevention Law of PRC", and the workers were not organized to be trained about pre-job occupational health knowledges, nearly half of enterprises did not conduct the occupational health kowledge training during the post.

表 4-25 显示，仍有少数企业（3 家）的主要负责人和管理人员未按《中华人民共和国职业病防治法》的要求接受职业健康培训，未组织劳动者进行上岗前职业健康知识培训，近半数企业未对劳动者进行在岗期间的职业健康培训。

Table 4-25　Verificating results of the occupational health training

Verification Contents	results of Verification (numbers of enterprises)	
	have/yes	%
1. Whether the managers have been trained on the occupational health?	9	69.2
2. Whether the employer provide the pre-employment occupational health training to employees?	9	69.2
3. Whether the employer provide the on-job occupational health training to employees?	7	53.8

表 4-25　职业健康培训核查结果

核查内容	核查结果(企业数)	
	有/是	%
1. 用人单位的主要负责人、管理人员是否接受了职业健康培训？	9	69.2
2. 是否对上岗前的劳动者进行职业健康培训？	9	69.2

3. 是否定期对在岗期间的劳动者进行职业健康培训？	7	53.8

4.8.13 Occupational Disease Diagnosis and Patient safeguard

职业病诊断与病人保障

13 enterprises currently not found the patients with any occupational disease, so enterprises did not establish the management systems related to the diagnosis of occupational deseases and patients safeguard.

13 家企业目前均未发现职业病病人，因此均未建立职业病诊断与病人保障相关的管理制度。

4.8.14 The masses Surveillance

群众监督情况

Table 4-26 shows that 3 enterprises did not establish trade unions. In 10 enterprises which have establish the trade unions, nearly half of enterprises have not set up trade unions labor protection supervision and inspection network, a small number of enterprises did not carry out mass labor protection supervision and inspection activities.

表 4-26 显示，仍有 3 家企业未建立工会组织。建立工会组织的企业中，有近半数的企业未设立工会劳动保护监督检查网络，少数企业未开展群众性劳动保护监督检查活动，1 家企业无民主管理和民主监督。13 家企业中有 12 家在签订集体合同时，进行了平等协商。

Table 4-26 Verification results of surveillance by the masses

Verification Contents	results of Verification (numbers of enterprises)	
	have/yes	%
1. Whether established the labour union organization?	10	76.9
2. Whether to set up union labor protection supervision and inspection of the network??	6	46.2
3. Whether developed the mass supervise and checking activity for labour production?	8	61.5
4. Whether exist the democracy management and democracy surveillance?	9	69.2
5. Whether consult coequally with each other during signing the collective contract?	12	92.3

表 4-26 群众监督情况核查结果

核查内容	核查结果(企业数)	
	有/是	%
1. 是否建立工会组织？	10	76.9
2. 是否设立工会劳动保护监督检查网络？	6	46.2
3. 是否开展群众性劳动保护监督检查活动？	8	61.5
4. 是否存在民主管理、民主监督？	9	69.2
5. 签订集体合同时，是否平等协商？	12	92.3

4.8.15 Environmental monitoring and management

环境监测与管理情况

Table 4-27 shows that 5 enterprises have not specially-assigned person in charge of the daily monitoring management work of environment factors, 4 enterprises did not conduct regular environmental monitoring and evaluation, 5 enterprises did not store the results of its monitoring and evaluation into the management archive.

表 4-27 显示，13 家企业中仍有 5 家企业环境因素日常监测无专人管理，有 4 家企业未对环境因素

进行定期监测与评价，5 家企业未将其监测与评价结果存入管理档案。

Table 4-27 Results of the Environmental monitoring and management verification

Verification Contents	results of Verification (numbers of enterprises)	
	have/yes	%
1. Is there someone responsible for the routine monitoring of environmental factors?	8	61.5
2. Whether the regular monitoring and evaluation of environmental factors?	9	69.2
2.1 If so, whether the proposed corrective measures?	7	77.8
3. Detection, evaluation, whether the result of corrective measures to manage files stored?	8	61.5

表 4-27　　环境监测与管理情况核查结果

核查内容	核查结果(企业数)	
	有/是	%
1. 是否有专人负责环境因素日常监测？	8	61.5
2. 是否定期对环境因素进行监测与评价？	9	69.2
2.1 如是，是否提出整改措施？	7	77.8
3. 检测、评价、整改措施结果是否存入管理档案？	8	61.5

4.8.16 Worker interviews

工人访谈结果

Project group have made the interview with the worker representatives representative including 4 workshops during the two enterprises on-site inspection. The interview questions and the results are as follows.

项目专家组在对 2 家有代表性企业进行的现场核查后，同包括 4 个车间的工人代表进行了访谈，访谈问题及结果如下。

Enterprise A:

企业 A：

Question 1: How many years have you been working? And how long have you worked in this factory? Did you work in the other factory before?

问题 1：工作几年了？在这个工厂工作几年了？在其他工厂工作过吗？

Raw material Workshop representative: I have been worked in the materials workshop of the building company’s quarries for 12 years; and later I have been working in the brick factory for 4 months. (Junior high school graduate)

原料车间代表：以前在建材公司的采石场工作，原料车间工作了 12 年，来砖厂 4 个月，初中毕业。

Question 2: Always in a workshop work?

问题 2：总是在一个车间工作吗？

Firing workshop representative: currently in the firing workshop, and before in the molding workshop.

烧成车间代表：目前在烧成车间，以前在成型车间。

Question 3: Which workshop do you like?

问题 3：你喜欢哪个车间？

Molding workshop representative: The molding workshop, which is very challenging and earns more, additionally the wage is calculated on workload.

成型车间代表：成型车间，比较有挑战性，挣钱多，工资按工作量计算。

Question 4: In order to improve the occupational health, how to improve working conditions? Two people work at different time. Could you come up with two recommendations to improve the working conditions (other than wages)?

问题 4：工作条件方面如何改进，来提高职业健康工作？两人工作时间不同，能不能想出 2 条改善工作条件的建议（不谈工资）？

Representatives of the two workshops: working conditions is pretty good.

两车间代表：工作条件还挺好的，还行。

Question 5: What are the occupational hazards? How about the labor protection?

问题 5：存在的职业危害有哪些？劳动保护怎么样？

A representative: high temperature and dust. Masks (cleaning, anti-dust) and gloves are delivered on time.

某代表：热没办法，有灰洒水，口罩（打扫卫生、防灰）、手套都按时发放。

Question 6: Do you work indoor or outdoor?

问题 6：你在室内还是室外工作？

A representative: indoor.

某代表：室内工作。

Question 7: Some people leave their jobs, and do you know the reasons?

问题 7：有些人离开工作岗位了，原因你知道吗？

A representative: it is because the issue of incomes rather than the environment problems and injury problems.

某代表：因为收入的问题，不是环境问题，不是伤害的问题。

Question 8: rest?

问题 8：休息呢？

A representative: there are 17 people involved in this work, but the required number of actual work is 15 people, so the rest 2 people can rest.

某代表：17 人工作，实际需要 15 人，有 2 人可以休息。

Question 9: you have worked for 12 years, and do you think what the most common reason of unintentional injuries is?

问题 9：你工作了 12 年，比较长了，在 12 年中你认为意外伤害的发生最常见的原因是什么？

Workshop materials representative: The tool roll into the belt in the process of clearing materials. There is no

aloft work, and no falling and no hit feet.

原料车间代表：清料时皮带把工具卷进去，车间无高空作业、无坠落、无砸脚。

No crash against hand and feet has occurred until the September in this year except the illegal operation (belt squeeze hands and feet).

今年到 9 月份为止未发生碰脚碰手的事情。违章操作时发生过碰脚碰手（皮带挤手脚）。

Question 10: How about the workers?

问题 10：工人情况如何？

Answer: the workers are all contract workers who are rural residences. This work mainly appeals to the farmers in the vicinity whose farmland could be reserved and annual income is around ten thousand.

回答：工人是合同工，农村户口，主要是吸引住在附近的农民，地不扔，年收入 1 万元左右。

Enterprise B:

企业 B

Question 1: is there any accident injury in the daily work? What is the reason? Is there any complaint about dust, noise and high temperature, etc?

问题 1：日常工作中有什么意外伤害吗？原因是什么？有没有抱怨？关于粉尘、噪声、高温等？

Answer: it is adopted remote monitoring technology in tunnel kiln and used computer to display the temperature. There is no need to enter the field generally, just need a regular inspection and regular inspections about the kiln. When something is unusual, it should refer everything to the factory leaderships, meanwhile two people go there at the same time who must wear labor protection supplies such as special shoes and clothes. It is not allowed for one person alone up to the kiln crown. The thick of Kiln wall is more than a meter, and the temperature is as high as 1050℃ in the roasting zone. We all use ladder to enter the stove (ladder not hot). There is no temperature difference between the kiln crown and kiln around, where all have high-temperature protective material.

回答：隧道窑采用远程监控技术，用微机显示温度，现场一般不去，只是常规检查，窑体周围定期巡查。出现异常时需先请示厂领导，2 人同时去，有劳动保护，专门的鞋、衣物，不允许 1 人单独上窑顶。窑墙 1 米多厚（预热带、焙烧带、冷却室-在微机上显示），窑内焙烧带温度 1050℃，梯子上窑（梯子不热），窑顶温度与窑周无差别，有高温防护材料。

No accident has happened.

未发生过事故。

The equipments are maintained once for half a year and overhauled once for a year. The workers all have received safety training which is arranged by the trade unions arrange. All staff in Propaganda section is trained once for a year.

设备半年一检修，一年一大修。接受过安全培训，工会组织工人培训。宣传科全员培训，每年一次。

Question 2: What is the content of the training? And what have you learned?

问题 2：培训内容是什么？收获有哪些？

Answer: Safety training. How to work in High temperature and pressure and how to deal with the Emergencies such as pipeline leak that it could handle until the temperature and pressure drop to a certain degree.

回答：安全培训。高温高压作业；意外情况（管路泄露）当温度、压力降至一定程度才能进行处理。

Question 3: the Heat recovery Power Generation systems were established in 2008; is there any change about the safety and health conditions before and after the establishment?

问题 3：余热发电 2008 年才建立，建立前后安全、健康情况是否有变化？

Answer: it is well demonstrated by the experts that no accident has happened. All workers have received relevant safety training. Physical examination is arranged once a year by Safety supervision department and the Bureau of Labor organization and the medical file are all well created. The noise is too loud and in the work we all wear earplugs, gloves and helmet.

回答：经专家论证过，未发生任何事故，接受过相关安全培训，由公司安监处、劳动局组织，每年均体检，建立档案。噪声很大，佩戴耳塞、手套、安全帽。

Question 4: how about security situation, such as cuts, crushing exist?

问题 4：安全状况，如割伤、砸伤存在吗？

Answer: not, automatic cutting billet and artificial yards billet.

回答：不存在，自动切坯、人工码坯。

Question 5: what is the dust value in raw materials workshop?

问题 5：原料车间粉尘值多大？

Answer: don’t know.

回答：不知道。

Question 6: Are the five insurances all contributed?

问题 6：五险都上了吗？

Answer: yes.

回答：都上了。

Question 7: are the Personal Protective Equipments equipped with? What is the Selection basis?

问题 7：个体防护用品都配备了吗？选择依据？

Answer: yes. But it is baseless. There exist dusts and smoke, where the workers reflect strongly will be equipped with dust masks. Each workshop has a safety officer, quality inspector and inspector, who all correspond with parent body.

回答：配了，没有依据，有尘、有烟，工人反映强烈的地方就配了防尘口罩，每年至少 5 次，每次每人 1 个，2 个月 1 次。有的没有记录，每个车间都有安全员、质检员、巡检员，与上级机构对口。

Question 8: what’s the arrangement for the unloading brick lines and the fatigue situation of workers?

问题 8：卸砖线的安排，工人疲劳情况？

Answer: the work is in three shifts and each class has 6 people. The daily working time is 6 hours, and there has a break in the interval, thus generally the work last for 4 hours. The amount of manual unloading bricks is based on the production. There exists fatigue but no overfatigue. Those who could not competent can exchange post. In general, there will a post exchange once for 1.5-2 years. Larger work intensity accompany with higher wages.

回答：卸砖 3 个班，每个班 6 人，每日工作量 6 小时，中间休息，持续工作 4 个小时左右。手工卸砖根据产量而定。疲劳有，但过度疲劳没有，无法胜任，调换岗位。1.5-2 年调换一次岗位，工作强度大工资高。

Question 9: will you have back pain and arm pain after 5 hours continuous unloading bricks? Is there any training? Whether there have been bashed?

问题 9：持续 5 小时卸砖，是否会腰酸、背痛、胳膊疼，是否有这些症状？是否有培训？是否出现过砸伤？

Answer: it's easily get tired but it will be all right after having a rest. There is no backache, low back pains and arm pain. Gloves and protective shoes are all equipped with. All stuff has safety consciousness.

回答：当时会疲劳，歇歇就好了；没有腰酸、背痛、胳膊疼现象；手套、劳保鞋都配备了；有安全意识。

Question 10: How to move bricks? How much number? What position? Do you have such training there?

问题 10：如何搬砖？数量、姿势？这样的培训有吗？

Answer: take two pieces of bricks each time, according to the experience.

回答：每次拿 2 块砖，根据经验而来。

Question 11: what to do when factory catch fire?

问题 11：工厂着大火如何做？

Answer: There have emergency measures.

回答 1：有应急措施。

4.9 Assessment of Environmental Health Impact

环境影响评价

The 13 enterprises as the construction project had little negative impact on society. Most have been located in the open area, although some enterprises built on the former rural land, they solve the farmers to worry about survival through solving the house and provided suitable jobs for farmers. The 13 enterprises do not have the following working condition which be endangered, threatened, vulnerable or protected species and Population, ecological environment or living environment (Animals and Plants), national parks, nature reserves, desert areas, protected areas or wild river. Coal-gangue brick production may come into being have air pollutants, wastewater, noise and vibration, solid waste and other pollutants and may have impact on the environment and plant. There are the 8 enterprises of 13 enterprises have not established the environmental management plan.

13 家企业作为建设项目对社会几乎未产生不利影响，均处于低影响水平。多数企业建在了空旷的地带，部分企业虽然建在了原农村田地上，但采取了为其农民解决住房和就地安置就业等问题，解决了农民生存的后顾之忧。13 家企业均无近于濒危、受威胁、易攻击的或受保护的物种、人群、生态环境或生

活环境（动植物）下工作情况，均无在国家公园、自然保护区、、荒漠区、保护区或野生河内工作等情况。煤矸石生产过程中可能存在空气污染物、废水、噪声和振动、固体污染物和废物等对环境和植物的影响。13 家企业中尚有 8 家企业未建立环境管理计划。

Table 4-28 lists the results of the evaluation of environmental impact. The table shows that the coal gangue brick manufacturing enterprises have the dusts and smoke dusts impact on the environment. Dust pollution mainly come from the transport of raw materials, crushing, screening, belts and transportation process, the control measures mainly set up the dust removal facilities in the raw material crushing and screening. On transporting process of raw materials (including the Bucket Wheel, Stacker, vehicles Transport), the dust control measures have not taken. Ernterprise provide worker exposed to dust with a dust mask. Smoke come from toxic gases produced by the vehicle engine and roasting kiln incomplete combustion, the roasting kiln is layout of the control measures of desulfurization and denitrification, and following the high-altitude emissions through the chimney. A few enterprise exist water pollution, mainly from the storage of fuel contaminated groundwater, and generally no control measures. The noise and vibration pollution of the environment mainly come from the crusher, vibrating screen, mixer, extruder and cutter in the production etc, and mainly come from the generators, motors, cutting machines, excavators, motor vehicles and cranes during construction and so on. Noise and vibration generated by the crusher, vibrating screen and mixers have been controled by mainly taking sealing measure, and installed anti-vibration pad. No control measures when construction. Solid pollutants and waste mainly come from the solid waste generated during construction and some industrial waste in the production, and generally do not take measures. The other effects on the environment may include cleared of trees, shrubs, grasses, roots in the construction, the loss of the bushes, and reducing the use of the land.

表 4-28 列出了环境影响的评价结果。表中显示，煤矸石制砖生产企业存在粉尘及烟尘对环境的污染。粉尘的污染主要来自于原料的转运、粉碎、筛分、皮带运输等过程，其控制措施主要是在原料粉碎、筛分处设置除尘设施，原料转运（包括斗轮机、堆取料机、车辆运输）过程产生的粉尘目前尚未采取防尘措施。企业为粉尘接触者配备了防尘口罩。烟尘来自于车辆发动机和焙烧窑不完全燃烧产生的有毒气体，焙烧窑的控制措施一般布置脱硫、脱硝装置脱硫脱硝后通过烟囱高空排放。个别企业存在水污染，主要来自于存放的燃料污染地下水，一般无控制措施。噪声和振动对环境的污染，生产时主要来自于破碎机、振动筛、搅拌机、挤出机、切坯机等，建筑时主要来自于发电机、电动机、切割机、挖掘机、汽车、吊车等。针对生产时的破碎机、振动筛、搅拌机等产生的噪声与振动主要采取密闭措施，并安设减振垫；建筑时产生的噪声一般无控制措施。固体污染物和废物主要来自于建筑时产生的固体垃圾和生产时产生的少许工业废物，一般不采取措施。对环境存在其他影响，包括建筑时清除了树木、灌木、草、树根，丧失了灌木丛，减少了使用的土地。

Table 4-28 Result of environmental impact assessment

Question	Source of Impact	Number of Influential Enterprises	Unique Control Measures Project
Ai	Impact of Construction ● Dust: raw material crushing, screening, belt transport, vehicle transport, mining, etc.	6	Raw material crushing and screening are equipped with a dust collector dust masks. Workers are expose to dust are equipped with dust masks. There is no control measures for Vehicle transport, equipment, excavation, removal of dust When the soil removal.
	Impact of Operation ● Dust: Dust vehicles; emissions: roasting kiln.	4	There is no control measure for Vehicle fumes. Roasting kiln exhaust gas, discharge to air after desulfurization
Wate	Impact of Construction ● Fuel Pollute Groundwater of Storage	3	Without Control Measures
	Impact of Operation ● No.	0	
Noise and Vibration	Impact of Construction ● Noise / Vibration: production of the crusher, vibrating screen, mixer, extruder, cutter, etc. and buildings when the generators, motors, cutting machines, excavators, motor vehicles, cranes and so on.	6	Crusher, vibrating screen, mixer adopting sealing, and install anti-vibration pad. Noise generated during construction, no control measures.
	Impact of Operation ● Noise / Vibration: building when the generators, motors, cutting machines, excavators, motor vehicles, cranes, plate movement and so on.	3	Without Control Measures
Pollutants and Waste	Impact of Construction ● Solid waste generated by construction have occupied the land.	3	Without Control Measures
	Impact of Operation ● Industrial Waste	3	Without Control Measures
Land use and transportation	Impact of Construction and Operation ● NO	0	
Animals and Plants	Impact of Construction ● cleared of trees, shrubs, grass, roots during construction	3	Without Control Measures
	Impact of Operation ● NO	0	
Soil	Impact of Construction and Operation ● NO	0	
Visual and heritage	Impact of Construction and Operation ● NO	0	
Other environmental issues	Loss of The Bushes, Reduction of Land Use	3	Without Control Measures(Jingmen Chen Xiong, Jingmen new Central, Jingmen Yong Teng)

表 4-28　　环境影响评价结果

问题	影响来源	有影响的企业数	项目特有控制措施
空气	建筑影响 粉尘：原料破碎、筛分、皮带运输、车辆运输、挖掘等。	6	原料破碎、筛分配备除尘器，接触粉尘者配备防尘口罩； 车辆运输、设备挖掘、清除土壤时产生的粉尘，无控制措施。
	操作影响 烟尘：车辆烟尘；废气：焙烧窑。	4	车辆烟尘，无控制措施； 焙烧窑废气，脱硫后高空排放。
水	建筑影响 ●储存的燃料污染地下水。	3	无控制措施。
	操作影响 ●无。	0	
噪声和振动	建筑影响 噪音/振动：生产时的破碎机、振动筛、搅拌机、挤出机、切坯机等和建筑时的发电机、电动机、切割机、挖掘机、汽车、吊车等。	6	破碎机、振动筛、搅拌机采取密闭措施，并安设减振垫； 建筑时产生的噪声，无控制措施。
	操作影响 噪音/振动：建筑时的发电机、电动机、切割机、挖掘机、汽车、吊车、钢板动作等。	3	无控制措施。
污染物和废物	建筑影响 ●建筑时产生的固体垃圾侵占了土地。	3	无控制措施。
	操作影响 ●工业废物。	3	无控制措施。
土地使用和运输	建筑影响和操作影响 ●无。	0	
动植物	建筑影响 ●建筑时清除了树木，灌木，草，树根。	3	无控制措施。
	操作影响 ●无。	0	
土壤	建筑影响和操作影响 ●无	0	
视觉和遗产	建筑影响和操作影响 ●无。	0	
其他环境问题	丧失了灌木丛、使用的土地减少。	3	无控制措施（荆门晨雄、荆门环新、荆门勇滕）

5. Discussion and Summary

讨论与总结

5.1 The occupational safety, health and environmental hazards status related to gangue brick business

煤矸石制砖企业相关的安全、健康、环境危害现状评价

5.1.1 The site selection and the overall layout

选址与总平面布局

According to a survey result of 13 enterprises, the enterprise does not exist the impacts from the natural disasters, and have no the impacts on the surrounding nature reserves and the water sources. The peripheries of 5 enterprises have the residents living area, but all enterprises have taken the desulfurization treatment of smoke dust. Nevertheless, it may have the greater or lesser impacts on the surrounding residents, such as dust, SO_2 and so on, pollution problems. As enterprises and surrounding residents have a certain protective distance, less noise pollution to residents. So far, the enterprises have not accepted complain from the surrounding residents and the dispute problem between the enterprise and the residents. The activities did not carry out environmental monitoring around the neighborhood, because of the restraining from atmospheric emissions monitoring conditions, so no such data in terms of quantitative assessment.

根据对 13 家企业的调查，企业不存在受所在地自然环境灾害的影响，也不存在对周围自然保护区和生活水源地的影响问题。5 家企业周边存在居民居住区，但企业均对可能产生的烟尘采取了脱硫除尘处理。虽然如此，对周围居民也可能会产生或多或少的影响，如粉尘、SO_2等的污染问题。由于企业与周围居民有一定的防护距离，噪声对居民的污染不大。到目前为止，尚未见有居民对企业的抱怨或企业与居民的纠纷问题。本活动项目由于企业大气排放监测条件的限制和本研究客观条件的约束，未对周围居民区开展环境监测工作，因此无此方面的定量评估数据。

The water provide of the enterprise by relying on groundwater resources of the coal mines and urban centralized water, so water resources are the relative abundant. Enterprise life water all have been treated through the concentration disinfects processing. Because the enterprises have not serious pollutant, therefore do not constitute a water pollution to the environment.

企业用水多依托于采用地下水资源的附近煤矿和城市集中供水，因此水资源比较丰富。企业生活用水均使用经过集中消毒处理的水源。企业由于无严重污染物，因此未构成对环境水资源的污染问题。

Enterprise total layout is reasonable, and 13 companies functional partition clear. Enterprise administrative office area, welfare housing are set in factory former zone. Production workshop and auxiliary housing are set in the production zone. 13 companies has 11 companies which architectural layout is reasonable, production zone located in the upper hand side of the local wind summer minimum frequency, the living area in the lower hand side of local wind summer minimum frequency. But there are two enterprise architecture layout is not reasonable, office arranged in roasting workshop under direction of leading year-round wind and office and living areas in the roasting workshop of wind year the leading. The vertical axis of workshop with high temperature in 13 enterprises is perpendicular to local year-round leading wind. The vast amounts of heat radiation roasting kiln adopted the single-layer buildings, the crusher, sieve extension and extruder equipment which produce larger noise and vibration are installed on the single-layer workshop. In addition to the individual unreasonable architecture layout enterprise, other Enterprises meet the relevant requirements of industrial enterprise design hygiene standards

“GB50187” and " GBZ1".

企业总平面布局比较合理，13 家企业功能分区明确。企业行政办公用房、生活福利用房均设置在厂前区内；生产车间和辅助用房布置在生产区。13 家企业中有 11 家企业建筑布局合理，生产区布置在当地夏季最小频率风向的上风侧，厂前区和生活区布置在当地最小频率风向的下风侧。但有 2 家企业建筑布局不合理，办公区布置在焙烧车间的全年主导风向的下风向和办公及生活区在焙烧车间的全年主导风向的下风向。13 家企业高温车间的纵轴基本与当地全年主导风向相垂直。放散大量热的焙烧窑均采用了单层建筑，噪声与振动较大的破碎机、筛分机、挤出机等设备均安装在了单层厂房内。企业的总平面布局除个别企业建筑布局不合理外，其他均满足 GB50187《工业企业总平面设计规范》和 GBZ1《工业企业设计卫生标准》的相关要求。

5.1.2 Major occupational dangerous, hazard factors and environmental pollution

主要职业危险、有害因素及环境污染源

5.1.2.1 Occupational dangerous factors

职业危险因素

The risk rank "3", "4" and "5 " determined based on the risk score have been regarded as hazard sources, and considered unacceptable risks, it is need for enterprises to take the corrective action or to stop this dangerous job. Rank "2" shall be deemed to the note danger. As can be seen from table 4-7, the 7 possible occupational dangerous factors have been identified in the coal gangue brick-making enterprises, including mechanical injury, compression injury, burns / scalding, electric shock, vehicle damage, poisoning and asphyxia and crushing. The risk of the 7 dangerous factors are the rank "1 " and "2 ".

根据分值大小判定的危险等级“3”级、“4”级和“5”级为危险源，视为不可接受风险，需要企业整改或停止这种危险作业。“2”级危险，应视为需要注意的危险。从表 4-7 可以看出，煤矸石制砖企业共确定可能存在 7 种职业危险因素，包括：机械伤害、挤压伤害、烧伤/灼烫、触电/电击、车辆伤害/撞击、中毒与窒息和砸伤。这 7 种危险均为“1”级和“2”级的危险。

Mechanical injury risk: mainly in raw materials, firing, molding and maintenance workshops. Dangerous parts of plant material are mainly cutting, material removal, water, broken, belt transport, a stirring, vibrating screen, feeding and the drapery workplace, risk rank is "1" or "2", and jobs needed to note this dangerous ("2" dangerous) with cutting, crushing workers and belt drivers, operators of a stir, feeding workers and reversible drapery machine operator, the risk part of forming workshop are the cut adobe, add water, multi-bucket operation, mixing, extrusion / brick, two and three-stirring mix workplace, risk rating is "1" or "2" level, jobs need to pay attention to such dangerous are cut adobe operatives, multi-bucket operatives, Stir drivers, extrusion operatives, two and three mix operatives, the risks jobs in firing workshop have operating jobs, risk jobs in repair shop is mainly related to maintenance workers and fitters.

机械伤害危险：主要分布在原料、烧成、成型和维修四个车间。原料车间的危险部位主要有下料、清料、加水、破碎、皮带运输、一搅、振筛、给料和布料工作场所，危险等级均为“1”级或“2”级，需要注意该类危险的工种（“2”级危险）有下料工、破碎工、皮带司机、一搅操作工、给料工和可逆布料机操作工；成型车间的危险部位主要有切坯、加水、多斗操作、搅拌、挤出/砖、二搅和三搅工作场所，危险等级均为“1”级或“2”级，需要注意该类危险的工种有切坯操作工、多斗操作工、搅拌司机、挤出操作工、

二搅和三搅操作工；烧成车间涉及的危险工种有运行工，需要注意该类危险的发生；维修车间涉及的危险工种主要是维修工和钳工，需要注意该类危险的工种主要为钳工。

②Extrusion injury risk: mainly in the code adobe of the shaping workplace, mainly involving types of code adobe operator.

挤压伤害危险：该类危险主要分布在成型车间的码坯工作场所，涉及的危险工种主要为码坯操作工，应为需注意的危险。

③Burns/scalding risk: mainly in the firing workshop and maintenance workshop. The risk position of firing workshop mainly are sinter, ferry, run, and oiling, sinter workers and running operating workers should pay attention to such a dangers.

烧伤/灼烫危险：主要分布在烧成车间和维修车间。烧成车间的危险部位主要有烧结、摆渡、运行和注油工作场所，其中烧结工和运行工需注意该类危险的发生。

④Electric shock/shock hazard: mainly distributed in the molding workshop and maintenance workshop, the main risk jobs involved in the master control operators and electrical repair worker, the electrician repair worker should pay attention to such dangers.

触电/电击危险：主要分布在成型车间和维修车间，涉及的危险工种主要为成型车间的主控操作工和维修车间的维修电工，其中，维修电工需注意该类危险。

⑤Vehicle damage risk: mainly distributed in the raw material workshop and transport workshop, primarily risk jobs involving in forklift drivers in raw materials workshop and transport drivers in transport workshop, transport drivers should pay attention to such a dangers.

车辆伤害/撞击危险：主要分布在原料车间和运输车间，涉及的危险工种主要为原料车间的铲车司机和运输部的运输司机，其中运输司机需注意该类危险的发生。

⑥Poisoning and asphyxia risk: mainly distributed in the sintering plant, jobs involved in ferry workers, risk occur commonly in such abnormal situations, although the risk level judged to be rank "1", but still need to pay special attention to such dangers.

中毒和窒息危险：主要分布在烧成车间，涉及的工种为摆渡工，该类危险多在生产异常情况下发生，危险等级虽然判定为“1”级，但仍需特别注意该类危险的防范。

⑦crashing injury risk: mainly distributed in the unloading process, involved in loading and unloading bricks workers , need to pay attention to such dangers.

砸伤危险：主要分布在卸砖车间，涉及卸砖装卸工，为需注意该类危险的工种。

In addition to the dangers, although completing survey did not revealed the presence of falling dangers, but according to the on-site inspection results, the report shows that the crusher in raw materials workshop, kiln top operation of firing workshop, extrusion brick in molding workshop and various kiln car bottom and so on, in where operator need to climb up or down hole operation, still exists fall risk.

除上述危险之外，虽然填表调查未显示存在坠落危险，但依据现场核查结果，本报告认为，原料车间的破碎机、烧成车间窑顶操作、成型车间的挤出/砖操作机、各类窑车底部等处需登高或下洞操作工种，还存在坠落危险。

5.1.2.2 Occupational hazardous factors

职业性有害因素

Occupational hazard factors classification results see also table 4-8. The main occupational hazard factors generating in the workshop air of coal gangue brick-making enterprises include: dust, noise, high temperature and harmful gases (such as SO_2, CO, NO_2). Among them, the high temporature and harmful gases mainly in the firing workshop, such as drying kiln side, drying kiln top, roasting kiln side, firing control room, roasting kiln roof, insulation zone of firing kiln roof, firing zone of kiln top, the preheating zone of kiln top, center control room of firing kiln roof, import and export of firing kiln. Through analysising the high temporature, SO_2, CO, NO_2 and so on in the above workplace air, the high temporature and harmful gases concentration in all workplace did not exceed the requirements of the national occupational exposure limit. Dust and noise hazards mainly produced in raw materials workshop, molding workshop and firing workshop, their hazard is relatively serious, but not rank "3" and over risk. As can be seen from table 4-8，the dust hazard in the raw material workshop is the most serious, followed by molding and firing workshop. The noise hazard in molding and raw material workshop is the most serious.

职业病危害因素作业岗位危害程度分级的结果见表 4-8。经对 13 家煤矸石制砖企业的调查与测试，该类企业各车间空气中存在的主要职业性有害因素有：粉尘、噪声、高温和有害气体（如 SO_2、CO、NO_2）四类。其中，高温和有害气体主要存在于烧成车间，如干燥窑旁、干燥窑窑顶、焙烧窑旁、烧成控制室、焙烧窑窑顶、烧成窑顶保温带、烧成窑顶烧成带、烧成窑顶预热带、烧成窑顶中控室、烧成窑头进口和出窑口，通过对上述作业场所高温和 SO_2、CO、NO_2等有害气体的测试与分析，上述作业岗位的高温和有害气体均未超过国家职业接触限值的要求。粉尘和噪声危害主要存在于原料车间、成型车间和烧成车间，其作业场所危害情况相对严重，但无“3”级及以上危害结果。从表 4-8 可以看出，粉尘危害以原料车间最为严重，其次为成型和烧成车间。噪声危害以成型和原料车间最为严重。

Dust hazard is rank "2", and seriously overproof posts or jobs are: ① the raw materials workshop: baiting of rough crushing machine, crushing, material clearing, and material clearing next to vibration sieve, first blendering posts; ② molding workshop: the cutter adobe operating positions; ③ firing workshop: firing control room.

粉尘危害属于“2”级，即严重超标的岗位或工种有：①原料车间：粗破碎机旁的下料、破碎、清料岗位，振动筛旁的清料和振筛岗位，一次搅拌机旁岗位（包括操作和加水）；②成型车间：切坯机旁操作岗位；③烧成车间：烧成控制室。

Dust hazard are rank "1", the overproof posts and jobs are: ① the raw materials workshop: mixing loading, operating room, aging operating position and the transport belt side; ② molding workshop: Second mixing operating and code adobe operating.

粉尘危害属于“1”级，即超标的岗位或工种有：①原料车间：混料装载、操作室、陈化库操作位和皮带机旁；②成型车间：二搅伴操作和码坯机旁。

Noise hazards rank "2", that is the moderate hazardous posts or jobs, onlyis secondary mixer.

噪声危害属于“2”级，即中度危害的岗位或工种只有二次搅拌机旁。

Noise hazards are rank "1", that is mildly hazardous posts or jobs are: ① the raw materials workshop: coarse crusher post, fine crusher and cleaning materials post, the cleaning materials and transport belt post of vibrating

screen side; ③ molding workshop: Third mixer, extruder machine and code adobe machine side posts, and the aircraft turning adobe machine operator posts.

噪声危害属于“1”级，即轻度危害的岗位或工种有：①原料车间：粗破碎机旁的破碎岗位，细破碎机旁的破碎和清料岗位，振动筛旁的清料和皮带机岗位；③成型车间：三次搅拌机旁、挤出机旁和码坯机旁岗位，翻坯机旁的架坯操作岗位。

5.1.2.3 Environmental harmful factors

环境有害因素

The site survey results based on a 13-site survey shows that the environment harmful factors in coal gangue brick-making enterprises mainly include: noise, pollutants (SO_2), waste residues (raw materials, slag and waste tiles) and wastewater. Noise generated in the material crush process in raw material workshop and the brick-making process of molding. Pollutants (SO_2, CO, NOx, etc.) produced in the brick kiln roasting process of the firing workshop, these pollutants were organized continuous emissions after the desulphurization and dust removal. Waste residues generated in the process of mixing and the process of unloading bricks, mostly of organized recycling.

依据对 13 家煤矸石企业的现场调查结果，煤矸石制砖企业存在的环境有害因素主要有：噪声、废气（SO_2)、废渣（原料渣和废砖）和废水。噪声产生于原料粉碎过程和成型车间制砖过程。废气（SO_2 、CO 和 NOx 等)产生于烧成车间的砖坯焙烧，均为经过脱硫除尘后的有组织连续排放。废渣产生于原料搅拌和卸砖过程，多为有组织的回收利用。

5.1.2.4 Ergonomic risk factors

工效学危险因素

The two enterprises on-site inspection and verification results shows that posts and jobs exposed to adverse ergonomic factors in coal gangue brick-making process are: forklift drivers of raw materials workshop, multi-bucket and code adobe operation of molding workshop, tile repair and manual unloading of firing workshop, loading and unloading bricks operating and transport drivers. Adverse factors include biomechanics, psychology, and individual factors, see table 4-9 and related images.

经对 2 家有代表性企业的现场检查与核查结果，煤矸石制砖企业存在的不良工效学因素及其暴露的工种或岗位有：原料车间的铲车司机，成型车间的多斗或码坯操作，烧成车间的面砖修理和人工卸车，卸砖车间的装卸和运输部的运输司机。不良因素主要有生物力学、心理学和个体因素，见表 4-9 及相关图片。

5.1.3 Occurrence of safty accidents and occupational diseases

安全事故及职业病发生情况

13 enterprises have not occurr a case of injuries and occupational diseases. Analysising results for enterprises dangerous factors shows that majority of workplaces existed rank "1" or rank "2 " risk, so enterprises still exist the possibility of occuring injuries and occupational diseases.

13 家企业无 1 例工伤及职业病发生。但从企业危险、有害因素的分布及其危险、有害程度分析，多数作业场所存在“1”级和“2”级事故危险，因此，煤矸石企业仍存在工伤及职业病发生的可能性。

5.1.4 Occupational hazard production

职业危害防护

5.1.4.1 Occupational hazard prevention facilities

职业病危害防护设施

Table 4-11 shows that facility assembled in the coal gangue brick-making enterprise is mainly used to prevent dust pollution from the crushering and belt transporting process in raw materials workshop, including the dust removal facilities, shower facilities and the flue gas desulphurizater. Facilities are almost dust bag filter, flue gas desulphurization and dust removal facilities employ now mature technology on the gypsum flue gas desulphurization and dust removal, some workplaces are supplemented by spraying, watering and other dust suppression measures. The protective measurations of controling dusts and drugs basically meet the requirement of "Occupational Disease Prevention Law", GBZ1 and other related regulations and standards on the arrangement and selection of facilities. However, on the view of protective effects, based on the results of workplace occupational hazard factors (see Table 4-8), the dust concentration on most of workplace air has still exceeds the requirements of the national occupational exposure limits. Althrough being layout of the protection facilities, such as dust removal facilities being set in crusher, vibrating screen, firing etc., spray facilities in belt conveyor, forming and firing. Thus, although these measures have played a certain dust control effects, we should also strengthen the design and management for the related design area, the relevant technical parameters, routine maintenance and management to protection facilities. The limestone add post have not set the protection facilities.

表 4-11 显示，煤矸石制砖企业配置的防护设施主要是针对原料车间防止破碎机和皮带机粉尘污染的除尘设施、喷淋设施和炉窑烟气排放的脱硫、除尘设施等。除尘设施几乎均采用布袋除尘器，烟气脱硫、除尘设施均采用目前已成熟使用的石膏法烟气脱硫除尘技术，有些作业场所还辅以喷淋、洒水等抑尘措施。这些控制尘、毒的防护设施从布置及选型上基本可以满足《职业病防治法》和 GBZ1 等相关法规、标准的要求。但从防护措施效果来看，依据作业场所职业性有害因素检测结果（见表 4-8），多数作业场所虽然布置了采取了防护设施，如破碎机、振筛、烧成等处设置除尘器，皮带输送、成型、烧成等处设置喷淋设施，但其空气中的粉尘浓度仍然超过国家职业接触限值的要求，相当一些场所达到了严重超标的程度。由此可见，这些防尘措施虽然发挥了一定的防尘效果，但从相关设计部位、相关技术参数、日常维护与管理等方面加强设计与管理。石灰石添加岗位未布置相关防护设施。

For the noise protection measures, 13 enterprises did not mentioned the any protective equipments of sound insulation and noise reduction, we have not seen them during the on-site verification. Noise hazards from crusher, vibrating screen, mixers and extruders in the workplace can be more serious. The medium hazards exist to the individual workplace level. Enterprises neither set protection facilities nor provide the protection acoustic apparatus for workers in these workplaces.

从噪声防护措施来看，13 家企业均未提及隔声降噪等防护设施，现场核查结果也未见相关设施存在。从工作场所噪声检测结果可见，破碎机、振动筛、搅拌机、挤出机等设施产生的噪声危害比较严重，个别工作场所达到中等危害程度。企业即没有为这些场所设置降噪设施，也没有为这些场所的操作人员配置护听器。

Warning marks seting in the workplace is an important and effective prevention measures, "safety law", "Occupational Disease Prevention Law," "Health Standard of Industrial Enterprises Design" and other related regulations and standards are clear for its requirements. The investigation results from 13 enterprises shows that

majority of enterprises set the warning mark on safety in where the dangerous factors may exist, but most enterprises fail to set up warning marks on health in where occupational hazard factors may exist, see also table 5-1 later pictures).

工作场所设置警示标识，是有效预防职业危险、有害因素的重要措施，国家《安全生产法》、《职业病防治法》、《工业企业设计卫生标准》等相关法规、标准对其均有明确要求。从 13 家企业调查及有代表企业现场核查结果来看，多数企业在可能存在危险因素的场所设有安全标识，但多数企业在存在职业性有害因素的工作场所未按规定设置职业病危害因素警示标识，已设置的警示标识见表 5-1 后面的图片。

The view of security protection facilities, workbench and professional equipment all set up the sufficient repairing space; running components set the protective cover； Machine-side installed the emergency stop switch in case of emergency；stairways, corridors and side of the pool assembled the mobilizable railings or guardrail；Transporting equipment, piping etc place assemble Pedestrian ladder. The substation set the high voltage protection, isolation rail, ao to prevent electric shock injuries.

从安全防护设施来看，可能存在上述职业危险因素的设备和工作台等均留有足够的检修空间，运行部件均设置防护罩。机旁设置紧急停车开关，以应急需；楼梯、走廊及池边以及登高作业等装设活动栏杆或护栏，输送设备、管道等处考虑必要的人行过梯。地沟上加盖板。变电所设置了高压保护，隔离栏杆，以防止电击伤害。

5.1.4.2 Personal Protective Equipment (PPE)

个体防护装备（PPE）

The PPE selected by 13 enterprises mainly include the anti-dust masks, eye and face protectors (hand-held goggles, welding caps), skin care products (eg hand-washing liquids) and protective gloves (eg insulated gloves, general protective gloves). Individual enterprise fails to state management of special labor protection articles relevant provisions, chose no security certificate of authenticity and non-manufacturer of the product or use waste products decided according the relative requirements of GB / T 18664 " The selection, use and maintenance guide of Respiratory protective equipment ". Almost all enterprises provided the anti-noise hearing protectors for the worker exposed to noise.

13 家企业选择的个体防护装备主要包括防尘口罩、眼面护具（手持护眼罩、电焊帽）、劳动护肤品（洗手净）和防护手套（如绝缘手套、一般防护手套）。个别企业未按国家特种劳动防护用品管理的相关规定，选择了无安全鉴定证书和无生产厂家的产品或使用了按照 GB/T 18664《呼吸防护用品的选择、使用与维护指南》要求应为判废的产品。几乎所有企业均未配置防噪声的护听器。

The point of view for PPE configuration, half of enterprises used the anti-dust masks which should be decided as waste products. The issued number of insulation gloves does not meet the rule number requirements. Nearly half of the enterprise selected the unqualified PPE. During coal producting process, the noise level of many workplace(such as crushing, clean materials, mixing, extrusion, billet aircraft, code adobe, etc.) exceeds the requirements of the national occupational exposure limits, workers must be equipped with hearing protectors, while the investigated all companies almost have not provided the any hearing protectors.

从 PPE 配置情况来看，半数企业使用了应判废的防尘口罩产品，绝缘手套发放数量没有满足有效期的要求。近半数企业配置不符合国家相关标准要求的 PPE。煤矸石生产的许多作业场所（如破碎、清料、搅拌、挤出、架坯、码坯等）噪声水平超过国家职业接触限值的要求，必须为劳动者配备护听器，而调查的几乎

所有企业均未为劳动者提供护听产品。

5.1.5 Occupational health surveillance，occupational disease diagnosis and patient safeguard

职业健康监护及职业病诊断与病人保障

"Occupational Disease Prevention and Cure Law" require that enterprises must organizate and arrange the workers exposed to occupational hazards to take in beforehand, On-the-job and leaveing occupational physical examination. The regulations performance of the surveyed 13 enterprises is not well, only half of the enterprises did not carry out the occupational physical examination for their workers. In the enterprises which have performed occupational physical examination, found no contraindication and occupational diseases patients. All of 13 enterprises do not arrange under age person to go in for operation exposed to occupational hazards.

《职业病防治法》要求，企业应安排接触职业危害的作业工人进行上岗前、在岗期间和离岗时的职业健康检查。调查的 13 家企业执行该法规情况不好，近半数企业未开展这项工作。进行职业健康体检的企业，未发现职业禁忌证和职业病病人。13 家企业没有安排未成年工从事接触职业危害的作业。

5.1.6 Situation and Evaluation of emergency rescue measures

应急救援措施现状及其评价

A few of enterprises were lack of clear knowing for enterprise emergency incident, the short of emergency response plans, the emergency rescue facilities in a few enterprises were owe intact, not in place of regular emergency drills.

少数企业对本企业应急事件认识不清，缺乏应急救援预案，个别企业应急救援设施欠完好，定期的应急演练不到位。

5.1.7 The status and evaluation of Auxiliary health facilities

辅助卫生设施现状及其评价

Most companies set up the auxiliary health facilities accordig to the request of state related standard，such as toilet, bathroom and cloakroom and women's health room. Auxiliary health facilities Configuration in a few enterprises was not in conformity with requirements of national regulations and standards, such as bathrooms, more / cloakroom room, living with a room.

大多数企业按国家要求配置了辅助卫生用室, 如厕所、浴室、更/存衣室、盥洗设施和妇女卫生用室等。个别企业配置的辅助卫生设施或用室不符合国家法规和标准的相关要求。

5.1.8 The management status and evaluaton of occupational safety, health and environment

职业安全、健康与环境管理现状及其评估

The commitment of enterprise top management to comply with national regulations and standards is core content how to do best occupational safety and health management work, whether enterprises set up occupational safety and health management organization is the organizational guarantee for enterprise to do best systematically and roundly these work. The following contents are the their summarization and evaluation results, including the organization, regulations and system, material equipment, workplace and relative archives administration, protective facilities and PPE administration, occupational safety and health training and so on.

企业最高管理者对遵守国家法规、标准的承诺是企业做好职业安全健康管理的核心内容，职业安全健康领导和管理机构的设置是企业全面、系统地做好职业安全健康工作的组织保证。下面从组织机构与规章制度，材料、设备、工作场所与相关档案管理，防护设施和个体防护装备管理，职业安全健康培训等方面加以总结与评估。

5.1.8.1 Organization and management system

组织机构与管理制度

Most enterprises set up the leading institutions and management organizations of occupational safety and health, with a part-time occupational safety and health management personnels, basically clear and definite the leadership responsibilities and management responsibilities on occupational safety, but nearly half of enterprises have not the clear and explicit management responsibilities on occupational health. The enterprises which have not set up leading institutions and management organizations are smaller enterprise that is the ones of less than 100 employees. The promise of enterprise top management to the national related regulations and standards is better, but the performmance of for the top management to some occupational safety and health management functions do not reach the designated position, occupational safety and health management exist in vacancy phenomenon.

多数企业按设立了职业安全健康领导机构和管理机构，配备了专兼职的职业安全和健康管理人员，基本明确了职业安全方面的领导职责和管理职责，但有近半数企业未明确职业健康方面的职责。未设立职业安全健康领导机构和管理机构的企业均为小小企业，职工人数低于 100 人。企业最高管理者对相关法规、标准的承诺比较好，但一些企业的最高管理者履行职业安全健康管理职能不到位，职业安全健康管理存在缺位现象。

For the occupational safety, health and environmental management systems, all of the surveyed enterprises have established safety production responsibility system, but some of them are lack of the occupational disease prevention and cure contents in the safety production responsibility system. Most enterprises can bring occupational safety, health and environmental objectives into the target management responsibility of the legal representative, but half of enterprise were fails to decompose layer upon layer the work target. Smaller enterprise is lack of occupational safety, health and environmental management systems. The enterprise have established the post safe operation programme and definituded the safety production content, but most enterprises are lack of the content about occupational health and safety operations. Most enterprises can ensure the safety production funding, but lack of the funding on prevention and treatment of occupational diseases. All enterprises have joined the work injury insurance. Half of the enterprises have not established the daily monitoring and evaluation systems of workplace occupational hazard factors, lack of the daily managment for them.

从职业安全、健康和环境管理制度来看，所有企业均建立了安全生产责任制，但部分企业的安全生产责任制缺乏职业病防治责任内容。多数企业能将职业安全、健康和环境工作目标纳入法定代表人目标管理责任，但有半数企业未将目标进行层层分解。小小企业缺乏职业安全、健康和环境管理制度。企业建立了岗位安全操作规程并明确了安全生产内容，但多数企业缺乏职业健康安全操作内容。多数企业能够确保安全生产投入，但对职业病防治方面的投入不足。所有企业均加入了工伤保险。半数企业未建立工作场所职业性有害因素的日常监测、评价制度，缺乏日常监测管理。

5.1.8.2 Materials, equipment, workplace and related archives management

材料、设备、工作场所与相关档案管理

The surveyed companies do not exist the processes, technologies and materials, expressly prohibited or eliminated by PR China, and do not product, manage import and use the equipments and materials generating occupational diseases hazard，and radiation hazards and high toxic substances expressly prohibited by PR China. Workplace lack of warning marks, particularly warning marks related to occupational health. In a few enterprises, the setting of warning marks and Chinese warning illustration exist vacancy phenomenon, nearly half of the companies have neither occupational health archives nor the worker health surveillance archives, even if the file was established, but their information is not updated regularly enough. A few enterprises have no the beforhands and leave occupational physical examination records, most enterprises have no the afterhand following physical examination records. The routine monitoring system of workplace and environmental hazards is not perfect, failure to perform the routine regulatory detect according to requirements.

调查企业均不存在使用国家明令禁止或淘汰的工艺、技术和材料，不存在生产、经营、进口和使用国家明令禁止的产生职业危害的设备和材料以及放射性危害和高毒物品。工作场所缺乏警示标识，尤其职业健康相关的警示标识。个别企业中工作场所和设备警示标识和中文警示说明的设置存在缺位现象，近半数企业即无职业卫生档案也无劳动者健康监护档案，即使建立了档案，但信息的定期更新也不够。个别企业无上岗前体检和离岗时体检记录，多数企业无离岗后随访记录。工作场所职业性危害因素和环境危害因素的日常监测体系不健全，未按法规要求进行检测。

5.1.8.3 Protection facilities and PPE management

防护设施和个体防护装备管理

Dust removal facilities are lack of the individual periodic evaluation of protective effect, the routine maintenance and management archives are imperfect, records lack phenomenon is serious. The of discussion results with workers shows that the management of PPE providing records is not good, record contents is imperfect.

个别除尘设施缺乏防护效果的定期检测，防护设施的日常维护与管理档案不健全，缺乏记录现象比较严重。与工人座谈的结果显示，个体防护用品的配置、发放档案管理不好，记录不健全。

5.1.8.4 Occupational safety and health training

职业安全健康培训

" Safety Production Law" states: "employees should receive safety education and training required to master their own knowledge of production safety and improve the safety skills, enhanced accident prevention and emergency response capabilities.", "Occupational Disease Prevention and cure Law" provides: "Employers should accept occupational health training. Employers should organized employees to accept the pre-service and servicing peroid occupational health training, popularize knowledge of occupational health." A few enterprise are lack of the advertise, education and training about the occupational safety and health knowledge, including: the trainin for enterprise manager and the relevant management personnel, and pre-service and servicing peroid training for employees. Enterprise even conducted training, most enterprise also lack occupational health training content.

《安全生产法》规定：“从业人员应当接受安全生产教育和培训，掌握本职工作所需的安全生产知识，提高安全生产技能，增强事故预防和应急处理能力。”,《职业病防治法》规定：“用人单位的负责人应当接受职业卫生培训。用人单位应当对劳动者进行上岗前和在岗期间的职业卫生培训，普及职业卫生知识。”。少数企业缺乏职业安全、健康相关知识的宣传、教育与培训，包括：企业主要负责人和相关管理人员的培训，组织劳动者进行上岗前培训和在岗期间的定期培训。企业即使进行了培训，多数企业也缺乏职业健康

方面的培训内容。

5.1.9 The evaluation result of Environmental health impact

环境影响评估结果

13 enterprises did not located in the endangered, threatened, easy to attack or protected species, population, entironment or living environment (flora and fauna) and so on areas, did not also located in the national parks, nature reserves, nature protection zone, desert zone and wild river zone etc. Coal production process may generate the air pollutants, wastewater, noise and vibration, solid waste and other pollutants which may impact the environment and plants. There is no quantification of impact assessment. But not yet see the complain and dispute event from surrounding residents.

13 家企业均无近于濒危、受威胁、易攻击的或受保护的物种、人群、生态环境或生活环境（动植物）下的工作情况，均无在国家公园、自然保护区、荒漠区、保护区或野生河内工作等情况。煤矸石生产过程中可能存在空气污染物、废水、噪声和振动、固体污染物和废物等对环境和植物的影响。其影响程度目前尚无定量评估。但尚未见周围居民抱怨或与居民发生纠纷事件。

5.2 Current HRPG occupational safety and health status and the impact on the overall

现有 HRPG 职业安全、健康状况及其对整体的影响

Among 13 enterprises, there are 2 coal gangue brick ones with HRPG system, but only the the HRPG systems in new ZTE Zaozhuang Industrial Co., Ltd. Have being in use. According to this enterprise of on-site verification results, the the main occupational risk factors in this HRPG system include the electric shock injury, the main occupational hazard factors are noise and high tempurature, the basic non-toxic substances; environmental harmful factors for the noise. Noise come mainly from the steam turbine, boiler blowdown and a variety of feed water pump, etc., high temperature from the boiler, steam piping, turbine and other equipment. The protective facilities have the installed noise insulation measures, the workers should wear earplugs during working exposed to noise. This system did not come into bring the blight to whole of plant on the occupational safety, health and the environment, the occupational hazards and harmful factors analysis and test results has also proved this conclusion. The HRPG system may absorb or digest the smoke and heat producing from the roasting process, it may also reduce the risk from the two harmful factors.

13 家企业中，有两家煤矸石砖厂附有 HRPG 系统，但仅有山东枣庄新中兴实业有限责任公司建材分公司煤矸石制砖厂的 HRPG 系统投入使用。根据对该厂的调查与现场核查结果，该厂 HRPG 系统存在的主要职业危险因素有电击伤害，存在的职业性有害因素主要有噪声和高温，基本不含有毒物质；环境有害因素主要为噪声。噪声主要来自汽轮机、锅炉排污、各种给水泵等，高温来自锅炉、蒸气管道、汽轮机等设备。其防护设施有设备本身加设隔声隔热层，工人在可能暴露噪声的情况下佩戴防噪声耳塞。该系统从职业安全、健康与环境方面未对全厂整体产生影响，这从职业危险、有害因素的分析与检测结果也得到了证明。该系统可能对焙烧过程产生的烟尘和高温具有吸收和消化作用，可能会降低这两种危害因素的危险。

Since this plant have not the assessment information before the HRPG system run, and new HRPG projects with HRPG system in Shanxi Ju Yi Group not yet begin the production, we have not get the assessment dates after projects production, so can not complete the target appoint activities before.

由于该厂无建 HRPG 系统前的评估资料，而新建的山西聚义集团项目尚未投产，没有建成后的评估数据

资料，无法完成本活动项目约定的前后评估工作。

6. Proposal

建议

6.1 The recommendations to improve current occupational safety, health and environmental management on coal gangue brick field

煤矸石制砖领域当前职业健康安全、环境管理方面的改进建议

6.1.1 Smaller enterprises should establish the special occupational safety, health and environmental management organization, and improve the relative system, configurate occupational safety and health part-time management personnels; clear and definite the occupational safety and health leadership and management responsibility, especially in occupational health management responsibility.

小小企业应建立和完善专门的职业安全、健康与环境领导机构和管理机构，配置专兼职职业安全、健康管理人员；明确职业安全、健康领导职责和管理职责，尤其职业健康管理职责。

6.1.2 Enterprises should establish and improve occupational safety, health and environmental objectives, bring it into the target management responsibility of enterprise legal representative, and decompose layer upon layer the work target.

企业建立和完善职业安全、健康和环境工作目标，将其纳入法定代表人目标管理责任，并进行层层分解。

6.1.3 Improving occupational safety, health and environmental management systems and operation programmes, supplement and improve the safe operation content about occupational health; establish or improve occupational safety and health management annual plan, and improve occupational hazardous factors routine monitoring and evaluation system in the workplace , built the whole occupational health archives and workerhealth survilance records archives.

完善职业安全、健康和环境管理制度和操作规程，补充和完善职业健康方面的安全操作内容；建立或完善职业安全、健康管理年度计划，完善工作场所职业性有害因素的日常监测、评价制度，建全职业卫生档案和劳动者健康监护档案。

6.1.4 To improve the existing protection facilities, increase protection efficiency, reduce the concentration of occupational hazards factor in the workplace air, strengthening the routine maintenance and management for protection facilities. Addition process of limestone should supplement the local ventilation facilities, replenish the engineer protection measures on strong noise equipment (such as crusher, vibrating screen, extruders, mixers, steam turbine, etc.).

改进现有防护设施，提高防护效率，减低工作场所职业危害因素浓度，加强日常维护与管理。石灰石添加岗位增设局部通风装置，补充强噪声设备（如破碎机、振动筛、挤出机、搅拌机、汽轮机等）的工程防护措施。

6.1.5 To strengthen the scientific and reasonable selection and configuration of of PPE, add the configuration of hearing protectors, the establish the management accounts of PPE, strengthen the management for their routine.

加强对个体防护装备的科学、合理选择与配置，补充护听器的配置，建立个体防护装备管理台帐，加强日常管理。

6.1.6 Strengthen the training for enterprise leaders and manager about relevant laws and regulation knowledges, supplement the training for operation worker about occupational safety, health and environmental knowledge. The training content should include: laws, regulations, standards, occupational safety,health and environmental hazards of the enterprise and their distribution, routine use, maintenance and management of protective facilities, selection, use and maintenance of PPE.

加强对企业负责人和相关管理者法律、法规知识的培训，补充对劳动者职业安全、健康和环境知识的培训，培训内容应包括：法律、法规、标准知识，本企业职业与环境危害及其分布知识，防护设施日常使用、维护和管理知识，个体防护用品的选择、使用与维护知识等。

6.1.7 To establish adverse ergonomic factors identification, analysis and assessment system of coal gangue brick-making.

建立煤矸石生产企业不良工效学因素识别、分析与评估制度。

6.2 The policies and guidelines propose for the smaller coal gangue brick-making with HRPG system enterprises

针对煤矸石制砖附加 HRPG 的较小规模企业的政策和方针建议

6.2.1 To research and low down the Occupational safety, health and environmental hazard prevention and control norms for coal gangue brick (with HRPG Systems) manufacturers;

研制煤矸石制砖（附带 HRPG 系统）生产企业职业安全、健康与环境危害预防控制规范；

6.2.2 To establish occupational safety, health and environmental hazards management work specification for coal gangue brick (with HRPG Systems) manufacturers.

建立煤矸石制砖（附带 HRPG 系统）生产企业职业安全、健康与环境危害管理工作规范；

6.2.3 To establish the adverse ergonomic factors examination, evaluation and control guidelines for coal gangue brick manufacturors.

建立煤矸石生产企业不良工效学因素检查、评估与控制指南。

Annex Ⅰ 附件一

Implementing protocol of UNIDO/ILO/WHO Joint Activity on Health and Safety for Chinese coal-gangue brick sector

UNIDO/ILO/WHO 中国煤矸石制砖企业职业安全健康交流活动项目实施方案

1. 目的与目标

Purposes and Objectives of Joint Activity

1.1 探讨中国煤矸石制砖生产中余热发电系统（HRPG）的职业安全健康现状及其特点。

To ascertain status and characteristic of occupational health and safety (H&S) of the heat recovery power generation (HRPG) systems within the Chinese coal-gangue brick sector.

1.2 评估煤矸石制砖企业职业健康安全和环境危害现状及其相关政策、法规、标准在该行业的充分性或适用性。

To evaluate the hazardous status of occupational H&S and environment and adequacy or applicability of the related policy, regulations and standard within Chinese coal-gangue brick enterprises.

1.3 提出煤矸石制砖企业职业健康安全和环境管理对策建议，初步形成煤矸石制砖生产及其 HRPG 系统职业安全健康管理工作指南。

To present the recommendations and countermeasure for improvements and strengthen the H&S functions of coal-gangue brick/brick production, and elementally form the operational H&S guidelines for coal-gangue brick/brick production and it's HRPG systems.

2. 交流活动范围

Scope of Joint Activity

拟选择山西、山东、宁夏、湖北和辽宁五个省的 13 家企业煤矸石制砖企业（包含余热发电系统的企业至少有 2 家）作为本次交流活动的研究对象。其中，各调查省应兼顾企业规模分布。调查企业中，应包括山西省灵石市两渡乡崔家沟村的聚义实业集团新龙新建筑材料有限公司。

We should chose the 12 coal-gangue brick enterprises (including two enterprises covering heat recovery power generation systems at least) from Shanxi, Shandong, Hubei, Ningxia and Liaoning Provinces in China as the study objects of this joint activity. Of these factories, including 3 respectively in each of Shanxi, Shandong and Hubei Provinces, 2 in Hubei Province, 1 in Liaoning Province. Where possible a range of sizes of factories are to be considered. The companies to be chosen should include Xinrong New Building Material Co. Ltd., Juyi Industrial Group, Getai Industrial Park, Cuijiagou Village, Liangdu Town, Lingshi County, Shanxi Province.

拟调查企业名单：

The study objects of this joint activity including:

山西省：①山西潞安矿业集团常村矿新型墙体材料厂

Shanxi Changcun mine new wall materials product factory in Shanxi Luan Mining Group

②晋城康厦建材工程有限公司

Feng Fei brick factory of Jincheng Kangxia Building Materials Engineering Co., Ltd.

③聚义实业集团鑫融建材有限公司（附余热发电）

Xinrong New Building Material Co. Ltd. of Juyi Industrial Group

山东省：①枣庄新中兴实业公司建材分公司

ShanDong Building materials company, Zaozhuang New Zhongxing industry Co., Ltd.

②鲁能菏泽煤电公司彭庄煤矿煤矸石砖厂

Coal Gangue brick factory of Pengzhuang mining, Heze coal and power Co., Ltd,.

③山东新齐新型建材有限责任公司

Shandong Xinqi New building material Co., Ltd.

宁 夏：①宁夏中节能新材料有限公司（国能公司煤矸石制砖项目）

NingXia Ningxia Zhongjieneng New material Co.,Ltd.

②宁夏川泰新型节能建材有限公司（石嘴山恒益达有限公司）

Ningxia Chuantai New Jieneng building material Co.,Ltd.

③宁夏恒运达综合实业有限公司（宁夏隆湖制砖有限责任公司）

Ningxia Hengyuanda integrating industry Co.,Ltd.

湖 北：①晨雄煤矸石砖厂（湖北荆门东宝区漳河镇）

HuBei ZhenXiong Coal Gangue brick factory

②勇滕砖厂（湖北荆门东宝区漳河镇）

YongTeng Coal Gangue brick factory

③黄土坡红砖厂（湖北荆门东宝区栗溪镇）

HuangTu red brick factory

辽 宁：铁煤集团铁强墙体材料有限责任公司

Tieling Coal Group Tieqiang Wall Material Co., Ltd.

3. 内容与方法

Content and Method

3.1 内容

Content

3.1.1 企业基本情况

The general information of factories

3.1.1.1 企业基本情况包括：企业名称、地址、经济成分、企业规模、生产规模、员工总数等。同时包括项目备案情况。具体内容详见表 1。

The general information should include: The title, address, economic element, the Factory size, productive capacity, the number of employees of the factory and so on, and information put on records. Details see also table 1.

3.1.1.2 企业周边环境：自然地理、周边环境（包括城镇及周边居民的地理关系)、气候条件（常年风向、温湿度、气压等)、所处地域的居民数、企业生活饮用水供应等情况。具体内容详见附表 2。

Peripheral environments of enterprise: geography, peripheral environment (including the town and the surrounding residents of the geographic relationship), climate (annual wind direction, temperature and humidity, pressure, etc.), the number of peripheral residents, businesses, supply of drinking water etc. Details see also table 2.

3.1.2 工程现况

Engineering Status

3.1.2.1 企业工程现状

Enterprise Engineering Status

主要包括：总平面布置、生产工艺流程及生产组织、原辅料、中间产品、产品、用量或产量，主要生产设备及其机械化、自动化程度等。总平面布置和主要生产工艺流程详见表 2；主要生产组织调查见表 3；原辅料及中间产品、产品、副产品调查见表 4；主要生产设备调查见表 5。

Study content of Engineering status should include: general layout, production process and production organization, raw materials, intermediate products, product, dosage or capacity, the main production equipment, and mechanizing and automating level and so on. General layout and main production process see also table 2; the main production organization see also table 3; the raw materials , intermediate products, products and by-products see also table 4; main productive equipment see also table 5.

3.1.2.2 工业三废和噪声产生情况

Industrial waste and noise production situation

生产过程中是否产生废水、废气、废渣及噪声，产生废物的生产工艺流程环节；废物处置方式及工艺，废物排放去向。详细内容见表 2。

Whether the production process wastewater，waste gas, waste dregs and noise, and production part of bring those waste，waste disposal methods and processes, waste discharge destination. Details in table 2 .

3.1.3 危险有害因素的辨识与分析

Identification and Analysis of Dangerous and Harmful Factors

危险化学品（dangerous chemicals）：具有易燃、易爆、有毒、有害等特性，会对人员、设施、环境噪声伤害或损害的化学品。

Dangerous chemicals: the chemicals which would be dangerous or harmful for personnel, facilities and environmental, and with characteristics of flammable, explosive, toxic and hazardous and so on.

危险化学品重大危险源（major hazard installations for dangerous chemicals）：长期地或临时地生产、加工、使用或贮存危险化学品，且危险化学品的数量等于或超过临界量(thresholds quantity)的单元。

Major hazard installations for dangerous chemicals: the unit in which hazardous chemicals have been chronically or temporarily produced, processed, used and stored, and their dosage is equal to or exceeded the thresholds quantity.

职业性有害因素：又称职业病危害因素，在职业活动中产生和（或）存在的、可能对职业人群健康、安全和作业能力造成不良影响的因素或条件，包括化学、物理、生物等因素。

Occupational hazards(or the occupational-disease-inductive factors): The factors or conditions that produce and/or exist in the occupational activities, and may create adverse impact on health, safety and operational capacity of employees, generally including chemistry, physics, biology and so on.

环境有害因素：在生产过程中产生的对环境质量和非职业人群健康造成不良影响的因素，包括物理、化学和生物性因素。

Environmental hazard factor: The factors generated in the production process and be likely to to induce hazardous effects to environmental quality and non-occupational population health, including physical, chemical and biological factors.

3.1.3.1 危险化学品重大危险源的辨识与分析

Identification and Analysis of Major Hazard Installations for Dangerous Chemicals

危险化学品重大危险源的辨识主要依据 GB18218（危险化学品重大危险源辨识）和 GB12268（国家标准危险货物品名表）中危险化学品的危险特性及其数量，单元内存在化学品的数量等于或超过规定的临界量，即被定位为重大危险源。重大危险源辨识包括生产场所重大危险源的辨识和贮存区重大危险源的辨识。将确定的重大危险源按表 6 的内容填写。

Identification of major hazard installations for dangerous chemicals is based primarily on the hazardous properties and the quantity of dangerous chemicals existed in the unit, see GB12268(List of dangerous goods) and GB18218(Identification of major hazard installations for dangerous chemicals). If the amount of chemical existed in the unit is equal to or exceeds it's thresholds quantity, it should be regarded as major hazard installations. Identification of major hazard installations includes the identification for production sites and storage areas. Major hazard installations which have been identified should be filled in accordance with the contents of table 6.

3.1.3.2 危险有害因素的辨识与分析

Identification and Analysis of Dangerous and Harmful Factors

从人、物和环境三方面识别职业健康安全和环境危险有害因素。危险因素类别主要依据 GB6441《企业职工伤亡事故分类标准》，综合考虑起因物、一起事故先发的诱导性原因、致害物、伤害方式等，将其划分为 16 类；职业性有害因素划分主要依据卫生部《职业病危害因素分类目录》（卫法监发[2002]63 号），按其可能导致的职业病类别将其划分为 10 类。详细调查与识别内容见表 6.1。危险有害因素的具体类别如下：

We should distinguish occupational safety, health, environmental risks and harmful factors from three aspects that is the human, physical and environmental aspects. This study will divide the risk factors be into 16 categories by considering synthetically the origin objects, causes induced an accident, damage substances, mode of injury and according to on GB6441 (Workers casualty classification criteria), and divide Occupational Hazards factors into 10 categories according to Categories directory of occupational-disease-inductive factors promulgated by the Ministry of Health (Health Law release supervision [2002] 63) which follow occupational diseases categories. Detailed investigation and identification content of elements see also table 6.

Dangerous and harmful factors in specific categories as follows

⑴危险因素类别

Categories of Risk Factors

a.物体打击；b.车辆伤害；c.机械伤害；d.起重伤害；e.触电；f.淹溺；g.灼烫；h.火灾；i.高处坠落；j.坍塌；k.放炮；l.火药爆炸；m.化学性爆炸；n.物理性爆炸；o.中毒和窒息；p.其他伤害。

a. objects beating; b. vehicle injuries; c. mechanical injury; d. lifting injury; e. electric shock; f. drowning; g. burnings; h. fire; i. fall from high places; j. collapse; k. blasting; l. gunpowder explosion; m. chemical explosion; n. physical explosions; o. poisoning and asphyxia; p. other injuries.

⑵职业性有害因素类别

Categories of Occupational Hazards factor

a.粉尘（13 种）；b.电离辐射/放射线；c.化学物质（56 种）；d.物理因素（4 种）；e.生物因素（3 种）；

f.导致职业性皮肤病的危害因素（8 种）；g.导致职业性眼病的危害因素（3 种）；h.导致职业性耳鼻喉口腔疾病的危害因素（3 种）；i.职业性肿瘤的职业病危害因素（8 种）；j.其他职业病危害因素（5 种）。

a. dust (13 species); b. ionizing radiation/radiation; c. chemicals (56 species); d. physical factors (4 species); e. biological factors (3 species); f. risk factors that can cause occupational skin diseases (8 species); g. risk factors that can lead to occupational eye disease (3 species); h. risk factors that can lead to occupational ears, nose, throat and oral diseases (3 species); i. risk factors that can cause occupational tumor (8, species); j. other occupational hazards (5 species).

3.1.3.3 环境污染源识别与分析

Identification and analysis of environmental pollution

分析、识别生产过程中产生废物的工艺流程环节及所产生废物的形式与排放方式。如生产过程中产生废水、废气、废渣及噪声。环境介质中特征污染物无组织排放，且超过国家相应环境标准，可视为环境污染源。

分析、识别生产过程中产生的各环境介质中优势或特征性环境污染物。具体调查内容包括：生产工艺、产生的废物（气、水、声、渣）、 排放方式（有组织或无组织）、排放持续性（连续或间歇）、产生废物的生产过程、废物中优势或特征性环境污染物种类或名称（例如：重金属，如镉、铅、汞、铬；多环芳烃，如苯并 a 芘）（见表 6.2）。

环境有害因素类别：重金属、SO2、NO2、CO、多环芳烃、噪声等。

To analysis and identify the waste generated during the production process, and its existing shape and sections and discharge methods. Such as wastewater, waste gas, waste dregs and noise. The contaminants in environmental media have been eliminated without organization and its concentration exceed relevant environmental standards, those contaminants and its emissions can be considered as environmental pollution.

To analysis and identify the advantaging or featuring environmental pollutions. Specific investigations include: the production process, waste resulting in these production process (air, water, sound, Java), discharge method (organized or unorganized), durative of emissions (continuous or intermittent), the productive processes producing wastes, types and title of environmental pollutants (example: heavy metals, such as cadmium, lead, mercury, chromium; polycyclic aromatic hydrocarbons, such as benzo$_{[a]}$pyrene) (see table 6.2).

Environmental hazards categories: heavy metals, SO_2, NO_2, CO, polycyclic aromatic hydrocarbons, and noise.

3.1.3.4 危险有害因素的监测与评价

Monitoring and Evaluation of Dangerous and Harmful Factors

⑴职业和环境有害因素监测

Monitoring of Occupational and Environmental Hazards

对可能导致职业病或环境危害的职业和环境有害因素进行调查或现场检测，具体调查与检测内容包括：①化学因素监测：粉尘、毒物等；②物理因素监测：噪声、振动、高温、辐射等。职业有害因素包括：粉尘、高温、噪声、CO、SO_2、NO_2 等；环境有害因素包括：重金属(如镉、铅、汞、铬)、SO_2、NO_2、CO、多环芳烃（如苯并 a 芘）、噪声等。

调查和检测内容包括：职业和环境有害因素的浓度或强度、职业接触情况调查（工时记录内容）、环境污染情况调查、粉尘游离 SiO_2 含量测试等。调查及监测内容详见表 7。

To implement the Investigation or on-site detection for the occupational and environmental hazards factors that

may cause occupational diseases or environmental hazards. The item of investigation and detection include: ① the monitoring of chemical factors such as dust, poisons, etc.; ② Monitoring of physical factors such as noise, vibration, heat, radiation. The dust, high temperature, noise , CO、SO_2、NO_2 and so on been ascertained as occupational hazards factors to detect. heavy metals, SO_2, NO_2, CO, polycyclic aromatic hydrocarbons, and noise and so on been ascertained as environmental hazards factors to detect.

The detailed content of Investigation or on-site detection include: Investigation or detection of the concentration or intensity of harmful factors（such as dust, high temperature，noise, CO、SO_2、NO_X, free SiO_2 content in dust, etc.）, occupational exposure and environmental pollution thing (such as work Records etc.), etc. The detailed content see also table 7.

⑵危险性分级

Risk Classification

拟采用预先危险性分析或作业条件危险性评价法，对危险因素可能导致的危险程度进行分级分析。其调查和分析内容包括：按照危险因素导致的事故、危害的危险（危害）程度；事故发生的可能性分值（L）、暴露于危险环境的频繁程度（E）、事故造成的后果分值（C）。填写内容详见表 6。

The preliminary risk analysis or operative risk assessment method will be selected to classify the risk from risk factors. The investigation and analysis include: the accidents caused by risk factors, degree of the harm; the scores of possibility of accidents occurring (L), frequency exposed to hazardous environmental (E), the scores of the consequences severity of an accident (C). Their result will be Fill in table 6.

⑶接触职业性有害因素作业危害程度分级

Determining Risk of Occupational Hazards

分别采用①粉尘作业危害分级；②有毒作业危害分级；③高温作业危害分级；④噪声作业危害分级等分析方法对工作场所职业性有害因素危害程度进行分级分析。填写内容详见表 6。

The methods of risk assessment we should adopt including respectively: ①hazard classification of workplace exposed to dust; ②hazard classification of workplace exposed to toxics; ③hazard classification of workplace exposed to high-temperature; ④hazard classification of workplace exposed to noise. Complete contents see also table 6.

⑷重大危险源

Major Hazard Installations

拟采用事故树或事件树分析方法对重大危险源作定性或定量评价。其内容包括：初始事件的确定、安全功能判定、发展事件树和简化事件（故）树、事件（故）树分析等。

Analysis method of Fault Tree (FT) or Event Tree (ET) will be selected to conduct qualitative or quantitative evaluation for the major hazard installations. The contents of evaluation include: the determination of the initial event, the determination of security features, development and simplify FT or ET, and FT or ET analysis etc al.

⑸安全事故及职业病发生情况

Safety accidence and occupational diseases

安全事故（伤亡事故）：指企业职工在生产劳动过程中，发生的人身伤害(以下简称伤害)、急性中毒(以下简称中毒)。人身伤害包括死亡、重伤和轻伤。

Safety accidence (Casualty accidence)：The accidence of injury occurring during producing and labouring, which include physical injury, acute poisoning and so on. The physical injury include death, severe injury and slight injury.

重伤：指相当于损失工作日等于和超过 105 日的失能伤害。

Severe injury：The injury which lose labour ability for 105 workdays and more than.

轻伤：指损失工作日低于 105 日的失能伤害。

Slight injury：The injury which lose labour ability for less than 105 workdays.

职业病：指用人单位的劳动者在职业活动中，因接触粉尘、放射性物质和其他有毒、有害物质等因素而引起的疾病。此处专指职业病名单中的 10 大类 115 种职业病。

Occupational diseases：Here under refers to the diseases incurred to the labourer of enterprises, institutions and private business units (hereinafter referred to as “Employer”) resulted from contacting with powder dust, radioactive substances, other poisonous and harmful substances in the work，including 115 kinds of 10 categories from the occupational disease list in China.

安全事故及职业病发生情况调查的具体内容详见表 8。

The material contents of Investigating safety accidence and occupational diseases see also table 8.

⑹环境有害因素监测与评估：对生产过程中所产生废物中的优势或特征性环境有害因素进行调查、现场检测，评估大气、饮水（包括水源水）是否出现污染。检测结果按国家大气环境质量标准和饮水（包括水源水）卫生标准进行判定，超标者可视为出现污染。

Evaluation and detection for environmental hazard factors：To survey and detect the environmental hazard factors, and evaluate whether the air and water are polluted. The result detected is determined according to state related standards, the environments exceeded the state related standards is regarded as polluted one.

3.1.4 职业健康安全和环境防护设备现状及其评价

Status and Evaluation of Occupational, Safety and Environmental Protective Equipments

现有职业健康安全和环境防护设施投入及分布，设施运行、定期监测、评价与维护等情况及相关管理制度与其执行情况等。详细内容见表 9。

To analysis and evaluate the status of protective equipment for occupational and environmental hazard. The contents include: existing equipment, equipment work status, The periodic monitoring, evaluation and maintenance of the equipments’ protective effect, and related management systems and implementation status. Details see also table 9.

3.1.5 应急救援设施现状及其评价

Status and Evaluation of Emergency Rescue Facilities

应急救援设施及其分布，设施日常监测、维护情况及相关管理制度、演练制度及执行情况。详细内容见表 9。

Emergency rescue facilities and facilities distribution, daily monitoring, maintenance and related management system, training system and implementation situations. Details see also table 9.

3.1.6 个体防护装备（PPE）配备及其使用现状与评价

Usage status and Evaluation of Personal Protective Equipment (PPE)

调查与评价内容包括：配备类型，应配备和实际配备情况，实际使用情况，培训情况，相关管理制度及执行情况等。详细内容见表 10、表 11。PPE 配备正确性评价主要依据：GB/T 11651《个体防护装备选用规范 》、GB/T 18664 《呼吸防护器用品的选择、使用与维护》和 GB/T 23466《护听器的选择指南》等。

Investigation and evaluation contents for PPE include: type of equipped, the actual equipped situation, the actual usage, training, related management systems and implementation situation and so on. Details see also table 10 and table 11. The evaluation of the validity for equipping PPE based mainly on: GB/T 11651 (The selection and Usage rules of Personal Protective Equipment), GB/T 18664 (Selection, Use and Maintenance of Respiratory Protective Device) and GB/T 23466 (Guide for Selection of Hearing Protectors) and so on.

3.1.7 职业健康检查现状及其评价

Status and Evaluation of Occupational Medical Examination

职业健康检查相关内容包括：职业健康监护人群、健康监护种类和周期、健康监护指标、健康监护结果等。评价内容参见表 12，评分标准见表 12a。

The key contents of status and evaluation of occupational medical examination include: occupational health care personnel, the category and periods (frequency) of health care, health care indicator, the results of health care and so on. The content of evaluation see also table 12, the standard of evaluation see also 12a.

3.1.8 卫生用室及设施现状及其评价

Status and Evaluation of Sanitary Rooms and Facilities

卫生用室及设施包括：浴室、更/存衣室、盥洗设施、生活用室、妇女卫生室等。详细内容参见表 12。

The evaluation content of sanitary rooms and facilities include: bathroom, dressing room/keep dressing room, toilet facilities, living room, women's health room and so on. Details see also table 12.

3.1.9 职业健康安全和环境管理现状及其评价

Status and Evaluation of Occupational safety, Health and Environmental Management

现状调查与评价内容主要包括：a.组织机构；b.规章制度；c.档案管理；d.前期预防；e.材料和设备管理；f.工作场所管理；g.工作场所职业病危害因素监测；h.履行告知义务；i.防护设施和个体防护装备；j.职业健康监护；k.职业病危害事故的应急救援；l.辅助卫生用室；m.职业卫生培训；n.职业病诊断与病人保障；o.群众监督。P. 环境保护设施管理。详细调查内容及评价项目参见表 12。

Contents of survey and Evaluation include: a. organization; b. rules and regulations; c. records management; d. early prevention; e. Materials and equipment management; f. workplace management; g. the monitoring of occupational hazards in workplaces; h. To execute the impartment obligation; i. protection facilities and personal protective equipment; j. occupational health care; k. emergency rescue and assistance for occupational-disease-inductive accidents; l. auxiliary sanitary rooms; m. occupational health training; n. occupational disease diagnosis and patient ensure; o. public supervision; p. The managements for environmental protective equipments. Details of the investigation and evaluation see also table 12.

3.1.10 职业安全健康环境管理对策

Occupational Safety, Health and Environmental Management Strategy

采用态势分析方法（SWOT）对山西聚义实业集团制砖线及 HRPG 安装前后的职业安全健康管理现状及对策进行调查与分析。其内容包括：①对影响职业健康安全和环境的外部因素调查和内部因素的调查；②内外部因素优势和劣势分析，机遇和威胁分析；③提出职业健康安全和环境改善建议。调查与分析内容详见表 13。

Using Situation analysis (SWOT) to investigate and analyze the status and countermeasure of Occupational Safety and Health Management of Shanxi brick JuYi Industrial Group brick making lines before and after installation of HRPG. The contents include: ①the investigation of the external and internal factors that impact on occupational safety, health and the environment; ② the analysis of strengths and weaknesses, analysis of opportunities and threat for external and internal factors; ③giving advice to occupational safety, health and environmental improvement. The contents of investigation and analysis see also table 13.

3.2 方法

Method

采用填表调查、现场检测、查阅文件和现场核查等相结合的方法，对上述内容进行全面调查。表 1～表 6（表 6 包括表 6.1 和表 6.2）、表 8、表 9 和表 11 由调查人员会同被调查企业职业安全健康环境管理人员共同填写。表 6 中的个别内容：如职业性有害因素的危险级别，应由职业病防治技术人员根据现场检测资料进行分级后确定；如是否重大危险源，应由企业安全健康管理人员依据 GB18218（危险化学品重大危险源辨识）和 GB12268（国家标准危险货物品名表），对其分析判断后填写。表 10 由调查员填写，信息来源于相关文件资料查阅、现场调查与核实、现场访谈等。职业性有害因素监测结果（表 7）来源于日常监测资料或现场实时检测资料。

This study conduct the comprehensive investigation and study for above contents through using the method of filling surveys, on-site detecting, access to documents and on-site verification. The content of investigation in table 1 to table 6, table 8，table 9, and table 10 will be fulfilled together by the investigators in conjunction with management personnel with responsibility for occupational safety, health and environmental. The part contents in table 6, such as the risk level of occupational hazard factor will be fulfilled by the occupational health personnel after determine classification information through on-site testing; such as whether to major hazards should be fulfilled by safety and health management after judging and analysis for it according to GB18218 (Risk Identification of Major Hazards of Chemicals) and GB12268 (National Standards List of dangerous goods). Table 10 should be fill out by the investigators, the information root in relevant documents and information access, on-site investigation and verification, on-site interviews. Occupational hazards monitoring results (see table 7) derived from the daily monitoring data or field detecting data.

表 1～表 11 内容，所有被调查企业均应填写。

The contents in table 1 to table 11 should be completed for all surveyed enterprises.

表 12、表 14～表 16 为现场检查用表，可由企业职业健康安全和环境人员自行检查和外部专家现场检查分别完成。其中表 14～表 16 为环境检查专用表格。

The contents in table 12，from table14 to table 16 should be completed respectively by all surveyed enterprises and exterior inspector .

表 13 是针对附加 HRPG 的煤矸石制砖企业的职业安全健康管理现状及对策采用 SWOT 方法进行调查与分析而设计的。因此，该项内容是仅对附加 HRPG 的煤矸石制砖企业进行的调查与分析，由调查员与企业职业安全健康管理人员共同填写完成。

Table 13 is designed for surveying and analysing the occupational safety and health management status and countermeasures of coal-gangue brick with HRPG based on SWOT analysis method. Therefore, table 11 is only used to coal-gangue brick with HRPG , and filled together by investor of this study and the occupational safety and health manager of the enterprises.

危险因素分级采用预先危险性分析或作业条件危险性评价法；职业性有害因素分级针对不同职业危害采用不同的有害作业危害程度分级方法。

The preliminary risk analysis or operative risk assessment method will be used to risk classification of risk factors. The different risk classification method of hazardous work will be selected for the different types of hazard factor to be used to the risk analysis of this hazardous factor.

对每个企业的危险化学品重大危险源可能导致的危害事故，进行事件树或事故树分析，为制定相应的防范措施提供依据。

Analysis method of Fault Tree (FT) or Event Tree (ET) will be used to analysing and assessing the each business major hazards of hazardous chemicals which have been identified and may cause the harm accident, in order to provide evidence for establishing and developing the related preventive and control measures.

3.3 质量控制

Quality Control

本次调研，为了确保资料的可靠和真实。选用同一调查表格，同一队调查人员进行培训。正式调查之前，对本方案首先进行专家评审，并进行试点调查，在此基础上，进行进一步的修订，最后实施全面调查。职业性有害因素的检测方法均采用国家标准方法进行采样和实验室检测。调查或填表人员的培训采用二级培训制度。一级培训：方案设计人员对参与调查的工作组成员进行培训；二级培训：参与调查的工作组成员对被调查企业参与调查的安全健康管理人员进行培训。

In order to ensure the reliable and true information, this research will use the same survey form, the same team of investigators to conduct the training. Before the formal investigation, the expert review on this program should be done firstly, and then carry out the pre-survey, on this basis, make amendments to the program further, and implement the comprehensive survey. Occupational hazards detection methods adopt the national standard methods of sampling and laboratory testing. To adopt three-tier training system for the investigators or guidance staffs training. Primary training: the program design staffs training for the working group members involved in the investigation; secondary Training: the working group members training for the safety and health management staffs of the companies that involved in the investigation.

资料的审核与验收，二级审核与验收制度。依据二级培训层次，由高一级调研人员对下一级调查人员资料进行逐级审核汇总后上报。最后，由工作组人员同一汇总，统计与分析。

Using approval and acceptance of two-tier system for examining and receiving the data. According to the two levels of training, the data should be examined and verified step by step from the high-level investigators to the next level information investigators, and then the high-level investigators gather all the information in order to form the review summary report. And the task of the data summary, statistics and analysis should be done by the working group staffs finally.

4 组织与分工

Organizations and Division of Labour

4.1 专家组

Experts Group

组长：李涛、Brent Powis

Group Leader: Li Tao 、Brent Powis

成员：李涛、王忠旭、Brent Powis、毛吉祥、廖海江、邵华、郭支喜、马福海、 凌瑞杰。

Members: Li Tao, Wang Zhongxu, Brent Powis, Miao Jixiang, Liao Haijiang, Shao Hua, Guo Zhixi, Ma Fuhai, Ling Ruijie.

4.2 执行组

Executive Group

4.2.1 组长：王忠旭、李涛（中国疾病预防控制中心职业卫生与中毒控制所）

Group Leader: Li Tao, Wang Zhongxu (Institute of Occupational Health and Poison Control, China Centre for Disease Control and Prevention)

4.2.2 参加单位、负责人及成员：

Person in charge and members of the participating units:

⑴中国疾病预防控制中心职业卫生与中毒控制所

Institute of Occupational Health and Poison Control, China Centre for Disease Control and Prevention

负责人：李玉珍

Person in charge：Li Yuzhen

成　　员：秦汝莉、李玉珍、张雪艳、贾宁。

Members：Qin Ruli,　Zhang Xueyan,　Jia Ning.

⑵山东省职业病防治研究院

Shandong Research Academy of Prevention and Treatment of Occupational Diseases

负责人：邵华

Person in charge: Shao Hua

成　　员：单永乐、张志虎、冯斌、张放、刘尚军、窦广伟、刘志刚

Members: Shan Yongle, Zhang Zhihu, Feng Bin, Zhang Fang, Liu Shangjun, Dou Guangwei, Liu Zhigang.

⑶山西省疾病预防控制中心

Shanxi　Centre　for　Disease Control and Prevention（Shanxi CDC）

负责人：郭支喜

Person in charge: Guo Zhixi

成　　员：李秀萍、郭红梅、曹红兵（山西省疾病预防控制中心）

李安昌（山西潞安矿业集团有限责任公司卫生处）

周志明（山西晋城无烟煤矿业集团有限责任公司总医院）

杨海珍（山西省灵石市卫生监督所）

Members: Li Xiuping, Guo Hongmei, Cao Hongbing.（Shanxi CDC）

Li Anchang

（The Health Management Department in Shanxi Luan Mining Group）

Zhou Zhiming

（The Hospital in Shanxi Jincheng City Blind Coal Mine Group Co., Ltd.）

Yang Haizhen

（Shanxi Lingshi City Health Authority）

⑷宁夏回族自治区疾病预防控制中心

Ningxia Centre f or Diseases Control and Prevention（NXCDC）

负责人：马福海、刘吉祥

Person in charge: Ma Fuhai, Liu Jixiang

成　　员：王冠梅、耿敬东、孙伟、李鸿成（宁夏回族自治区疾病预防控制中心）

祖丽萍、闵宁华、边浩(石嘴山市疾控中心)

李银山、曲丽萍、冒志东、孟玉茹(石嘴山市卫生监督所)

Members: Wang Guanmei, Geng Jingdong, Sun Wei, Li Hongcheng(NX CDC)

Zu Liping, Min Ninghua, Bian Hao(Ningxia Shizuishan City CDC)

Li Yinshan, Qu Liping, Mao Zhidong, Meng Yuru(Ningxia Shizuishan City Health Authority)

⑸湖北省职业病防治院

Hubei Academy of Prevention and Treatment of Occupational Diseases（Hubei APTOD）

负责人：凌瑞杰

Person in charge：Ling Ruijie （Hubei APTOD）

成　　员：孙敬智、徐沙、黄开发（Hubei APTOD）

解华山、杨东岳、范丽（荆门市疾病预防控制中心）

曾凡亮（荆门市卫生监督局）

Members: Sun Jingzhi, Xu Sha, Huang Kaifa.（Hubei APTOD）

Xie Huashan, Yang Dongyue, Fan Li（Hubei Jingmen City CDC）

Zeng Fanliang（Hubei Jingmen City Health Authority）

⑹辽宁省职业病防治院

Liaoning Institute of Occupational Health

负责人：李刚、李凤桐

Person in charge：Li Gang, Li Fengtong

参加人员：张克、李晓然、甄宝宁、洪静（铁岭市疾病预防控制中心）

Members: Zhang Ke, Li Xiaoran, Zhen Baoning，Hong Jing（Tieling City CDC）

5 时间进度

The schedule of Joint Activity

活 动 内 容 **Activity contents**	活动计划（2010 年） **Activity schedule(2010)**								
	4 月 Apr	5 月 May	6 月 Jun	7 月 July	8 月 Aug	9 月 Sep	10 月 Oct	11 月 Nov	12 月 Dec
1.检索企业、草拟活动实施方案 Search business, draft the activity program	√	√							
2. 方案评审、试点调查、确定实施方案 Evaluate protocol, pilot survey and determine activity protocol.		√	√						
3. 全面调查与研究 Survey and research comprehensively			√	√	√	√	√		
4. 形成总结材料 Analyse materials, form summary reports							√	√	√
5. 参与由 UNIDO 组织和资助的区域研讨会。 Participate in Regional Workshop									√

6 项目产出

Project Outputs

6.1 煤矸石制砖企业相关的安全、健康、环境危害现状评价。

Assessment of the current Environment, Health & Safety risks associated with coal-gangue brick factories.

6.2 现有 HRPG 操作指南、其他领域应用以及中国当前在用的任何相关法规框架使用充分性的评估。

Assessment of the adequacy of existing HRPG H&S operational guidelines, application in other sectors and any current regulatory frameworks governing its utilization in China.

6.3 煤矸石制砖领域当前职业健康安全、环境管理方面的改进建议。

Recommendations for improvements to the current coal-gangue brick sector management of Environment/Health &Safety including; risk assessment, control, training and communication.

6.4 针对煤矸石制砖附加 HRPG 的较小规模企业，提出适于现有法律、法规、标准和规章制度方面的政策和方针建议。建议将首先以上述第 1、2 和 3 产出为基础，其次是对项目的第一个试点企业（新龙新建筑材料有限公司，山西省灵石市两渡乡崔家沟村）现有煤矸石制砖生产线开展研究，该研究是继当前在建的新 HRPG 制砖生产线相关研究之后的一项工作。这将进一步突出由于引进这个 HRPG 所带来的可操作的职业安全健康要素、应用与培训要求，形成以政策、法规建议形式的中央政府 HRPG 职业安全健康操作指南。

Recommendations on policy/ on the adaption of existing HRPG rules, standards, laws, regulations to the smaller scale that would be employed with the brick sector. The proposal will be based firstly on Outputs 1 2 &3 and secondly on a study on the existing coal-gangue brick production line at the project's first pilot plant (Xinrong New Building Material Co. Ltd., Juyi Industrial Group, Getai Industrial Park, Cuijiagou Village, Liangdu Town, Lingshi County, Shanxi Province) followed by a study of the new HRPG brick production line currently being constructed – this will highlight the additional operational H&S factors, implications and training requirements that the introduction of these HRPG systems will bring about. Formulation report on HRPG operational H&S guidelines for central Government in the form of policy and regulatory advice.

6.5 参与由 UNIDO 组织和资助的区域研讨会。
Participate in Regional Workshop to be organised and funded by UNIDO present outcomes

表 1　基本情况调查表

（Table 1　The Investigate Form of General Information of Factories）

<table>
<tr><td>企业名称
Factory name</td><td></td><td colspan="2">企业法人
Corporation</td><td>联系电话
Telephone</td><td></td></tr>
<tr><td>详细地址
Address</td><td></td><td rowspan="3">安全健康环境管理负责人
Manager in charge of SHE</td><td>安全：
Safety:</td><td>联系电话
Telephone</td><td></td></tr>
<tr><td>备案情况
Put on records</td><td>文号：
Number of file:</td><td>健康：
Health:</td><td>联系电话
Telephone</td><td></td></tr>
<tr><td>投产时间
Time of puting into production</td><td>月/日/年：
Mouth/date/year:</td><td>环保：
Environment:</td><td>联系电话
Telephone</td><td></td></tr>
<tr><td>经济成分
Economic element</td><td>①国有(state)；②集体(collectivity)；③私有(private)；④港澳台(Hong kong/Macao/Taiwan)；⑤外商(overseas)。</td><td>企业规模
Factory size</td><td colspan="3">①企业人数(work force)：　　人；　②销售额(sell quantum,RMB)：　　万元/年(ten thousand yuan/a)；③资产总额(assets amount, RMB)：　　万元(10^4yuan/a)；④生产规模(productive capacity)：　　万块/年(10^4piece/a)。</td></tr>
<tr><td>工人数
Work force</td><td colspan="4">实际从业人数(practitioner)：　　人。其中：①固定工(permanent worker)：男(male)：　　人；女(female)：　　人；②流动工(joad)：男(male)：　　人；女(female)：　　人。</td></tr>
<tr><td>主要产品
Main Production</td><td colspan="4"></td></tr>
</table>

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 2　总平面布置、生产工艺及周边环境

（Table 2　The general layout ，production process and the peripheral environment）

企业名称（Factory name）：_____。

总平面布置简述及示意图（包括主要生产单元、办公区、辅助生产区等布置图，注明风向标）： Brief　in general layout and sketch map:
主要工艺流程简述及示意图（注明主要污染源、职业危险有害因素存在环节及工业三废和噪声产生环节）： Brief　in the main production process and sketch map:
企业周边环境（包括自然地理、周围环境、气候条件、生活水供应、所处地域居民数等情况）： Peripheral environments of enterprise：
废物处理方式及工艺情况、废物放排去向： waste disposal methods and discharge destination：

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 3　生产组织构成调查表

（Table 3　The Investigate Form of general layout and production process）

企业名称（Factory name）：_____。

序	部门/车间 Section/workshop	工种/岗位(1) type of work/station	工种/岗位(2) type of work/station	工种/岗位(3) type of work/station	工种/岗位(4) type of work/station	工种/岗位(5) type of work/station	……

号 No.	名称 Name	人数 Num.of person	名称 Name	人数 Num.of person	名称 Name	人数 Num.of person	名称 Name	人数 Num.of person	名称 Name	人数 Num.of person	名称 Name	人数 Num.of person	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
…													

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 4　　原辅料及产品和副产品调查表

(Table 4　The Investigate Form of raw materials, products and by-products)

企业名称（Factory name）：_____。

序号 No.	主要原、辅料 the main raw and complement materials			产品、中间产品 Products and intermediate Products		副产品 By products	
	名　称 Name	产　地 Producing area	年用量 Capacity	名　称 Name	年产量 Capacity	名　称 Name	年产量 Capacity
1							
2							
3							
4							
5							
6							
7							
…							

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 5　主要生产设备调查表

(Table 5　The Investigate Form of Main Productive Equipment)

企业名称（Factory name）：_____。

序号 No.	主要设备名称 The name of main productive equipment	规格 Specification	台数 Number	备注（标注自动化程度） Remark(Roboticized level)
1				
2				
3				
4				
5				
6				
7				
…				

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 6.1　主要危险有害因素检查表

（Table 6.1　The Check-up Form of Main Dangerous and Harmful Factors）

企业名称（Factory name）：_____。

序号 No.	车间/部门 Section /workshop	工种/岗位 type of work/ station	危险有害因素类别 Type of Dangerous and Harmful Factors	危险有害因素名称 Name of Dangerous and Harmful Factors	重大危险源 Major Hazard Installations	事故相关情况 The thing related to accidents								操作方式 Operative type	防控设施 Protective establishment	个体防护装备 PPE	接触人数 The number of person exposed to risk or harm	
						可能的危害后果 Potential sequent	事故可能性 L* Possibility	暴露频繁度 E# Frequency	事故后果值 C※ Sequent value	危险等级$ Risk rank	触发事件 Spring event	形成原因 The cause of occurring accident	设备状态 State of equipment work				总人数 Total	女工人数 Female

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

注：* 表中 L 填写：①、②、③、④、⑤、⑥或⑦。事故可能性从大到小依次为：①完全会被预料到；②相当可能；③不经常，但可能；④完全以外，极少可能；⑤可以设想，但高度不可能；⑥极不可能；⑦实际上不可能。

表中 E 填写：①、②、③、④、⑤或⑥。暴露频繁度从大到小依次为：①连续暴露于潜在危险环境；②逐日在工作时间内暴露；③每周一次或偶然地暴露；④每月暴露一次；⑤每年几次出现在潜在危险环境；⑥非常罕见地暴露。

※ 表中 C 填写：①、②、③、④、⑤或⑥。事故后果从大到小依次为：①大灾难，许多人死亡；②灾难，数人死亡；③非常严重，一人死亡；④严重，严重伤害；⑤重大，致残；⑥

引人注目，需要救护。

[$]表中危险等级填写：无需填写。

表 6.2　　环境有害因素及其排放情况检查表

(Table 6.2　The Check-up Form of Main Environmental Harmful Factors and Letting Status)

企业名称（Factory name）：_____。

序号 No	部门/车间 Section /workshop	生产工艺 production process	产生的废物 (气、水、声、渣) bring waste	排放方式 (有组织/无组织) discharge method	排放持续性 (连续或间歇) durative of emissions	废物产生过程 the productive processes producing wastes	废物种类或名称 types and title of wastes	备注 Remark

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 7　职业及环境有害因素监测结果汇总表

（Table 7　The Gather Form of Occupational and Environmental Hazards Monitoring Results）

企业名称（Factory name）：_____。

序号 No	监测地点 Place monitored	接触人群或工种岗位 Type of exposed personals	有害因素 Occupational and Environmental Hazard factors	应测点数 The number of detecting spot	实测点数 The number of detected spot	样本数 The number of Sampling	检测结果						检测时间 Date of sampling	监测点合格率（%） Eligibility rate of detected spot	检测机构 Detecting organization
							C_{MAC} (Mg/m^3)		C_{STEL}		C_{TWA}				
							平均值 Average	范　围 Value of range	平均值 Average	范　围 Value of range	平均值 Average	范　围 Value of range			

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

注：（职业性有害因素测定：粉尘、高温、噪声、CO、SO_2、NO_2；环境有害因素测定：重金属，如镉、铅、汞、铬；多环芳烃，如苯并 a 芘。监测点的设定应依据国家规范；每个测试点需测 6 个样）

(Detected factors including: dust, high temperature， noise, CO,SO_2, NO_2; Monitoring points should be located according to national standards; every monitoring point should detect 6 samples)

表 8　　生产安全事故及职业病发生情况调查表（2005 年 1 月～2009 年 12 月）

(Table 8　The　investigation Form of safety accidence and occupational diseases occurring　states)

企业名称（Factory name）：_____。

序号 No	部门/车间 Section/workshop	年份 Year	员工平均人数 Person number	安全事故发生情况 The instance of occurring the safety accidence								职业病发生情况 The instance of occurring occupational diseases											
				死亡事故 Death		重伤事故 GBH		轻伤事故 Flesh wound		财产损失事故 Estate loss		尘肺病 Pneumo-coniosis		急性中毒 Acute poisoning		慢性中毒 Chronic poisoning		职业中暑 Occupational heliosis		听力损失 Hearing loss		其他 Other	
				起数	人数	起数	人数	起数	人数	起数	损失(万元)	种类	人数	种类	人数	种类	人数	种类	人数	种类	人数	种类	人数
1		2005																					
		2006																					
		2007																					
		2008																					
		2009																					
2		2005																					
		2006																					
		2007																					
		2008																					
		2009																					
3		2005																					
		2006																					
		2007																					
		2008																					
		2009																					
4		2005																					

		2006																					
		2007																					
		2008																					
		2009																					
5		2005																					
		2006																					
		2007																					
		2008																					
		2009																					
…	…																						
全厂合计																							

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 9　职业安全卫生和环境危害防护设施、应急设施及其分布情况调查表

（Table 9　The Investigation Form of Protective Equipment and Emergency Rescue Facilities and Facilities Distribution）

企业名称（Factory name）：_____。

序号 No.	防护设施名称 The Name of Protective Equipment	型　号 model	布置地点 Collocated spot	工种/岗位 Type of work/ station	运行状况 Work status	定期检测频次 The frequency of Periodic detection	防护效果 Protective effects	投入情况 （万元） 总投入/年维护
1					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
2					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
3					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
4					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
5					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
6					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
7					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
8					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
9					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	

10					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
11					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	
⋮					正常(work)、异常(no work)	年(a year)、半年(half year)、无(no)	好(good)、一般(common)、差(bed)	

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

填表说明

该表为每个企业填写一份。表中，**防护设施名称：**包括除尘设施、抑尘设施（如水幕、水雾等湿式降尘设施）、通风排毒设施、防噪声设施、喷淋器等；**型号：**各种防护设施的具体型号；**布置地点、工种/岗位：**设有上述防护设施的地点或工作/岗位；**运行状况：**正常或异常；**定期检测情况：**对防护设施防护效果进行的定期检测，表中的年、半年为监测周期，划“√”表示；**防护效果：**以作业地点浓度或强度值是否超过国家限值标准来判定，如果作业地点浓度或强度值经常不超过国家职业接触限值为“好”，偶尔超过为“一般”，经常超过为“差”。

Each company should complete a copy of the table. In the table: The Name of Protective Equipment include dust removal facilities, dust suppression facilities (such as water screen, water sprays and other wet dust suppression facilities), detoxification facilities, ventilation, anti-noise facilities, shower etc; model: specific models of each protective equipments; collocated spot and type of work/station: spot or work/station that had the protection facilities; work status: work or not work; the frequency of Periodic detection: the regular test of protective effect on the protection facilities, ‘Year’ and ‘Half a year’ in the table is the monitor the cycle, indicated by "√"; protective effects: using the method that whether the concentration or intensity values exceed the national standard limit to determine the protective effects. If the job site concentration or intensity often no more than the national occupational exposure limit for the "good", sometimes more than for the "common", often more than for the "poor."

表 10　　个体防护用品（PPE）选择情况调查表

(Table 10　The Gather Form of the PPE selection)

企业名称（Factory name）：_____。

序号 No.	产品名称 Name of PPE products	型 号 Model	生产企业名称 Name of productive factory	主要性能指标 Performance or index	执行标准 Standard	使用期限(月) Usage term	安全鉴定证 Certificate	有无产品使用说明 User explain
1	防尘口罩 Dust Mask			阻尘效率/% Dust retardation Rate				
1.1								有(Y)、无(N)
1.2								有(Y)、无(N)
:								有(Y)、无(N)
2	呼吸防护用品 Respiratory protection equipment							
2.1	呼吸防护用品 Respiratory protection equipment			指定防护因数（APF）				
2.1.1								有(Y)、无(N)
2.1.2								有(Y)、无(N)
:								有(Y)、无(N)
2.2	过滤式防毒面具面罩 Filter Type protective gas mask			指定防护因数（APF）				
2.2.1								有(Y)、无(N)
2.2.2								有(Y)、无(N)
:								有(Y)、无(N)
3	眼面部防护 Protectors for eye and face							
3.1								有(Y)、无(N)
3.2								有(Y)、无(N)
:								有(Y)、无(N)
4	听力防护用品 Hearing protectors							
4.1								有(Y)、无(N)
4.2								有(Y)、无(N)
:								有(Y)、无(N)
5	劳动护肤用品 Skin-protectors for worker							
5.1								有(Y)、无(N)
5.2								有(Y)、无(N)
:								有(Y)、无(N)
6	其他个体防护 Other PPE							
6.1								有(Y)、无(N)
6.2								有(Y)、无(N)
:								有(Y)、无(N)

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

填表说明：

产品名称：在 2 级序号（如 1.1、2.1、2.2 等）的相应栏目中填写详细的产品名称与类别。Name of PPE products: In the second-level directory (such as 1.1,2.1,2.2, etc.) fill in the corresponding column name and type of product detail.

型号：该产品的详细型号。Model: Detailed model of the product.

主要性能指标：指定防护因素（APF）指呼吸防护用品，在适合使用者佩戴且正确使用的前提下，预期能将空气污染物浓度降低的倍数（参见 GB/T18664-2002）。各类呼吸防护用品的 APF 来自于产品说明书，如说明书中无此内容可在表中填写“无”。Performance or index: Designated protective factors (APF) means the concentration of multiple air pollutants that the respiratory protective equipment is expected to be able to reduce (see GB/T18664-2002) with the premise of fit to wear and the proper usage. Various types of respiratory protective equipment APF come from the manual, if don't have the manual such content can fill in the table "no".

执行标准：该产品生产技术执行的国家或行业标准，填写标准号。Standard: The national or industry standards that implemented by the production technology, fill in the standard number.

使用期限：产品使用寿命。Use life: The effect time of products.

生产企业名称：生产企业的具体名称。Name of productive factory: The specific name of the manufacturer.

安全鉴定证书：有安全鉴定证书的应填写“安全鉴定证书号”，无安全鉴定证书的填“无”。Certificate: If have the certificate should fill out the "certificate number", without certificate filling "no".

有无产品实用说明：根据有无“产品使用说明书”的实际情况在相应的地方划“√”。User instructions: Designated "√" in the appropriate places according to the actual situation whether have the "user instructions ".

举例：如在“1.1”行中填写“劳卫牌复式防尘口罩（Ⅱ级）”、“武安 301”、“无”、“LD29-92”、“3 个月”、“***市塑料十三厂”、“无”、“有”。For example: Fill "Duplex anti-dust respirator brand Laowei (Ⅱ level)", "Wu'an-301", "No", "LD29-92", "3 months ",13rd Plastics factory of *** City", "No ", "Yes" in the line "1.1".

表 11　个体防护用品（PPE）配置情况调查表

(Table 11　The Gather Form of the PPE selection)

企业名称（Factory name）：_____。

序号 No.	部门/车间 Section/workshop	工种/岗位 Type of work/station	有害因素及其接触情况(hazardous factors and exposure status)				PPE 配置情况（Configuring status of PPE）		
			有害因素名称 Name of hazardous factors	平均接触浓度 (mg/m^3) Average value of exposure	最高接触浓度 (mg/m^3) Peak value of exposure	接触人数 Num.of person occupational exposure	PPE 配置名称 Name of PPE	配置数量 Number of PPE	配置周期(个/年) Frequency
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
…									

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 12　　职业安全健康管理现状调查表

(Table 12　Questionnaire for Management Status of Occupational Safety and Health)

企业名称（Factory name）：_____。

评价项目	调查与评价内容(Evaluation and Investigation Content)---由评价人员会同企业相关人员共同完成 是或否的□, 划“√”。	结果(分值)及备注 On-site check Score
1. 组织机构 Organization	1.1 最高决策者是否具有遵守国家法律、法规、标准和规范的书面承诺？是□，否□。如有：是否告知劳动者？是□，否□；是否进行年度管理评审？是□，否□。 Whether the highest decision-makers complied with national laws, regulations, standards and norms in a written commitment? Yes□, No□. Did inform the employees? Yes□, No□. Whether did the annual management review? Yes□, No□.	
	1.2 是否设立职业安全卫生领导机构？是□，否□。如设立，是否明确职业安全管理职责？是□，否□；是否明确职业卫生管理职责？是□，否□。 Whether established the occupational health and safety agencies? Yes□, No□. If established, whether clear the safety management responsibilities? Yes□, No□. Whether cleared the occupational health management responsibility? Yes□, No□.	
	1.3 是否设置职业安全卫生管理机构？是□，否□。如设置，是否明确：□职业安全管理职责；□职业卫生管理职责。如未设置，是否委托具有专业技术资格的工程技术人员提供安全生产和职业卫生服务？是□，否□。 Whether set occupational safety and health management organizations? Yes □, No □. If set, whether clearly: □ occupational safety management duties; □ occupational health management responsibilities. If not set, is entrusted with the professional qualifications of engineers and technicians to provide safety and occupational health services? Yes □, No □.	
	1.4.1 是否配备专职安全生产管理人员？是□，否□。如配备，是否明确管理职责？是□，否□。 Whether equipped the full time safety management personnel? Yes □, No □. If equipped, is a clear management responsibility? Yes □, No □. 1.4.2 是否配备专兼职的职业卫生专业人员？是□，否□。如配备，是否明确管理职责？是□，否□。 Whether equipped part-time occupational health professionals? Yes □, No □. If equipped, is a clear management responsibility? Yes □, No □.	
	1.5 是否为车间及班组配备兼职的安全卫生管理人员？是□，否□。如配备，是否明确：□职业安全卫生管理职责。 Whether equipped the part-time health and safety management personnel for the workshop and the team? Yes □, No □. If equipped, is cleared: □ Occupational Health and Safety management responsibilities	
2. 规章制度 Rules and regulations	2.1 是否建立专门的安全生产责任制？是□，否。是否建立专门的职业病防治责任制？是□，否。 Is there a special responsibility system for safety? Yes □, No □. Whether established the special occupational disease prevention and accountability? Yes □, No □.	
	2.2 职业健康安全和环境工作是否纳入法定代表人目标管理责任制？是□，否□。如是，其责任是否进行层层分解？是□，否□。 If the occupational health and safety work be incorporated into the legal representative of target management responsibility? Yes □, No □. If so, whether down to every level of their responsibility? Yes □, No □.	
	2.3 是否制定安全生产和职业病防治计划和实施方案？是□，否□。 Whether set up the plan of safe production and occupational diseases prevention and control and implementation plan? Yes □, No □.	
	2.4 是否建立职业健康安全和环境管理制度？是□，否□。如建立，是否明确其内容？是□，否□。 Whether establish the occupational safety and health management system? Yes □, No □. If established, whether cleared its contents? Yes □, No □.	
	2.5 是否设置岗位操作规程？是□，否□。如设置，是否明确：□安全生产内容；□职业卫生内容。 If set the post operating rules? Yes □, No □. If set, it cleared: □ safety content; □ occupational health content.	
	2.6.1 是否建立工作场所职业病危害因素检测及评价制度？是□，否□。是否建立安全危险因素的识别与评价制度？是□，否□。 Whether establish the occupational hazards inspection and evaluation system in the workplace? Yes □, No □.	

评价项目	调查与评价内容(Evaluation and Investigation Content)---由评价人员会同企业相关人员共同完成 是或否的□, 划“√”。	结果(分值)及备注 On-site check Score
	2.6.2 是否建立环境有害因素检测及评价制度？是□，否□。	
	2.7 是否建立健康监护管理制度？是□，否□。 Is there a health care management system? Yes □, No □.	
	2.8 是否建立对安全设备的检测、维护和保养制度？是□，否□。 Is there a safety equipment inspection, maintenance and maintenance system? Yes □, No □.	
	2.9 是否确保必要的经费投入？安全生产投入：是□，否□。职业病防治投入：是□，否□。 Whether ensure the necessary funds? Safety inputs: Yes □, No □. Occupational disease prevention and control inputs: Yes □, No □.	
	2.10 是否依法参加工伤保险？是□，否□。 Whether participate in the injury insurance? Yes □, No □.	
3. 档案管理 Archives management	3.1 是否建立职业卫生档案？是□，否□。如建立，其内容是否：□全面；□定期更新。 Whether established the occupational health records? Yes □, No □. If established, its content is: □ full; □ regularly updated.	
	3.2 本单位是否存在重大危险源？是□，否□。如存在，重大危险源是否：□登记建档；□进行检测、评估和监控，并制定：□制定应急预案；□告知从业人员应当采取的应急措施。是否将重大危险源及有关安全措施、应急措施报有关部门备案？是□，否□。 Whether the unit existed major hazards? Is □, No □. If there are major hazards: □ registration filing; □ testing, evaluation and monitoring, and development: □ develop contingency plans; □ inform employees of emergency measures should be taken. Whether the major hazards and related safety measures, emergency measures to the relevant departments for the record newspaper? Yes □, No □.	
	3.3 是否建立劳动者健康监护档案？是□，否□。如建立，是否含有：□上岗前；□在岗期间；□离岗时；和□离岗后随访。 Is there a laborer health records? Yes □, No □. Such as the establishment, whether it contains: □ posts ago; □-the-job period; □ undergo; and □ leave their posts were followed up.	
4. 前期预防 Early Prevention	4.1 企业是否进行职业病危害项目申报？是□，否□。如申报，申报的职业病危害因素是否：□齐全。如不齐全，未申报的职业病危害因素有：_____。 Whether the enterprise reported occupational hazard program? Yes □, No □. Such as reporting, reporting of occupational hazards are: □ complete. If not complete, failure to report the occupational hazards are: _____.	
	4.2.1 建设项目是否进行安全性评价？是□，否□；是否经过有关部门审查？是□，否□；如审查，是否通过？是□，否□。 Whether the construction project in the safety evaluation? Yes □, No □; whether a department review? Yes □, No □; such review, whether to adopt? Yes □, No □. 4.2.2 建设项目是否进行职业病危害预评价？是□，否□；是否经过卫生行政部门审查？是□，否□；如审查，是否通过？是□，否□。 Whether the construction project for evaluation of occupational hazards? Yes □, No □; with or without the administrative department of health? Yes □, No □; such review, whether to adopt? Yes □, No □.	
	4.3 严重职业病危害建设项目是否经卫生行政部门审查？是□，否□；如审查，□通过，□未通过。 Is there a serious occupational hazards in construction projects by the administrative department of health? Yes □, No □; such review, □ through, □ failed.	
	4.4 建设项目竣工验收前是否进行职业病危害控制效果评价？是□，否□；如是，经过卫生行政部门审查了吗？是□，否□；如审查，是否通过？是□，否□。建设项目是否进行职业病防护设施的卫生验收？是□，否□；如验收，是否合格？是□，否□。 Is the construction project carried out before the final acceptance occupational hazards assessment? Yes □, No □; so, after a review of the health administration department yet? Yes □, No □; such review, whether to adopt? Yes □, No □. Whether the construction project for occupational protective equipment for health inspection? Yes □, No □; such as acceptance, qualified? Yes □, No □.	
5. 材料和设备	5.1 是否使用国家禁止或淘汰使用的工艺、技术、材料？是□，否□。如存在，有那些：_____。 The use of the national ban or phase out the use of technology, technology, materials? Yes □, No □. If there are those	

评价项目	调查与评价内容(Evaluation and Investigation Content)---由评价人员会同企业相关人员共同完成 是或否的□, 划“√”。	结果(分值)及备注 On-site check Score
管理 Materials and equipment management	who: .	
	5.2 是否生产、经营、进口和使用国家明令禁止产生职业危害的设备和材料？是□，否□。如存在，有那些：_____。 Whether the production, management, import and use prohibited by the state to cause occupational hazards of equipment and materials? Yes □, No □. If there is, there are these: .	
	5.3 在其醒目位置是否有未设置警示标识和中文警示说明的危险、有害设备？是□，否□。如存在：有那些：_____。 In its prominent position have not set warning marks and warning statements in Chinese dangerous, hazardous equipment? Yes □, No □. If there is: There are those who: .	
	5.4 是否接受不具备防护条件的职业病危害的作业。是□，否□。 Whether have accepted the occupational hazards work to be not provided with the protection conditions. Yes □, No □.	
6. 工作场所管理 Workplace Management	6.1 职业病危害因素的强度或者浓度是否符合国家职业卫生标准？符合□，部分符合□，不符合□。 Do the intensity or concentration of Occupational hazard factors compliance with national occupational health standards? □, part of the line □, does not meet □.	
	6.2 生产布局是否合理？是□，否□。 The production layout is reasonable? Yes □, No □.	
	6.3 有害和无害作业是否分开？是□，否□。 Whether the harmful and harmless operations are separated? Yes □, No □.	
	6.4 可能发生急性职业损伤的有毒、有害工作场所，是否设置报警装置？是□，否□。 Is set alarm in the toxic, hazardous workplace that may occur acute occupational injuries? Yes □, No □.	
	6.5 可能发生急性职业损伤的有毒、有害工作场所，是否配置现场急救用品？是□，否□。 Is configured on-site first aid supplies in the toxic, hazardous workplace that may occur acute occupational injuries? Yes □, No □.	
	6.6 可能发生急性职业损伤的有毒、有害工作场所，是否配置冲洗设备？是□，否□。 Is configured washing equipment in the toxic, hazardous workplace that may occur acute occupational injuries? Yes □, No □.	
	6.7 可能发生急性职业损伤的有毒、有害工作场所，是否配置应急撤离通道？是□，否□。 Whether had emergency exit been configured in the toxic, hazardous workplace that may occur acute occupational injuries? Yes □, No □.	
	6.8 可能发生急性职业损伤的有毒、有害工作场所，是否配置必要的泄险区？是□，否□。 Whether have the configuration necessary risk-elimination area in the toxic, hazardous workplace that may occur acute occupational injuries? Is □, No □.	
	6.9 放射工作场所和放射源储存场所是否设置辐射警示标识？是□，否□。 Radiation in the workplace and storage areas of radioactive sources is set radiation warning logo? Yes □, No □.	
	6.10 一般有毒工作场所是否设置黄色区域警示线？是□，否□。 If has yellow area warning line been set in the generally toxic workplaces? Yes □, No □.	
	6.11 高毒工作场所是否设置红色区域警示线？是□，否□。 Has warning line of red area been set in the high toxic workplaces? Yes □, No □.	
	6.12 高毒作业是否设置淋浴间？是□，否□。 Is shower room set in high toxic workplace? Yes □, No □.	
	6.13 高毒作业是否设置更衣室？是□，否□。 Is the change clothes room set in high toxic workplace? Yes □, No □.	
	6.14 高毒作业是否设置物品存放专用间？是□，否□。	

评价项目	调查与评价内容(Evaluation and Investigation Content)---由评价人员会同企业相关人员共同完成 是或否的□, 划“√”。	结果(分值)及备注 On-site check Score
	Is set high toxic items stored private room? Yes □, No □.	
7. 工作场所职业病危害因素监测 Monitoring of occupational hazards factors in workplace	7.1 是否有专人负责职业病危害因素日常监测？是□，否□。 If there is special staff to undertake routine monitoring of occupational hazards? Yes □, No □.	
	7.2 是否定期对工作场所职业病危害因素进行识别、检测与评价？是□，否□。是否提出整改措施？是□，否□。 Whether complete regularly the identification, test and evaluation for the occupational hazards in the workplace? Yes □, No □. Whether proposed the corrective measures? Yes □, No □.	
	7.3 检测、评价、整改措施结果是否存入用人单位职业卫生档案？是□，否□。 Whether kept the result of the test , evaluation and rectification measures on occupational health files stored? Yes □, No □.	
	7.4 检测、评价结果是否定期向所在地卫生行政部门报告？是□，否□。 Whether regularly reported the test and evaluation results to the local health administration department? Yes □, No □.	
8. 履行告知义务 To fulfill this obligation	8.1 是否在醒目位置公布有关职业病防治的规章制度？是□，否□。 Whether prominently published rules and regulations relating to occupational disease prevention? Yes □, No □.	
	8.2 是否签订劳动合同？是□，否□。劳动合同中是否载明可能产生的职业病危害及其后果？是□，否□。 Whether signed the labor contract? Yes □, No □. Whether the labor contracts specified that the possible occupational hazards and their consequences? Yes □, No □.	
	8.3 是否劳动合同中载明职业病防护措施和待遇？是□，否□。 Whether the labor contracts set the occupational diseases prevention measures and treatment? Yes □, No □.	
	8.4 是否在醒目位置公布安全卫生操作规程？是□，否□。 Whether prominently published the safety and health routine practice? Yes □, No □.	
	8.5 是否在醒目位置公布职业病危害事故应急救援措施？是□，否□。 Whether prominently published the occupational hazards of emergency rescue measures? Yes □, No □.	
	8.6 工作场所职业病危害因素监测、评价结果是否告知劳动者？是□，否□。 Whether imparted the detection and evaluation results of occupational hazards in workplace to the employees? Yes □, No □.	
	8.7 是否将劳动者职业健康体检结果告知劳动者？是□，否□。 Whether informed the workers of their occupational health physical examination results? Yes □, No □.	
	8.8 对于患职业病或职业禁忌证的劳动者企业是否应告知本人？是□，否□。 Whether informed the worker that he/she had the Occupational disease or occupational contraindication? Yes □, No □.	
9. 防护设施和个体防护装备 Protection facilities and personal protective equipment	9.1 职业健康安全和环境防护设施台帐是否齐全？是□，否□。 Whether the occupational protective equipment ledger account is complete? Yes □, No □.	
	9.2 职业健康安全和环境设施配备是否齐全？是□，否□。 Whether the occupational protection facilities are complete ? Yes □, No □.	
	9.3 职业健康安全和环境防护设施是否有效？是□，否□。 Whether the occupational protective equipment is effective? Yes □, No □.	
	9.4 是否制定个体防护装备计划并组织实施？是□，否□。 Whether developed and implemented personal protective equipment program? Yes □, No □.	
	9.5 是否配备符合防治职业病要求的个体防护装备？是□，否□。 Whether provided personal protective equipment that corresponded with the occupational disease prevention and control requirements? Yes □, No □.	

评价项目	调查与评价内容(Evaluation and Investigation Content)---由评价人员会同企业相关人员共同完成 是或否的□, 划“√”。	结果(分值)及备注 On-site check Score
	9.6 是否有个体防护装备发放登记记录？是□，否□。 Are there registered records of payment of personal protective equipments? Yes □, No □.	
	9.7 是否及时维护和定期检测职业健康安全和环境防护设备？是□，否□。 Whether had the timely maintenance and regular testing of the occupational protective equipments? Yes □, No □.	
	9.8 是否及时维护、定期检测应急救援设施？是□，否□。 Whether had the timely maintenance, regular inspection of the aid facilities? Yes □, No □.	
	9.9 是否及时维护、定期检测个体防护装备？是□，否□。 Whether had the timely maintenance, regular inspection of the personal protective equipments? Yes □, No □.	
10. 职业健康监护 Occupational Health Surveillance	10.1 是否按规定组织上岗前、在岗期间和离岗时的职业健康检查？是□，否□。 Whether organized the pre-employment, on-job, and undergo occupational health examination according to the regulations? Yes □, No □.	
	10.2 对患有职业禁忌证的劳动者是否进行了调离禁忌作业岗位的处理？是□，否□。 Whether removed the workers that suffering from occupational contraindication from the original operating positions? Yes □, No □.	
	10.3 是否存在未进行离岗职业健康检查而解除或者终止劳动合同的现象？存在□，不存在□。 Whether had the revocation or termination of the labor contract situation that there is not undergoing occupational health examination? Exist □, Not exist □.	
	10.4 职业健康监护档案是否符合要求并妥善保管？是□，否□。 If the occupational health surveillance records met the requirements and be taken care of properly? Yes □, No □.	
	10.5 是否对遭受急性职业病危害的劳动者进行健康检查和医学观察？是□，否□。 Whether did the health examination and medical treatment for the workers that suffered acute occupational hazard? Yes □, No □.	
	10.6 是否安排未成年工从事接触职业病危害的作业？是□，否□。 Whether arranged the child labour to do the occupational hazards job? Yes □, No □.	
	10.7 是否对从事接触职业病危害的作业劳动者，给予适当岗位津贴？是□，否□。 Whether gave appropriate post allowance to the operating workers that involved in the occupational hazards? Yes □, No □.	
11. 职业病危害事故的应急救援 Occupational hazards of emergency plan	11.1 是否建立职业病危害事故应急救援预案？是□，否□。 Whether established the foreordain project of emergency rescue for occupational hazards? Yes □, No □.	
	11.2 应急救援设施是否完好？是□，否□。 If the emergency rescue facilities is intact? Yes □, No □.	
	11.3 是否定期演练职业病危害事故应急救援预案？是□，否□。 If regularly exercise emergency action plan for occupational hazards? Yes □, No □.	
12. 辅助卫生用室 Auxiliary health room	是否配置了辅助卫生用室？是□，否□。如配置，是否符合要求： Whether equipped Auxiliary health room? Yes □, No □. If yes, whether it accord with the demand of healthy： 12.1 配置浴室了吗？是□，否□。如是，符合□，不符合□。 Bathroom？ Yes □, No □. If yes, □meet，□no meet. 12.2 配置更/存衣室了吗？是□，否□。如是，符合□，不符合□。 dressing room? Yes □, No □. If yes, □meet，□no meet. 12.3 配置盥洗设施了吗？是□，否□。如是，符合□，不符合□。 Washroom? Yes □, No □. If yes, □meet，□no meet. 12.4 配置生活用室了吗？是□，否□。如是，符合□，不符合□。	

评价项目	调查与评价内容(Evaluation and Investigation Content)---由评价人员会同企业相关人员共同完成 是或否的□, 划“√”。	结果(分值)及备注 On-site check Score
	Living room? Yes □, No □. If yes, □meet，□no meet. 12.5 配置妇女卫生室了吗？是□，否□。如是，符合□，不符合□。 woman health room ? Yes □, No □. If yes, □meet，□no meet.	
13. 职业卫生培训 Occupational health training	13.1 用人单位的主要负责人、管理人员是否接受了职业卫生培训？是□，否□。 Whether the managers have been trained on the occupational health? Yes □, No □.	
	13.2 是否对上岗前的劳动者进行职业卫生培训？是□，否□。 Whether the employer provide the pre-employment occupational health training to employees? Yes □, No □.	
	13.3 是否定期对在岗期间的劳动者进行职业卫生培训？是□，否□。 Whether the employer provide the on-job occupational health training to employees? Yes □, No □.	
14. 职业病诊断与病人保障 Occupational disease diagnosis and patient ensure	14.1 是否及时向卫生行政部门报告职业病人？是□，否□。 Whether the employer and healthcare agencies report the occupational diseases to the local public-health authority? Yes □, No □.	
	14.2 是否及时向卫生行政部门报告疑似职业病人？是□，否□。 Whether the employer and healthcare agencies report the occupational-disease-like diseases to the local public-health authority? Yes □, No □.	
	14.3 是否向所在地劳动保障部门报告职业病人？是□，否□。 Whether the employer and healthcare agencies report the occupational diseases to the local labour safeguard authority? Yes □, No □.	
	14.4 是否积极安排劳动者进行职业病诊断、鉴定？是□，否□。 Whether the employer arrange the employees to make the diagnosis and appraisal for Occupational Disease? Yes □, No □.	
	14.5 是否安排疑似职业病人进行职业病诊断？是□，否□。 Whether the employer arrange the occupational-disease-like diseases to make the diagnosis for Occupational Disease? Yes □, No □.	
	14.6 是否安排职业病人进行治疗、定期检查、康复？是□，否□。 Whether the employer arrange the occupational diseases to make the treatment, periodical physical examination and healing? Yes □, No □.	
	14.7 是否调离职业病人？是□，否□。 Whether the employer arrange the patients with occupational diseases out of the present post ? Yes □, No □.	
	14.8 是否妥善安置职业病人？是□，否□。 Whether the employer arrange appropriately the patients with occupational disease ? Yes □, No □.	
	14.9 是否如实提供职业病诊断、鉴定所需要的资料？是□，否□。 Whether the employer provide faithfully information required by the diagnosis and appraisal for Occupational Disease? Yes □, No □.	
15. 群众监督 Public supervision	15.1 是否建立工会组织？是□，否□。 Whether established the labour union organization? Yes □, No □.	
	15.2 是否设立工会劳动保护监督检查网络？是□，否□。 Whether established the supervise and checking network for labour production in labour union? Yes □, No □.	
	15.3 是否开展群众性劳动保护监督检查活动？是□，否□。 Whether developed the mass supervise and checking activity for labour production? Yes □, No □.	
	15.4 是否存在民主管理、民主监督？是□，否□。 Whether exist the democracy management and democracy surveillance? Yes □, No □.	
	15.5 签订集体合同时，是否平等协商？是□，否□。 Whether consult coequally with each other during signing the collective contract? Yes □, No □.	
16. 环境有害因	16.1 是否有专人负责环境因素日常监测？是□，否□。	

评价项目	调查与评价内容(Evaluation and Investigation Content)---由评价人员会同企业相关人员共同完成 是或否的□, 划“√”。	结果(分值)及备注 On-site check Score
素监测与管理	If there is special staff to undertake routine monitoring of occupational hazards? Yes □, No □.	
	16.2 是否定期对环境因素进行识别、检测与评价？是□，否□。是否提出整改措施？是□，否□。 Whether complete regularly the identification, test and evaluation for the occupational hazards in the workplace? Yes □, No □. Whether proposed the corrective measures? Yes □, No □.	
	16.3 检测、评价、整改措施结果是否存入管理档案？是□，否□。 Whether kept the result of the test , evaluation and rectification measures on occupational health files stored? Yes □, No □.	

填表人(Name of filling person)：　　联系电话(Telephone)：　　填表日期(Date)：

表 12a　　职业安全健康管理现状评分表：现场检查专家用表

(Table 12a　The Score Form for Management Status Questionnaire of Occupational Safety and Health：The table for checker use)

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
1.组织机构 Organization	1.1	共 20 分：无承诺文件不得分；未告知劳动者，扣 5 分；未进行职业卫生年度管理评审的，扣 5 分。 A total of 20 points: No commitment document shall get no points; failed to inform workers, subtract 5 points; did not conduct the annual management assessment of occupational health, subtract 5 points.
	1.2	共 20 分：未设立，不得分；职责不明确扣 3 分；机构组成人员不符合规定扣 3 分；设立机构，但没有正常开展工作扣 3 分。 查阅：书面文件、会议纪要和工作记录。 A total of 20 points: Not established, shall get no points; duties not explicitly deducted 3 points; organization composed of non-compliance, subtract 3 points; established the institutions, but did not work properly deducted 3 points. Consultation: written documents, meeting summaries, and work records.
	1.3	共 20 分：未设置或者未指定不得分；管理机构职责不明确扣 5 分；没有相应工作人员、工作地点或工作条件扣 5 分；相关部门（包括工会、人事及劳动工资、企业管理、财务、生产调度、工程技术等）的职责和要求不明确扣 5 分。 查阅：书面文件。查看：工作场所。 A total of 20 points: Do not set or is not specified, get no points; administration functions is not clear subtract 5 points; no corresponding staff members, workplace or working conditions, subtract 5 points; the responsibilities and requirements of the relevant sectors (including trade unions, personnel and labour wages, business management, financial, production scheduling, engineering technology, etc.) are unclear deducted 5 points. Consultation: written documents. Lookup: the workplaces.
	1.4.1 1.4.2	共 10 分：未配备不得分；配备但职责不明确扣 5 分。 查阅：聘用文件、个人资质文件和专业档案。 A total of 10 points: Do not equip shall get no points; equip but the responsibility is not clear, deducted 5 points. Consultation: Employment documents, personal papers and professional qualification file.
	1.5	共 10 分：未配备不得分；配备但职责不明确扣 5 分。查阅：聘用文件。 A total of 10 points: Do not equip shall get no points; equip but the responsibility is not clear, deducted 5 points. Consultation: Employment documents.
2.规章制度 Rules and regulations	2.1	共 10 分：未建立责任制不得分。缺一项扣 5 分。 A total of 10 points: Not established, no points. Absent a item, deducted 5 points.
	2.2	共 20 分：总体目标无安全卫生内容，不得分。没有层层分解目标或阶段目标扣 5 分。 查阅：年度生产经营整体规划和目标分解、考核文件。 A total of 20 points: The overall objectives have no safety and health contents, shall get no points; There is no objective or stage goal down to every level deducted 5 points. Consultation: the annual production and operation decomposition of the overall plan and objectives, assessment documents.

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
	2.3	共 20 分：计划要素包括：目的、目标、措施、保障条件等内容。实施方案要求包括时间进度、实施步骤、技术要求、验收方法等内容。即无计划有无方案不得分，缺一项扣 8 分。相关要素不全，每缺 1 项扣 1 分。 查阅：书面的年度计划和实施方案资料。 A total of 20 points: program elements include: goals, objectives, measures, guarantee conditions and so on. Implementation program should include the time schedule, implementation steps, technical requirements, inspection methods and so on. If no program and no plan shall get no points, missing one item deducted 8 points. Related factors is incomplete, lack of a item for each 1 point. Consultation: the written annual plan and implementation program information.
	2.4	共 10 分：无管理制度不得分。缺 1 项制度的，扣 2 分。 查阅：管理制度书面文件。 A total of 10 points: no management system shall get no points. Lack of a system for each 2 points. Consultation: the written document of management system.
	2.5	共 10 分：无岗位操作规程不得分。缺 1 个岗位扣 1 分。 查阅：危险有害因素作业岗位清单和书面的岗位操作规程。 A total of 10 points: no post operation procedures shall get no points. Lack of a post, subtract 1 point. Consultation: the dangerous and harmful factors list of job positions and posts written operating procedures.
	2.6	共 10 分：检测及评价制度应当包括检测点的分布、检测周期、委托的机构、经费保障等内容。无工作场所职业病危害因素检测及评价制度不得分；内容涵盖不全的，缺 1 项扣 2 分。 查阅：书面文本。 A total of 10 points: Detection and evaluation system should include the distribution of test points, test cycle, associated agency, funding and so on. Without detection and evaluation system of occupational hazards in the workplace shall get no points; contents covering incomplete, lack of a item, subtract 2 points. Consultation: the written text.
	2.7	共 10 分：包括健康检查制度、监护档案管理制度、职业禁忌调离制度等。缺 1 项扣 2 分。 A total of 10 points: including occupational health examination system, monitoring records management system, professional taboo out of the system. Lack of a 2 points deduction.
	2.8	共 10 分：缺一项安全设备扣 1 分。 A total of 10 points: a lack of safety equipment, subtract 1 point.
	2.9	共 20 分：经费纳入成本预算，包括人员、机构、预防和治理、评价、防护设施配置与维护、个体防护装备配置与维护、职业病危害因素检测与评价、职业健康监护、职业卫生培训、职业病人诊断与管理、工伤保险等方面。未将经费纳入财务列支的，不得分。项目不全的，缺 1 项扣 2 分。 查阅：财务列支情况。参考相关登记和记录等。 A total of 20 points: take the cost of funds into the budget, including personnel, agencies, prevention and control, evaluation, deployment and maintenance of protective equipment, personal protective equipment configuration and maintenance, testing and evaluation of occupational hazards, occupational health, occupational health training, occupational-disease victims diagnosis and management, work injury insurance and so on. Not charged the funds included in the financial, get no points. Project is incomplete, lack of a item, subtract 2 points. Consultation: Financial charged situation. Refer to the relevant registers, records and so on.
	2.10	共 10 分：未参加工伤保险不得分。缺 1 人扣 1 分。 查阅：对照劳动者名册，检查财务部门提供工伤保险缴纳凭证。 A total of 10 points: did not participate in work injury insurance may get no points. Missing 1 person, subtract 1 point. Consultation: contrasting with the worker roster, check work injury insurance payment of vouchers provided by the financial sector.
3.档案管理 Archives management	3.1	共 10 分：职业卫生档案应当包括基本情况、工艺流程、所使用的材料清单、生产的产品、副产品、中间产品、有毒有害因素动态监测结果、职业健康监护结果、职业病人名单、防护设施清单等内容。无档案不得分，缺一项内容扣 1 分。 查阅：书面职业卫生档案。 A total of 10 points: occupational health record should include the basic situation, process flow, list of materials used, products, by-products, intermediate products, dynamic monitoring results of the toxic and harmful factors, results of occupational health surveillance, list of the occupational-disease victims, list of the protective equipments, etc. No records may get no points, missing an element, subtract 1 point. Consultation: the written occupational health files.
	3.2	共 10 分：未建档不得分，缺 1 项重大危险源扣 2 分。 查阅：书面档案。 A total of 10 points: not established file no points, missing a major hazard, subtract 2 points. Search: written records.
	3.3	共 10 分：未建立不得分。建立上岗前、在岗期间、离岗职业健康监护档案，分别为 3 分、4 分、3 分。不规范或缺 1 人各扣 1 分。

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
		查阅：职业健康监护档案。 A total of 10 points: not established shall get no points. The establishment of posts before, during, undergo occupational health record, get 3 points, 4 points, and 3 points respectively. Irregularity or lack of one person, each subtract 1 point. Consultation: the occupational health records.
4. 前期预防 Early Prevention	4.1	共 30 分：未申报不得分。申报不及时扣 10 分；职业病危害因素申报不全的，缺 1 项扣 2 分。 查阅：申报档案以及申报回执。 A total of 30 points: not reported get no points. not reported timely subtract 10 points; occupational hazards declared incomplete, lack of a item, subtract 1 point. Consultation: reporting files and reporting return receipt.
	4.2.1 4.2.2	共 25 分：未进行预评价不得分；预评价由无资质单位承担的，扣 10 分。预评价未经审批或审批不合格的扣 10 分。 查阅：检查建设项目清单、评价单位资质证明、预评价报告和行政部门的批准文件。 A total of 25 points: not do pre-evaluation shall get no points; pre-evaluation undertaken by the non-qualified units, deducted 10 points. Pre-evaluation without the approval or approval of unqualified deduction of 10 points. Consultation: Check the list of construction projects, qualification of the evaluation units, pre- evaluation report and the approval documents of the executive branch.
	4.3	共 20 分：未经审查不得分。审查未通过，扣 10 分。 查阅：建设项目清单，预评价报告及卫生审核意见书，建设项目设计资料（含职业卫生篇章）卫生审查文件。 A total of 20 points: uncensored get no points. Review does not pass, subtract 10 points. Consultation: the list of construction projects, pre-evaluation report and health audit report, construction project design materials (including occupational health chapter), documents of health review.
	4.4	共 15 分：建设项目未经行政部门验收或者验收不合格而投入运行的不得分。 查阅：建设项目清单、评价单位的资质证明、职业病危害控制效果评价报告书、行政部门竣工验收批文。 A total of 15 points: Construction project without or fail to pass inspection of the executive branch shall get no points. Consultation: the list of construction projects, qualification of the evaluation units, occupational hazards assessment report, final acceptance of the executive branch approval.
5. 材料和设备管理 Materials and equipment management	5.1	共 20 分：每使用一项，扣 10 分。 依据《产业结构调整指导目录(2005 年本)》，自查或现场检查。 A total of 20 points: Every use of a item, deduction of 10 points. Based on "Industrial Restructuring Guiding Catalog (2005)," self-examination or on-site inspection.
	5.2	共 10 分：若存在不得分。 查阅：使用的原材料和设备台帐，对照国家有关规定进行检查。 A total of 10 points: If have, no points. Search: the use of materials and equipment account, we control the relevant state regulations to be checked.
	5.3	共 10 分：发现 1 台扣 5 分；中文警示说明内容不完整的，缺 1 项扣 1 分。 查阅：设备台帐和现场核查。 A total of 10 points: 5 points deducted found a station; Chinese warning note is incomplete, and missing a 1 point deduction. Search: Equipment Accounting and field verification
	5.4	共 5 分：无承包合同或承包合同中无职业卫生作业条件要求条款的，不得分；条款不完整的，酌情扣分。 查阅：承包项目、承包合同和单位的相关资质证明文件。 A total of 5 points: No contract or no occupational health protective conditions requirement in contract, and shall not get points; terms of incomplete, appropriate points. Search: contracted projects, contracts and units of the relevant qualification documents.
6. 工作场所管理 Workplace Management	6.1	共 20 分：1 个作业点中有 1 种有害因素不达标的，扣 5 分。 检查生产工艺流程图、职业有害因素的布点及工作场所职业有害因素检测结果报告单。 A total of 20 points: One kind of harmful factors in an operating point not meet the requirements standard, subtract 5 points. Check the production flow chart, the distribution occupational hazards occupational hazards in the workplace and test results report card.
	6.2	共 10 分：防尘、防毒、防暑、防寒、防噪声与振动、防电离辐射、防工频超高压电场各算 1 项，达不到《工业企业设计卫生标准》（GBZ1）中相应规定的要求，即为该项不符合。1 项不符合的，扣 2 分。 查阅：平面布置图、竖向布置图，现场查看，预评价报告和审批文件。 A total of 10 points: dust-proof, toxic-proof, sunstroke, cold stroke, anti-noise and vibration, anti-ionizing radiation, anti-frequency electric field with a high pressure, up less than the corresponding requirements specified in "standard for the design of industrial enterprises" (GBZ1), namely that do not meet. One does not meet, subtract 2 points. Search: floor plan, vertical layout, on-site view, pre-evaluation report and approval documents.
	6.3	共 10 分：有毒作业未采取密闭化、管道化，或未将有毒作业局限在某个独立的操作间的，不得分。有毒作业局限，但未采取通风净化的方式将有毒气体排走

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
		的，扣 5 分。 A total of 10 points: Operation exposed to toxic substances is not closed and pipelined, or confine toxic operations in the an independent operating room, no points. Toxic job limitations, but not the way to ventilation and air discharge of toxic gases, and subtract 5 points.
	6.4	共 5 分：没有配置报警装置的不得分。 查阅：报警装置配备档案；现场核查。 A total of 5 points: not configured alarm devices shall not get points. Search: alarm device file; on-site verification.
	6.5	共 5 分：未配备现场急救用品的不得分；配置不全的，每缺一项扣 1 分。 查阅：急救用品配备档案，定期检查、维修记录，现场查看。 A total of 5 points: not equipped with on-site first aid supplies shall not get points; configuration incomplete, subtract 1 point each missing . Search: first aid supplies files, regular inspection, maintenance records, the scene view.
	6.6	共 5 分：未配备冲洗设备的，或者现场检查没有效果的（如没有安全流动水），或者不能保证工人在发生事故后 3 分钟之内得到冲洗的，不得分。冲洗设备配备不全的，酌情扣分。 检阅：定期检查记录、维修记录，现场查看。 A total of 5 points: not equipped with washing facilities, or on-site inspection without effect (if there is no safe flow of water), or can not guarantee that the workers after the accident occurred within 3 minutes of washing, no points. Incomplete washing equipment with appropriate points. Review: regular inspection records, maintenance records, the scene view.
	6.7	共 5 分：没有按要求设置应急通道的，不得分；应急通道不畅通的，或者没有在醒目位置设置应急通道警示标识的，或者没有应急照明设施的，扣 2.5 分。 现场查看应急通道设置。 A total of 5 points: not to set emergency channel according the required, no points; emergency channel blocked, or not set the emergency channel warning prominently identified, or no emergency lighting, the deduction of 2.5 points. Emergency channel setting the scene view.
	6.8	共 5 分：没有按要求设置泄险区的，不得分；没有在醒目位置设置泄险区警示标识或无中文警示说明的，扣 2.5 分；中文警示说明内容不完整的，缺 1 项扣 0.5 分。 检查泄险区管理文件，现场查看。 A total of 5 points: not required to set necessary risk-elimination area. risk area, no points; not prominently set to risk-elimination or no warning marks or warning statements in Chinese, deduction of 2.5 points; Chinese warning note is incomplete, the lack of a deduction of 0.5 points. Check vent risk area management file, the scene view.
	6.9	共 5 分：应当配置而未配置射线报警装置的，或者不是经过国家质量监督检验合格的正规产品的，或者现场检查没有效果的，不得分。 现场检查：工业探伤（γ 射线工业、X 射线）报警装置（声光的或剂量的），亮灯或响铃等方式报警。检查报警装置配备档案、定期检查、维修记录，现场检查。 A total of 5 points: It should be configured without radiation alarm device configuration, or is not qualified through the State Administration of Quality Supervision, Inspection and regular product, or no effect on-site inspection shall not get points. Site inspection: industrial flaw detection (γ-ray industry, X-ray) alarm (sound and light or dose), lighting or alarm rings, etc.. Check the alarm device with files, regular inspection, maintenance records, on-site inspection.
	6.10	共 5 分：没有设置黄色区域警示线的，不得分。虽设置了黄色区域警示线，但日久变模糊的，酌情扣分。 对照有毒有害物质清单，现场检查。 A total of 5 points: Without the yellow area warning line, shall not get points. Although set up the yellow warning line region, but takes time to become blurred, where appropriate points. List of toxic and hazardous substances control, on-site inspection.
	6.11	共 5 分：没有设置红色区域警示线的，不得分。虽设置了红色区域警示线，但日久变模糊的，酌情扣分。 对照有毒有害物质清单，按照《高毒物品目录》，现场检查。 A total of 5 points: not set red zone warning line, no points. Although the warning line set up the red area, but takes time to become blurred, where appropriate points. List of toxic and hazardous substances control, in accordance with the "List of high toxic substances", on-site inspection.
	6.12	共 5 分：没有配备淋浴间的，或者没有安全的流动水的，不得分；淋浴器数量不足以满足从事高毒作业的人数的，扣 2.5 分。 对照清单，按照《高毒物品目录》，现场检查。 A total of 5 points: not equipped with shower room, or the flow of water is not safe, no points; shower in quantity sufficient to meet the high number of drug operations, the deduction of 2.5 points. Control list, in accordance with the "List of high toxic substances", on-site inspection.
	6.13	共 5 分：没有配备更衣室的，不得分；没有设置闭锁式衣柜的，扣 1 分。

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
		对照有毒有害物质清单，按照《高毒物品目录》，现场检查。 A total of 5 points: no configuration store-specific change clothes , not divided; not conspicuous warning logo, deduction of 2.5 points. List of toxic and hazardous substances control, in accordance with the "List of high toxic substances", live view.
	6.14	共 5 分：没有配置物品存放专用间的，不得分；没有在醒目位置设置警示标识的，扣 2.5 分。 对照有毒有害物质清单，按照《高毒物品目录》，现场查看。 A total of 5 points: no configuration store-specific room, no points; not conspicuous warning logo, deduction of 2.5 points. List of toxic and hazardous substances control, in accordance with the "List of high toxic substances", on-site view.
7. 工作场所职业病危害因素监测 Monitoring of occupational hazards factors in workplace	7.1	共 10 分：未设立不得分。设立但未明确监测工作职责扣 5 分。 查阅：工作场所管理制度或作业环境检测制度。 A total of 10 points: No points are not set up. Set up, but monitoring responsibilities unclear, deducted 5 points. Search: workplace management system or operating environment detection system.
	7.2	共 15 分：未进行识别、检测与评价不得分；检测与评价机构无相应资质扣 5 分；检测方案不正确的，扣 2.5 分；监测结果超标且无整改措施扣 5 分。 查阅：检测方案、职业病危害因素检测与评价委托书、检测结果报告单。 A total of 15 points: the absence of identification, testing and evaluation may not points; testing and evaluation of institutions without appropriate qualifications subtract 5 points; testing program is not correct, deduction of 2.5 points; monitoring results exceeded and no corrective measures are deducted 5 points. Search: The detection program, the occupational hazard monitoring and evaluation of instructions, test results report card.
	7.3	共 10 分：没有将检测、评价结果存入职业卫生档案的，不得分。存档资料不完全的，每缺 1 项扣 2 分。 查阅：职业卫生档案。 A total of 10 points: did not test and evaluation results not into occupational health records, and shall not get points. Archived data is not complete, missing a button every 2 points. Search: occupational health file.
	7.4	共 5 分：未报告的，不得分；报告不真实的，扣 2.5 分。 与用人单位所在地的卫生行政部门进行核实，或者检查上报材料的复印件。 A total of 5 points: not reported, not points; report untrue, deduction of 2.5 points. And the location of the employer to verify health administrative department, or check a copy of the submitted materials.
8. 履行告知义务 To fulfill this obligation	8.1	共 10 分：没有在厂区醒目位置公布有关职业病防治的规章制度，不得分。 现场检查：公告栏。 A total of 10 points: no eye-catching position in the factory announced the rules and regulations relating to occupational disease prevention, not minutes. On-site inspections: Bulletin Board.
	8.2	共 10 分：未签订劳动合同不得分。签订的合同中无职业病危害的种类、危害程度及其后果告知的扣 5 分，发现 1 人没有签订劳动合同，扣 2 分。 A total of 10 points: No points are not sign labour contracts. No contract signed the type of occupational hazard, harm and consequences to the extent deducted 5 points, found that a person did not sign labor contracts, subtract 2 points.
	8.3	共 10 分：劳动合同中未载明职业病防护措施和待遇的扣 5 分，发现 1 人没有签订劳动合同或合同中未载明职业病防护措施和待遇的，扣 2 分。 A total of 10 points: the labor contract does not specify protective measures and treatment of occupational diseases deduct 5 points, find one who has not signed labour contract or the contract does not specify protective measures and treatment of occupational diseases, subtract 2 points.
	8.4	共 10 分：检查用人单位是否在工作场所岗位的醒目位置公布操作规程，缺 1 个岗位，扣 2 分。 重点抽查：职业病危害严重的岗位。 A total of 10 points: Check whether in the workplace the employer posts prominently published operational procedures, lack of a job, subtract 2 points. Targeted surveillance: occupational hazards in serious positions.
	8.5	共 10 分：现场抽查，缺 1 各岗位，扣 2 分；内容不规范的，扣 1 分。 重点抽查：职业危害严重的岗位。 A total of 10 points: on-site sampling, the lack of a post, subtract 2 points; content is not standardized, subtract 1 point. Targeted surveillance: occupational hazards serious post.
	8.6	共 5 分：未告知或刻意瞒告的，不得分。虽公告，但告知不规范或内容不全的，酌情扣分。 现场检查：重点检查职业危害严重的岗位。 A total of 15 points: not informed or deliberately conceal divisions, and shall not get points. Although the announcement, but this non-standard or incomplete

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
		content, and appropriate subtract points. Site inspection: focus on serious occupational hazards inspection posts.
	8.7	共 15 分：没有告知的，不得分。1 人没有告知的，扣 1 分。 检阅：劳动者职业健康监护档案，体检结果报告单。现场考察：劳动者。 A total of 15 points: No notification shall not get points. 1 person be not informed, and subtract 1 point. Review: employee occupational health record, physical examination report card. Site visit: laborers
	8.8	共 20 分：没有告知的，不得分。1 例没告知的，扣 10 分。 检查劳动者职业健康监护档案、职业病诊断证明书、职业禁忌证患者名单、告知证明材料。对相关劳动者进行核查。 A total of 20 points: No notification shall not get points. 1 case did not inform, the deduction of 10 points. Check employee occupational health record, a certificate of diagnosis of occupational diseases, occupational contraindication list of patients, this evidence. Verification of the relevant workers.
9. 防护设施和个体防护装备 Protection facilities and personal protective equipment	9.1	共 5 分：没有台帐的, 不得分；台帐不齐全的，缺 1 台设备或 1 项内容, 扣 1 分。 查阅：职业病危害防护设施台帐。 A total of 5 points: no ledger, and no points; ledger is not complete, missing a piece of equipment or a content, subtract 1 point. Search: occupational hazard protection facilities ledger
	9.2	共 10 分：1 个岗位未配备或配备不正确的，扣 2 分。 检查有毒有害物质清单和工艺流程图，现场检查。 A total of 10 points: a posts is not equipped or not equipped with the right, subtract 2 points. Check list of toxic and hazardous substances and process maps, on-site inspection
	9.3	共 15 分：1 台无效的，扣 3 分，没有达到以下任何 1 个方面要求的视为职业病防护设施无效：防护设施完好，运行正常，有定期运行维护检修记录。 现场进行抽查，少于 5 台的全部检查，多于 5 台的抽查 5 台。 A total of 15 points: 1 set invalid, subtract 3 points, did not meet any of the following requests in connection with an occupational protective equipment as invalid: protection facilities in good condition, run properly, regular operation and maintenance inspection records. Carry out spot checks on site, less than 5 sets of all inspection, sampling more than 5 sets of 5 sets.
	9.4	共 5 分：没有计划的，扣 2 分；不组织实施的，不得分。 检查管理制度书面文件、个体防护装备计划书面文件、工种台帐、发放记录、督查记录。 A total of 5 points: no plan, subtract 2 points; not organized and implemented, no points. Inspection management system written documents, personal protective equipment programs written documents, ledger type of work, payment records, inspection records.
	9.5	共 30 分：应配备而未配备的不得分。选择不当扣 10 分，配备不全扣 5 分，配备数量不够扣 5 分。 A total of 30 points: not yet be equipped with not points. Select improper deduction of 10 points， equipment incomplete with 5 points deducted, with insufficient number of 5 points deducted.
	9.6	共 5 分：没有记录的，不得分；记录不完整、不清楚的，扣 1 分。 检查个人职业病防护用品发放登记记录。 A total of 5 points: no record, no points; records were incomplete, unclear, subtract 1 point. Check personal protective equipment registration records.
	9.7	共 10 分：无维修记录或检测记录的，各扣 2.5 分；维修不及时或信息不畅通的，各扣 2.5 分；没有专人负责维修、定期检测的，扣 2.5 分。 检查维修记录、检测记录，现场询问劳动者。 A total of 10 points: no maintenance records or test records, the deduction of 2.5 points; repair is not timely or does not open, and the deduction of 2.5 points; not specifically responsible for the maintenance, regular inspection, the deduction of 2.5 points. Check the maintenance records, inspection records, field workers asked.
	9.8	共 10 分：无维修记录或检测记录的，各扣 2.5 分；维修不及时或信息不畅通的，各扣 2.5 分；没有专人负责维修、定期检测的，扣 2.5 分。 检查维修、检测记录，现场询问劳动者。 A total of 10 points: no maintenance records or test records, the deduction of 2.5 points; repair is not timely or does not open, and the deduction of 2.5 points; not specifically responsible for the maintenance, regular inspection, the deduction of 2.5 points. Inspection, maintenance, inspection records, field workers asked.

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
	9.9	共 10 分：无维修记录或检测记录的，各扣 2.5 分；维修不及时或信息不畅通的，各扣 2.5 分；没有专人负责维修、定期检测的，扣 2.5 分。 检查维修记录、检测记录，现场询问劳动者是否了解个人职业病防护用品的使用及维护、检测情况。 A total of 10 points: no maintenance records or test records, the deduction of 2.5 points; repair is not timely or does not open, and the deduction of 2.5 points; not specifically responsible for the maintenance, regular inspection, the deduction of 2.5 points. Check the maintenance records, inspection records, field workers asked whether the individual occupational protective equipment use and maintenance, testing conditions.
10. 职业健康监护 Occupational Health Surveillance	10.1	共 15 分；未安排劳动者进行上岗前、在岗期间和离岗时职业健康检查的，每缺一项各扣 2.5 分。如均未安排职业健康检查或者检查单位没有资质证明的，不得分。发现 1 名劳动者未进行上述职业健康检查的，或者检查不规范的，各扣 1 分。 检查职业健康监护制度，承担职业健康体检的医疗卫生机构的资质证明。 A total of 15 points: not to arrange the workers to conduct occupational health physical examination for pre-employment, on-job, and to undergo, each missing a deduction of 2.5 points each. If no arrangements for occupational health examination or inspection units without qualification certificate shall not get points. Found that a worker did not conduct the occupational health examination, or examination is not standardized, each 1 point deduction. Examination of occupational health surveillance system, commitment to occupational health examination for medical and health institutions of the qualification certificate.
	10.2	共 5 分：均未处理不得分。每名未处理人员，扣 1 分。 检查职业健康监护制度，职业健康检查体检结果报告，调岗通知书及调岗记录。 A total of 5 points: no deal with no points. Each untreated persons, subtract 1 point. Examination of occupational health surveillance system, occupational health screening physical examination reports, out of post transfer records.
	10.3	共 10 分：劳动者离岗时，未做职业健康检查而被解除或终止劳动合同的，发现 1 名扣 1 分。 检查离岗劳动者名册，职业健康监护档案，职业健康体检报告，劳动合同。 A total of 10 points: when workers leave their posts, without making occupational health examination and is discharged or terminated the employment contract, and found 1 person, the deduction of 1 points. Checking out of worker roster, occupational health surveillance, occupational health examination report, the labor contract.
	10.4	共 5 分：内容不全的，缺 1 项扣 1 分；没有指定专（兼）职人员负责保存的，扣 2.5 分；没有借阅登记或复印记录的，各扣 2.5 分。 检查职业健康监护制度，职业健康监护档案，借阅登记，复印记录。 A total of 5 points: the content of incomplete, missing a 1 point deduction; do not specify special (part) and staff members responsible for keeping, the deduction of 2.5 points; not borrow or copy the registration record, the deduction of 2.5 points. Examination of occupational health surveillance system, occupational health records, loan registration, photocopying records.
	10.5	共 10 分：未对遭受或可能遭受急性职业病危害的劳动者进行应急职业健康检查或医学观察的，不得分。相关规定没有涵盖应急职业健康检查内容的，扣 5 分。 检查职业健康监护制度，对照事故台帐，检查事故档案和劳动者职业健康监护档案。 A total of 10 points: did not arrange the workers suffered or may suffered acute occupational hazard to make occupational health examination or emergency medical observation, and not get points. Occupational health examination content are not covered by Relevant provisions of the emergency, subtract 5 points. Examination of occupational health surveillance system, control ledger of accident, inspection records and accident records of occupational health surveillance of workers.
	10.6	共 5 分：未制定相关规定的，扣 2.5 分。现场抽查 5 名劳动者，发现安排未成年工从事接触职业病危害作业的，不得分。 检查劳动者名册，职业健康监护制度，现场抽查劳动者。 A total of 5 points: not to formulate relevant regulations, the deduction of 2.5 points. Field sampling five workers, found that arranging nonage children to engage occupational hazard operations, shall not get points. Check the roster of workers, occupational health surveillance system, on-site checks of workers.
	10.7	共 5 分：没有岗位津贴发放记录的，不得分。发现 1 名不发放的，扣 1 分。 按照劳动者名册检查集体合同、劳动合同以及岗位津贴发放记录，抽查工资条。 A total of 5 points: No post allowance payment records, not points. Found a non-paid, subtract 1 point. Check the roster in accordance with the collective labor contracts, labor contracts and payment of post allowance records, pay checks article.
11. 职业病危害事故的应急	11.1	共 10 分：职业病危害事故应急救援预案应当明确责任人、组织机构、事故发生后的疏通线路、技术方案、救援设施的维护和启动、医疗救护方案等内容。没有预案的，不得分；内容不全的，缺 1 项扣 2 分。

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
救援 Occupational hazards of emergency plan		检查用人单位职业病危害事故应急救援预案书面文件。 A total of 10 points: Occupational Hazards Emergency Plans should be clear responsibility of people, organization, clear the line after the accident, technical programs, facilities, maintenance and start rescue, medical aid programs and so on. Have a plan, it may not divided; content of incomplete, missing a 2 points deduction. Check the employer occupational hazards of emergency rescue plans for writing.
	11.2	共 20 分：没有应急救援设施，或未经国家质量监督检验或经检验不合格的产品，不得分；没有相应制度保证应急救援设施安全有效的，扣 5 分；没有在醒目位置设置警示标识的，扣 5 分。 检查应急救援设施档案，定期检查、维修记录，现场查看，对劳动者进行抽查询问。 A total of 20 points: There is no emergency rescue facilities, or without the State Administration of Quality Supervision, Inspection or unqualified products, shall not get points; no corresponding system to ensure safe and effective emergency rescue facilities, subtract 5 points; not conspicuous warning logo , subtract 5 points. Check emergency rescue facilities, files, regular inspection, maintenance records, live view, carry out spot checks on the workers asked.
	11.3	共 10 分：没有演练记录的，不得分。无应急救援预案演练计划的，扣 5 分。演练内容不全的，缺 1 项，扣 2 分。 检查演练计划，演练记录，演练评估报告或总结。 A total of 10 points: No drill records shall not get points. No emergency response plan exercise program, subtract 5 points. Contents of the exercises incomplete, missing one, subtract 2 points. Check the exercise program, exercise records, training evaluation report or summary.
12. 辅助卫生用室 Auxiliary health room	12.1 12.2 12.3 12.4 12.5	共 10 分：未配置不得分。浴室、更/存衣室、盥洗设施、生活用室、妇女卫生室没缺 1 项扣 2 分。有 1 项不符合扣 1 分。 考核依据：现场核查。 A total of 10 points: Not configured not points. Bathroom and more / save clothing room, toilet facilities, living with a room, women's health, not lack of a room, subtract 2 points. Have an inconsistent, subtract 1 point. Assessment basis: on-site verification.
13. 职业卫生培训 Occupational health training	13.1	共 10 分：主要负责人未接受培训的，不得分；主要负责人接受了培训，但是相关管理人员未接受培训的，扣 5 分。 检查相关培训通知、培训内容、培训合格证或其它培训证明材料。 A total of 10 points: The main person in charge is not trained, not points; main person in charge received training, but did not receive training related management, and subtract 5 points. Check the relevant training to inform the training content, training, training certificate or other evidence.
	13.2	共 20 分：未对劳动者进行上岗前培训的，不得分。培训的内容没有针对性的，扣 5 分。1 人未培训的，扣 1 分。没有人负责保管档案资料的，扣 2.5 分。 检查上岗前劳动者名册，培训档案，现场询问。 A total of 20 points: did not conduct pre-employment training of workers shall not get points. The content of the training is not targeted, subtract 5 points. A person not trained, subtract 1 point. No one is responsible for keeping archives, deduction of 2.5 points. Check the posts before the list of workers, training files, on-site inquiries.
	13.3	共 20 分：未对劳动者进行在岗期间定期培训的，不得分。培训内容没有针对性的，扣 5 分。1 人未培训的，扣 1 分。没有人负责保管档案资料的，扣 2.5 分。 检查在岗劳动者名册，培训档案，现场询问。 A total of 20 points: Not to make regular training during the on-job shall not get points. Training is not targeted, subtract 5 points. A person not trained, subtract 1 point. No one is responsible for keeping archives, deduction of 2.5 points. Check the name list of workers in post, training files, on-site inquiries.
14. 职业病诊断与病人保障 Occupational disease diagnosis and patient ensure	14.1	共 5 分：对照职业病人名单，与当地卫生行政部门或所在地职业病诊断机构核对，名单不符的，不得分。 A total of 5 points: control occupational diseases list, check list is inconsistent, not points.
	14.2	共 5 分：对照疑似职业病人名单，与当地卫生行政部门或所在地职业病诊断机构核对，名单不符的，不得分。 A total of 5 points: control occupational-disease-like list, check with the local health administration department or institution of occupational diseases diagnosis, check list is inconsistent, not points.
	14.3	共 5 分：对照职业病人名单，与所在地劳动保障部门核对，名单不符的，不得分。 A total of 5 points: control occupational diseases list, check with local labour security department, the list of inconsistent, not points.
	14.4	共 10 分：有投诉记录的，不得分。 A total of 10 points: There are records of complaints, not minutes.
	14.5	共 5 分：对照职业健康体检结果报告单或职业健康监护档案，追踪疑似职业病人是否被安排进行职业病诊断，经查实没有安排的，不得分。

评价项目	内容编号	现场评分标准、要点及依据材料（专家掌握）
		A total of 5 points: the control of occupational health physical examination report card or occupational health record, tracking suspected occupational patients to the diagnosis of occupational diseases, verified no arrangements, no points.
	14.6	共 5 分：对照职业病人名单、职业病人诊断病例档案检查职业病人治疗、定期检查、康复记录，1 项未安排扣 5 分。 A total of 5 points: control the list of patients suffered with occupational diseases, diagnosed cases of patient treatment records check, periodic inspection, rehabilitation records, one not scheduled to subtract 5 points.
	14.7	共 5 分：对照职业病人名单检查职业病人调离书面证明，并进行现场核查，没有按规定要求调离的，不得分。 A total of 5 points: control job change record of the patient list of inspections and conduct site inspections, there is no change, no points.
	14.8	共 5 分：对照职业病人名单检查安置记录，并进行现场核查，没有安置的，不得分。 A total of 5 points: control job placement record of the patient list of inspections and conduct site inspections, there is no placement, no points.
	14.9	共 5 分：通过询问当事人，查询当地职业病诊断机构，证实用人单位不提供或不如实提供的，不得分。 A total of 5 points: by asking the parties, check local institutions diagnosis of occupational diseases, confirmed that the employer does not offer or provide, and shall not get points.
15. 群众监督 Public supervision	15.1	共 20 分：没有建立工会组织的，没有规定配备工会主席和工会干部的，均不得分；未经工会组织同意调动工会干部工作的，扣 10 分。 A total of 20 points: not established labour unions, without union president and does not provide for labour union cadres, and not scoring; without the labour unions agreed to mobilize thelabour union work, subtract 10 points.
	15.2	共 10 分：未建立工会劳动保护监督检查网络的，或者未开展相关工作的，不得分；抽查 5 名职工，了解其企业及所属分厂（车间）工会劳动保护监督检查委员会（或工会劳动保护监督检查小组）的组建及工作情况，缺 1 项扣 5 分；抽查 5 名职工，了解工会小组劳动保护检查员设置及工作情况，缺 1 项扣 5 分。检查工会工作记录和工会劳动保护监督检查委员会活动记录，抽查工会小组劳动保护检查员工作记录。 A total of 10 points: not to establish labour unions labor protection supervision and inspection network, or not to carry out related work, and should not get points; random five workers to understand their business and their factory (workshop) union labor protection supervision and inspection of the Committee (or union labor protection supervision and inspection team) the establishment and work of the lack of a button 5; random five workers to understand the protection of labour union group and the work of inspectors set, missing a 5 points without 1 item. Check the records of labour union work and union labor protection supervision and inspection records of its activities, labor protection inspector checks the work of labour union group records.
	15.3	共 15 分：未开展，不得分；工程项目 “三同时”审查验收无工会人员参加的的，不得分；工会没有组织和参加安全检查的，不得分；用人单位对劳动者就其代表提出的紧急情况处置措施没有做出及时反应的，不得分。没有开展工会宣教工作的，扣 5 分，效果不好的酌情扣分。检查用人单位基建工程、技改技措项目清单和“三同时”审查验收申报表。 A total of 15 points: not carried out, no points; the checkup and acceptence works of "three simultaneous" without the participation of labour union officers, and shall not get points; labour union did not organize and participate in safety inspections, and shall not get points; employers do not deal with a timely response on its behalf emergency measures from labour representatives, and shall not get points. Not to carry out missionary work in union, subtract 5 points, the bad effects subtract extenuatory points. Check employers infrastructure, technological transformation and technology initiatives list of projects and the "three simultaneous" review of acceptance declaration.
	15.4	共 10 分：未建立职工代表大会制度的，不得分；没有开展劳动安全卫生工作的，不得分；法定代表人的工作报告没有劳动安全卫生内容或内容失实的和职代会没有审议表决结果的，不得分；劳动保护措施和相关规章制度未经职代会审议通过的，不得分；用人单位对职工代表提出的质询不予答复和答复草率的不得分，答复不准确的酌情扣分；报告内容不准确、不完整的酌情扣分；方案内容存在严重缺陷的，酌情扣分；对漠视劳动者提出的重大意见、建议和要求的扣 5 分，解决不力的酌情扣分；单项未经审议的，每一项扣 2 分；没有组织视察、督查活动的，扣 5 分。 A total of 10 points. No score-employer not established the Congress of the staff system or no occupational safety and health or have not the contents of occupational safety and health in the annual reports from the fictitious person or the labour protective measures and related system have not passed by the Congress of the staff or not reply for the inquiry from the staff. Things of take the circumstances into consideration to subtract score include that Employer have not reply well and truly the inquiry or the content of report is inaccurate or have the severe disfigurement. To disregard the fateful problem from employees or no supervise activity should Subtract 5 scores from total score. One item of no discussion should Subtract 2 scores from total score. 查阅该单位职工代表大会工作规定、会议文件和“民主评议、厂务公开”有关规定；查阅用人单位法定代表人的工作报告和职代会审议决议；查阅相关文件和职代会审议决议，抽查 5 名职工代表和普通职工，了解职代会工作情况。 Refer to the work requirement, conference papers of Congress of the staff and the "democratic evaluation, factory publicity," the relevant provisions, the work report of the legal representative and the discussing decision of the employee congress; relevant documents and the employee congress consideration of resolutions, sampling 5 staff representatives and the general staff, understand the work of employee congress.
	15.5	共 15 分：未建立用人单位与工会平等协商机制的，不得分。 A total of 15 points. No score-Employer not established the consulting coequally mechanism with labour union.

表 13　职业安全健康环境管理 SWOT 对策及战略分析表

(Table 13 Occupational Safety and Health Environmental Management Strategy and Strategic SWOT Analysis)

企　　业　　名　　称　　（　　Factory name）：_____。

内部因素 Internal factors / 外部因素 External factors	优势（Strength）	劣势（Weakness）
	1. 2. 3.	1. 2. 3.
机遇（Opportunity）	SO	WO
1. 2. 3.		
风险（Threats）	ST	WT
1. 2. 3.		

表 14-工程详细资料
TABLE 14 – PROJECT DETAILS

注：实施 REF 之前，由实施评价的人员承担场所检查工作。

NOTE Prior to completing this REF a site inspection is to be undertaken by the officer completing the assessment.

场所检查（REF） --由实施评价的人员承担场所检查工作 **Site Inspection. A site inspection was undertaken by the person completing the**	☐ Yes ☐是

Item **条款**	**General Description** **条款内容**	
1.1	Description of the environment – relevant to the potential impacts. (This could include drainage systems, waterways, flora and fauna, visual/scenic quality, human settlements , transportation routes, land use, traffic flow, land contamination etc.) 环境描述- 相关的潜在影响。 （可能包括排水系统，排水通道，植物和动物，视觉/景观品质，人类住区，交通道路线，土地使用，交通流量，土地污染等）	
1.2	Description of types and quantities of waste. 描述排放废物的种类和数量	
1.3	Description of any relevant City policy or Development Control Plan 描述任何有关城市政策或发展控制计划	
1.4	What is the likely impact of the project on the community? 项目对社会可能产生什么影响？	☐ LOW ☐ MODERATE☐ HIGH ☐ 低 ☐ 中 ☐ 高

表 15-批准、许可和管理计划
TABLE 15– APPROVALS, LICENCES and Management Plans

条 款 Item	敏感区域包括： Sensitive Areas Include:	只能划 1 个“√” Tick one
2.1	近于濒危、受威胁、易攻击的或受保护的物种、人群、生态环境或生活环境（动植物）的工作-. Working near Endangered, Threatened, Vulnerable or Protected Species, Populations, Ecological Communities or Critical Habitat (Flora and Fauna) –.	☐ 是 ☐ 否 ☐ Yes ☐ No
2.2	是否在一个国家公园，自然保护区，原住民区，荒漠区，保护区或野生河内工作- Working within a national park, nature reserve, aboriginal area, wilderness area, conservation area or wild river –	☐ 是 ☐ 否 ☐ Yes ☐ No
2.3	存在环境管理计划？ Existence of Environmental Management Plans	☐ 是 ☐ 否 ☐ Yes ☐ No

表 16-环境影响评价
TABLE 16– ENVIRONMENTAL IMPACT ASSESSMENT

条款 Item	问题 Issue	影响实例 Examples of impacts	影响和原因描述 注:无影响划勾,有影响提供详细说明 Description of Impacts AND Causes NOTE: Either tick 'no impact' OR provide details.		项目特有控制措施 Project Specific Control Measures	环境分数 Environmental Score
3.1	空气 AIR	**建筑影响** 产生粉尘（如挖掘、扰动土壤、储存、挖沟、侵蚀、清除植被、土壤运输等）来自于车辆、设备、机器或其他活动的烟雾、异味和其他空气污染物... **Construction:** Dust generation (excavating, disturbing soil, stockpiling, trenching, erosion prone sites, clearing of vegetation, transporting soil etc.) Fumes, odours and other air pollution from vehicles, equipment, machinery or other activities...	无影响 ☐ 如打“√”，进入下一问题。 No Impact☐ If ticked, go to next issue.	或 OR		
3.2		**操作影响** 来自于车辆、设备、机器或其他活动的烟雾、异味和其他空气污染物... **Operation-** Fumes, odours and other air pollution from vehicles, equipment, machinery or other activities...	无影响 ☐ 如打“√”，进入下一问题。 No Impact☐ If ticked, go to next issue.	或 OR		

条款 Item	问题 Issue	影响实例 Examples of impacts	影响和原因描述 注:无影响划勾,有影响提供详细说明 Description of Impacts AND Causes NOTE: Either tick 'no impact' OR provide details.		项目特有控制措施 Project Specific Control Measures	环境分数 Environmental Score
3.3	水 WATER	**建筑影响** ●污染水道、湿地、雨水渠或地下水（如油、燃料、农药、化工、坑/沟槽水或其它液体的储存、运输、处理或处置）； ●泥沙淤积河道、湿地、雨水渠或地下水（如开挖、扰动土壤、储存、挖掘、混凝土切割、处理河道、侵蚀等）。 **Construction** Polluting waterways, wetlands, stormwater drains or groundwater (eg storing, transporting, handling or disposing of oils, fuels, pesticides, chemicals, pit/trench water or other liquids). Sedimentation of waterways, wetlands, stormwater drains or groundwater (eg excavating, disturbing soil, stockpiling, trenching, concrete cutting, access tracks, erosion prone sites etc.).	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue.	或 OR		
3.4		**操作影响** ●污染水道、湿地、雨水渠或地下水（如油、燃料、农药、化工、坑/沟槽水或其它液体的储存、运输、处理或处置）； ●泥沙淤积河道、湿地、雨水渠或地下水。 **Operation -** Polluting waterways, wetlands, stormwater drains or groundwater (eg storing, transporting, handling or disposing of oils, fuels, pesticides, chemicals, pit/trench water or other liquids). Sedimentation of waterways, wetlands, stormwater drains or	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue.	或 OR		

条款 Item	问题 Issue	影响实例 Examples of impacts	影响和原因描述 注:无影响划勾,有影响提供详细说明 Description of Impacts AND Causes NOTE: Either tick 'no impact' OR provide details.		项目特有控制措施 Project Specific Control Measures	环境分数 Environmental Score
3.5	噪声和振动 NOISE AND VIBRATION	**建筑影响** 噪音/振动（如凿岩、混凝土切割机、风炮、链锯、压缩机、挖掘机、反铲挖土机、卡车、汽车、吊车、钢板动作、发电机等）。 **Construction** noise/vibration (eg rockbreakers, concrete cutters, jackhammers, chainsaws, compressors, excavators, backhoes, trucks, vehicles, cranes, steel plates movements, generator etc.).	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue.	或 OR		
3.6		**操作影响** 噪音/振动（如水泵，发电机）。 **Operational** noise/vibration (eg pumps, generators).	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue	或 OR		

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3.7	污染物和废物 CONTAMINATION AND WASTE	建筑影响 ●干扰了受污染的土壤（如已知的污染、ASS、老工业区、以前的垃圾填埋场等）； ●损害或污染土地（如储存、处理或处置的油、燃料、农药、化学物、坑/沟槽水或其它液体）； ●由发电和存储、处理、运输或处置工业废物（如土壤、建筑材料、油类、溶剂等）引起的环境问题； ●制约与土地相关的当前和潜在活动（如娱乐、建筑物、停车场）。 Construction Disturbing contaminated soil (eg known contamination, ASS, old industrial site, previous landfill etc.). Contaminating or polluting land (eg storing, handling or disposing of oils, fuels, pesticides, chemicals, pit/trench water or other liquids Environmental problems caused by generating, storing, handling, transporting or disposing of waste (eg soils, building materials, oils, solvents, etc.). Restricting current and potential activities associated with the land (eg amenity, buildings, parking).	无影响 ☐ 如打“√”，进入下一问题。 No impact ☐ If ticked, go to next issue.	或 OR		

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3.8		**操作影响** ●损害或污染土地（如储存、处理或处置的油、燃料、农药、化学物、坑/沟槽水或其它液体）； ●由发电和存储、处理、运输或处置工业废物（如土壤、建筑材料、油类、溶剂等）引起的环境问题； ●制约与土地相关的当前和潜在活动（如娱乐、建筑物、停车场）。 **Operational** Contaminating or polluting land (eg storing, handling or disposing of oils, fuels, pesticides, chemicals, pit/trench water or other liquids Environmental problems caused by generating, storing, handling, transporting or disposing of waste (eg soils, building materials, oils, solvents, etc.). Restricting current and potential activities associated with the land (eg amenity, buildings, parking).	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue	或 OR		
3.9	**土地使用和运输** **LAND USE AND TRANSPORT**	**建筑影响** ●限制或影响运输（如行人、汽车、公共汽车、火车、机场、船、过河、巴士站、公共交通走廊和基础设施，建设相关干扰、特性处理、停车限制等）； ●代替、扰乱或损害地面或水中动物（如造成动物运动的障碍，清除残留的植物或野生动物走廊，碰撞等）。 **Construction** Restricting or affecting transport (eg pedestrian, car, bus, train, airports, boats, river crossings, bus stops, public transport corridors and infrastructure, construction related disturbances, property access, parking restrictions, etc.). Displacing, disturbing or damaging terrestrial or aquatic fauna (eg creating a barrier to fauna movement, clearing remnant vegetation or wildlife corridors, collisions etc.).	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue.	或 OR		

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3.10		**操作影响** ●制约或影响运输（如行人，汽车，公共汽车，火车，机场，船，过河，巴士站，公共交通走廊和基础设施建设相关的骚乱，属性访问，停车限制等）。 ●代替、扰乱或损害地面或水中动物（如造成了动物运动的障碍，清除残留的植物或野生动物走廊，碰撞等）。 **Operation** Restricting or affecting transport (eg pedestrian, car, bus, train, airports, boats, river crossings, bus stops, public transport corridors and infrastructure, construction related disturbances, property access, parking restrictions, etc.). Displacing, disturbing or damaging terrestrial or aquatic fauna (eg creating a barrier to fauna movement, clearing remnant vegetation or wildlife corridors, collisions etc.).	无影响 ☐ 如打“√”，进入下一问题。 No impact ☐ If ticked, go to next issue	或 OR		

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3.11	动植物 FLORA AND FAUNA	**建筑影响** ●清除或改变了原生植物（包括树木、灌木、草、树根、草药或水生物种）； ●引入或传播了杂草（含有毒）或害虫； ●引入了林火的危险因素； ●危及濒危物种动物、植物或其他形式生命，包括陆地、水或空气中（如当地任何鸟类的危险）； ●任何对当地生态系统的其他环境影响。 **Construction** Clearing or modifying native vegetation (including trees, shrubs, grasses, roots, herbs or aquatic species) Introducing or spreading weeds (inc noxious) or vermin Introducing bushfire risk factors Endangering any species of animal, plant or other form of life, whether living on land, in water or in the air (eg. any danger to birds in the locality). Any other environmental impacts on the ecosystems of the locality	无影响 □ 如打“√”，进入下一问题。 No impact □ If ticked, go to next issue.	或 OR		

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3.12		**操作影响** ●引入或传播了杂草（含有毒）或害虫； ●引入了林火的危险因素； ●危及濒危物种动物、植物或其他形式生命，包括陆地、水或空气中（如当地任何鸟类的危险）； ●任何对当地生态系统的其他环境影响。 **Operation** Introducing or spreading weeds (inc noxious) or vermin. Introducing bushfire risk factors Endangering any species of animal, plant or other form of life, whether living on land, in water or in the air (eg. any danger to birds in the locality). Any other environmental impacts on the ecosystems of the locality	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue	或 OR		
3.13	土壤 **SOCIAL**	**建筑影响** ●对社会造成影响（如通过噪声影响市容，可预见的火灾、爆炸物业价值贬值的危险等）。 ●对社会公众造成经济损失（如限制公众进入商业区，改变土地使用等）。 **Construction** Creating a nuisance to the community (eg impact on amenity through noise, perceived risk of fires, explosions, property value devaluation etc.). Creating financial loss to members of the community (eg. restricting access to commercial premises, changing land use etc.).	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue.	或 OR		

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3.14		**操作影响** ●对社会造成影响（如通过噪声影响市容，可预见的火灾、爆炸物业价值贬值的危险等）。 ●对社会公众造成经济损失（如限制公众进入商业区，改变土地使用等）。 **Operation** Creating a nuisance to the community (eg impact on amenity through noise, perceived risk of fires, explosions, property value devaluation etc.). Creating financial loss to members of the community (eg. restricting access to commercial premises, changing land use etc.).	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue	或 OR		
3.15	视觉和遗产 VISUAL AND HERITAGE	**建筑影响** 影响了地方、项目、场所或建筑物的美学、人类学、考古、建筑、历史、科学、文化和社会意义或其他特殊值（如对毗邻的建筑物或文物项目的视觉效果，干扰、移动挖掘原住民对象）或在文物可能被发觉地点（如考古分区计划）的施工影响。任何原住地影响。 **Construction** Affecting a locality, item, place or building having aesthetic, anthropological, archaeological, architectural, historical, scientific, cultural or social significance or other special value (eg. visual effect on adjoining heritage buildings or items, disturb, move excavate Aboriginal object) or working where heritage items could be found (eg Archaeological Zoning Plans).Affecting any Aboriginal heritage (eg engravings, middens, carved trees, grinding grooves, paintings, burial sites, etc.).	无影响 ☐ 如打"√"，进入下一问题。 No impact ☐ If ticked, go to next issue.	或 OR		

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3.16		**操作影响** ●影响了地方、项目、场所或建筑物的美学、人类学、考古、建筑、历史、科学、文化和社会意义或其他特殊值（如对毗邻的建筑物或文物项目的视觉效果，干扰、移动挖掘原住民对象）或在文物可能被发觉地点（如考古分区计划）的施工影响。任何原住地影响； ●改变了景色优美的风景（如限制观赏、拆除树木等）； ●使局部地区变形（如明显的地震）。 **Operational** Affecting a locality, item, place or building having aesthetic, anthropological, archaeological, architectural, historical, scientific, cultural or social significance or other special value (eg. visual effect on adjoining heritage buildings or items, disturb, move excavate Aboriginal object) or working where heritage items could be found (eg Archaeological Zoning Plans).Affecting any Aboriginal heritage (eg engravings, middens, carved trees, grinding grooves, paintings, burial sites, etc.). Changing the visual or scenic landscape (eg restricting views, removing trees.). Transforming a locality (e.g. significant earthworks).	无影响 如打“√”，进入下一问题。 No impact If ticked, go to next issue	或 OR		

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3.17	其他环境问题 OTHER ENVIRONMENTAL ISSUES	●对环境的长期影响（如废弃物排放）; ●丧失了环境质量（如周围灌木丛、污染和侵蚀影响）。 Long-term effects on the environment (e.g. as a result of waste emissions). Degrading of the quality of the environment (e.g. effect on surrounding bushland, contamination, erosion).	无影响 ☐ 如打“√”，进入下一问题。 No impact ☐ If ticked, go to next issue.	或 OR		
3.18		任何对环境安全的其他风险。 Any other risk to the safety of the environment				
3.19		减少了有利环境的使用周围，例如周围土地使用，并考虑了受影响的土地拥有者的反应。 Reducing the range of beneficial uses of the environment (e.g. effect on surrounding land-uses and considering response of affected land owners).				
3.20		增加了资源需求（自然人或其他），或可能成为供不应求（如用水需求）。 Increasing demands on resources (natural or otherwise) that are, or are likely to become, in short supply (e.g. demand on water use).				
3.21		任何累积环境效应对现有或未来可能的活动的影响。 Any cumulative environmental effect with other existing or likely future activities				