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Guideline of Safety Management Implementation by the Management Party for Petrochemical Construction Project

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Foreword

The *Guideline of Safety Management Implementation by the Management Party for Petrochemical Construction Project* is stipulated on the basis of safety management modes and methods in the construction process for Sino-foreign Joint Venture Projects and offshore investment projects as well as the actual situation of China.

This standard is only a guideline which describes the responsibilities of the Owner, the Management Party and the Contractors for the improvement of project safety performance. With the increased number of foreign investment projects and joint venture projects, their practices have been gradually learned and made reference by the Chinese enterprises which have accumulated good management experiences. Therefore, we intend to provide reference for the Owner, Management Party and Contractor by compiling a guideline for project safety management mode and introducing some basic practices for project safety.

Case Study for the *Guideline of Safety Management Implementation by the Management Party for Petrochemical Construction Project* is attached to the Guideline as reference material.

This Guideline is prepared and managed by the State Administration of Work Safety.

The following organizations have participated in the drafting of this Guideline: China Business Council for Sustainable Development, SINOPEC Qingdao Safety Engineering Institute, Shanghai SECCO Petrochemical Co., Ltd..

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Introduction

The popular mode of international project safety management at present is to set up the Management Party between the Owner and the Contractors to carry out the project safety management in an all-round way. In a project, the Owner is the main body of rights and obligations with the responsibilities to provide safety policy and resources for the project; the Management Party shall set up an authoritative safety management for the whole project, prepare the unified Safety Management System as per the relevant state laws, decrees and codes as well as the Owner's safety policy and lead the safety management work for the project in an all-round way; the Contractors shall compile their own safety plans and guarantee that the requirements of the Management Party are met.

The objective of the Guideline is to guide the Owner and Management Party to design and establish a reasonable and effective project safety management mode and to develop the Safety Plans that meet the Owner's requirements so as to enhance the executive force for enterprise safety management and improve the project safety performance.

Guideline of Safety Management Implementation by the Management Party for Petrochemical Construction Project

1. Scope

This document is a guide to concepts, modes and methods of project safety management.

This Guideline is applicable to the safety management for petrochemical construction projects and it is also valuable reference material for the safety management of construction projects in other industries.

2. Normative References

The following documents become the integral parts of this Guideline by making reference to them. As for all referenced documents that are dated, the subsequent revision notice (not including the correction of errors) or revised edition of them shall not apply to this Guideline. However, all parties that have reached agreement as per this Guideline are encouraged to study the latest editions of the following referenced documents. As for the referenced documents that are not dated herein, the latest editions of them shall apply to this Guideline.

GB/T24001-2004 *Requirements & Instruction for Environmental Management System*

GB/T28001-2001 *Code for Occupational Health & Safety Management System*

GB/T28002-2002 *Guide for Occupational Health & Safety Management System*

SY/T6276-2004 *Management System of Health, Safety & Environment in Petroleum & Natural Gas Industry*

3. Terminologies and definitions

The following terminologies and definitions are applicable to this Guideline:

3.1 Accident

Events which result in death, illness, injury, property loss or environmental damage.

3.2 Incident

Situation which results in or may result in incident.

Note: the outcome of an event that has not caused any disease, injury, damage to property, or damage to environment is known as a “Near Miss Incident.” Incident shall include “Near Miss Incident”.

3.3 Hazard

Root cause or status which may result in injury or illness, property loss, environmental damage or concurrence of these situations.

3.4 Hazard identification

Process during which the hazard is identified and its characteristics are confirmed.

3.5 Environmental aspect

Elements of activities, product and service of construction project which interact with the environment.

3.6 Environmental impact

Any harmful or beneficial changes to environment caused by all or part of the environment factors of the

construction project.

3.7 Risk

Combination of possibility and consequences of the occurrence of specific hazardous condition.

3.8 Risk assessment

The whole process which evaluates the degree of risk and identify whether the risk can be allowed.

3.9 Interested parties

Individual or group related with or impacted by the health, safety and environment performance of the project.

3.10 Performance

Measurable results which are obtained from project risk management based on safety management policy and objectives.

3.11 Continual improvement

Process during which the construction project intensifies safety management as per safety management policy for the purpose of improving the overall safety management performance.

3.12 Nonconformity

Any deviation from the work standard, convention, procedure, laws, performance of management system, etc.. It can directly or indirectly result in injury or illness, property loss, damage to work environment or the combination of such situation.

3.13 Owner

The party takes over the project under the contract, i.e., the investor of the project.

3.14 Contractor

The supplier under contract, i.e., individual, department or cooperator who is employed by the Owner to complete some works or provide services.

3.15 Sub-contractor

Unit who undertakes partial work or labor service to Contractor by means of contract or agreement.

Note 1: The major difference between the contractor and subcontractor is that a contractor who employs subcontractor is the Owner for subcontractor

Note 2: The requirements to the Contractor in the Guideline also apply to any Subcontractors.

3.16 Audit

A systematic and independent and documented process carried out for obtaining audit evidences and objectively evaluating them to identify the degree of compliance with audit criteria.

3.17 The Management Party

A project management organization formed or designated by the Owner.

4. Policy, Resources and Duties for Safety Management

4.1 Safety Management Principles

The Safety Management Principles are the main constituent part of the Owner’s business policy, embodying the core value of the Owner and demonstrating to the public and the society the attitude to safety and the related responsibilities. Provision of necessary fund and personnel and identification of the safety responsibilities and information communication channels are the prerequisites to the normal operation of all safety management work.

4.2 Objective of safety management

The objective of safety management is the guide to safety management, demonstrating the safety management principles. The objective of safety management is to achieve Zero Accident and can be composed of specific indicators. The objective of safety management shall be issued by the top management of the Owner for implementation and shall be publicized to the public and the society.

When the objective of safety management is set for the project by the Owner, the following aspects shall be considered:

--- Tally with the other policies and objectives of the Owner and has the equal level of magnitude;

--- Show the observance to laws and regulations;

--- Embody the commitment to prevent accidents, protect environment, respect life and health and make continuous improvement;

--- Commitment to provide necessary resources for the implementation of the safety management objectives.

The objective of safety management shall be conveyed to all parties engaged in the project by any means, and make people at all levels to fully understand and implement it. Management executives at various levels shall show that they attach importance to safety management by means of open commitment conducted level by level from the higher to the lower levels and setting themselves as examples, and be subject to the monitoring from all parties.

4.3 Concepts of safety management

The safety management concepts of “Human-oriented Safety System” and “All accidents are preventable” shall be spread among all parties (including the Owner, the Management Party and contractor, subcontractor and other interested parties) participating in the construction project, for such concepts are the basis and guarantee to realize the objective of safety management.

4.4 Standards for safety management

Before the project construction starts, the Management Party shall formulate a complete set of safety management standards representing the Owner’s intentions and conforming to requirements of laws and regulations; when these standards are prepared, considerations shall be given to their applicability and the possibility to adopt general international standards. These safety management standards shall be timely offered to all the contractors and be familiarized by the contractors. During the process of the project construction, these management standards can be amended, supplemented and improved according to actual needs.

Before the project construction starts, the Management Party and the contractors shall reach an agreement in written regarding the application of safety management standards. Under general situations, the Contractor should carry out the Management Party’s safety management standards. If the Contractor requires to apply safety management standards of its own, its standards shall meet the Management Party’s requirements.

4.5 Fund

When the Owner compiles project investment plan, it shall raise the Special Fund for Safety, compile and carry out the detailed plan for using the Special Fund of Safety. The contractor shall also provide the wherewithal as per contract requirements to meet the need of safety management. When necessary, the Management Party can audit the contractor’s fund input and use in safety aspect.

4.6 Personnel

Managerial personnel at different levels for the Project shall have appropriate qualifications for their jobs,

especially for the capabilities of leadership, influence and communications in safety management, and a thorough understanding of advanced safety management philosophy and be conversant with imperative professional knowledge; The allocation and structural establishment of Management Party's safety personnel shall fit to the scale, nature and risk characteristics of the project and match with the project integral organization.

The contractor should have enough safety personnel. Generally, the average ratio of fulltime safety personnel to construction personnel at site shall not be less than the ratio of 1:100, depending upon the risk level, stages of construction and personnel quality.

4.7 Responsibilities

The Owner shall establish a safety policy and provide necessary resources and at the same time, clearly define safety responsibilities among the related parties. Any supervisory companies for Project shall fulfill their obligations under the relevant state laws and regulations. The Management Party and the contractor shall establish safety responsibility system for personnel in various posts ranging from project manager to shift supervisors, expressly state that the managerial executives at all level should perform good safety management. The main duty of safety personnel is to provide technical support and implement supervision and management for risk identification, assessment and control. The Management Party and the contractor can enhance implementation of safety duties by means of periodic inspection and performance assessment, etc..

The Management Party's and the contractor's safety duties shall be very clearly identified and defined in their contract or agreement, in principle, the contractor shall assume its responsibility to have safety supervision and management in its construction site, while the Management Party shall periodically supervise the contractor's observance to safety requirements for the project, and has the right to put forward rectification requirements and recommendations for the problems identified at jobsite.

4.8 Information communication

The Owner, the Management Party and contractors shall establish good information communication channels among them and form the Safety Management Committee for the project attended by all parties. They can have immediate and efficient information communication and exchange by means of meetings, reports and e-mails, and make such communication a system in order to timely coordinate and handle issues, and adopt actions to improve.

5. Selection of Contractors

5.1 Contractor selection requirements

The Management Party shall establish a set of code and procedure to audit and select contractors, get to know the contractors' project construction ability and their past safety performances so as to select qualified contractors. The Owner shall have the right to participate in the selection of Contractors or Subcontractors.

5.2 Owner's authorization to select contractors

The Owner or the Management Party authorized by the Owner shall perform the selection of contractors. The following paragraphs are jut for the scenario that the Management Party selects the contractors. However, if the Owner reserves full or partial rights to select the contractors, the Owner shall make the selection of contractors.

5.3 Prequalification of contractor

The Management Party shall make prequalification to the new Contractor and the Contractor who has been listed in the roll, the Contractor is responsible for prequalification of subcontractor. If the Management Party

defines clear requirements for subcontractor's qualification, the Contractor's selection of Subcontractors shall meet the Management Party's requirements. If necessary, the Management Party may directly participate in selection of Subcontractors.

5.3.1 Prequalification form

The Management Party can get to know some necessary information about the Contractor through the Prequalification Form and evaluate preliminarily the contractor's safety management performance and the ability to observe the related safety laws and regulations. The Prequalification Form mainly includes the contractor's basic information, organization, personnel, experiences, safety policy, training, safety management performance and other necessary information.

5.3.2 Audit of contractor's qualification

The Management Party shall establish the criteria to examine the Contractor's safety qualification according to the nature, scale and risk characteristics of the construction tasks to be undertaken soon by the contractor, organize competent expert who are familiar with safety affairs to assess the Contractor's safety performance in accordance with the acceptance criteria. As for any parts that need to be improved in the contractor's safety management criteria or any problems that need to be clarified, feedbacks shall be given to the Contractor so as to help the Contractor to improve the related safety management criteria.

5.3.3 Visit the Contractor

If necessary, experts that are familiar with the project characteristics and safety management can be organized to visit the Contractor's headquarters and ongoing projects to conduct site survey which can follow the Prequalification Form or specific Site Survey Plan.

5.3.4 Create and update the list of qualified contractors

The Contractor who complies with acceptance criterion will enter the final list of qualified contractors. The Management Party shall evaluate and update the list of qualified contractors on a regular basis.

5.4 Selection of contractor

5.4.1 Clearly identify safety management requirements

The Management Party shall identify safety management requirements for Contractors after having identified the construction type and risks. Such requirements shall include the applicable standards, norms and all safety management system and detailed rules and regulations for the project and shall be communicated to the Contractors.

For the work which has mandatory requirements, the Management Party shall consider to establish special safety requirements in order to select and employ those Contractors who possess professional experiences, and the ability to identify operation risks and meet the Management Party's special requirements.

5.4.2 Development of initial safety plan by the Contractor

The Management Party shall require the Contractor to develop an Initial Safety Plan which is consistent with the construction type and risks within the Contractor's Scope of Work. The Initial Safety Plan shall be a complete one that includes the contents such as resources, responsibilities, training and requirements for ability, incident reporting and handling, emergency response plan, etc.. When the Initial Safety Plan is developed, full consideration shall be given to the Management Party's requirements on safety management.

5.4.3 Hold pre-bid meeting

It is advisable to hold a pre-bid meeting and invite the Contractors to visit the site before conclusion of a contract so as to facilitate contractors' understanding of the details of safety requirements specified by the Management Party in the bid invitation documents and the site conditions, set up the channel between the Management Party and the contractors for communicating and discussing the issues concerned, and provide the Management Party with the opportunity to understand the relevant situation of the project or site and the factors may influence the implementation of the contract.

5.4.4 Final selection of contractor

Under the prerequisite that the prequalification of contractor is completed and the Contractor is confirmed as having safety management standards which are in conformity with the Management Party's requirements, the qualified contractor will be selected finally after the Management Party have considered comprehensively the acceptance criterion and other aspects (such as expenses, effectiveness and technical qualification).

The Management Party shall hold a meeting prior to signing of contract after the contractor is selected. The following items will be discussed at the meeting:

---- Confirm and verify again the common understanding reached during pre-bidding stage and the ability to accept any changes, and solve the specific issues related to such changes;

---- Discuss the specific safety activities to be completed by the contractor;

---- Discuss the relations among the Owner, the Management Party, the Contractor and Subcontractors (including any professional Subcontractors selected by the Owner).

Before signing of the contract, the Management Party and the contractor shall jointly identify the safety risk which might be caused by the processes or methods applied in the construction, and the necessary safety requirements, define the contractor's full responsibility for the safety and health of its employees and the environmental impact, and expressly specify that the contractor's work will not cause any harm to other personnel.

5.4.5 Conclusion of Safety Agreement

The Management Party shall sign a written safety agreement with the Contractor (which is normally a part of the Contract); The safety duties of both Parties (including the Contractor's duties for safety management of Subcontractor(s) selected by the Owner) shall be defined in the Safety Agreement. The Contractor shall:

---- Abide by the related safety requirements of the government, the Owner and the Management Party;

---- Employ proper personnel who have been trained and are familiar with the work;

---- Provide and/or use the equipment which can work safely and cause no environmental pollution;

---- Allow the authorized Owner's Representative and Management Party's Representatives to access the Contractor's jobsite.

6. Preparations before the start of construction

6.1 Requirements for making preparations prior to construction

Preparations before start of construction shall conform to the risk level of construction activities the Contractor undertakes and enable the Contractors to get familiarized with the construction areas, site conditions, personnel and information of other activities. The construction cannot be started until the proper preparations have been completed.

6.2 Site inspection before construction starts

The Management Party shall make site inspection with the contractor before start of construction so as to:

a) Determine the site conditions, plant status and tasks;

b) Define safety training and communication requirements for Contractors;

c) Define the relevant safety regulations and procedures to be implemented by the Contractors.

6.3 Review of Contractor's construction plan

The Contractor shall be responsible for compiling and implementing construction plan (including the construction organization and design, plans and technical measures, etc, and ensure the review and approval of all plans; the Construction Plans from the Subcontractors shall be reviewed initially be the Contractor. The Management Party shall have the right to further review the Construction Plan and require the Contractor or Subcontractors to make explanations.

When compiling and reviewing construction plan, the Contractor and the Management Party shall define preventive measures, i.e. emergency response plan, inspection and assessment plan and training requirement etc on the prerequisite that the both sides take the factors such as site operation conditions and construction process sequences etc into consideration.

6.4 Identify the detailed safety management requirements

In the preparative activities before start of construction, the Management Party shall make final review on Contractor's ability to observe safety management requirements, so as to define the safety management standards which shall be implemented by the Contractor, determine any additional requirements or delete any unnecessary requirements; clarify possible changes to the safety requirements due to changes of working conditions of both Parties during construction; clarify the relevant risks at construction site which may be caused by the Contractor.

6.5 Contractor's review of its personnel, tools and equipment

The Management Party and the Contractor shall make final review on personnel, tools and equipment before start of construction, generally including:

a) Make final inspection on the related Scope of Work and the ability to follow all corresponding safety management requirements;

b) Determine whether the manpower and equipment are enough to undertake the corresponding work;

c) Determine whether the personnel's knowledge, information and necessary training can meet the requirements of the assigned task;

d) Determine whether the PPE can meet site safety requirements; unless otherwise specified in the contract, generally, the Contractor shall provide its employees with proper PPE which meet the Management Party's requirements.

7. Risk Assessment

7.1 Risk assessment requirements

Risk assessment shall cover each phase of the project construction and adapt to the risk characteristics in each phase of the project. The Owner, the Management Party and the Contractor shall identify hazard and environment factors related to project construction activities through continuous work on risk assessment, and conduct scientific analysis and evaluation, and define the possibility of risks, severity of the consequence and

range of possible impact, so as to take effective or proper control measures to minimize the risk or control it within acceptable level. The results of risk assessment shall be documented, and communicated to affected personnel and other parties, so as to ensure that all operators can know it well.

7.2 Pre-assessment on project safety and occupational hazard and assessment on environmental impact

The pre-assessment on project safety and occupational hazard and assessment on environmental impact according to the relevant laws and regulations prior to the start of construction shall be valuable reference and guidance for the risk assessment for various stages of the project. According to the basis of the hazard, hazardous factors and environmental factors derived from analyses on the pre-evaluation of safety, occupational health and environmental impact as well as the countermeasures, actions and follow-up means raised, the Management Party shall direct the risk assessment in each stage of construction, and bring countermeasures into the construction process of project.

7.3 Overall risk assessment for construction project

Aiming at the risk characteristics of different phases of construction, the Management Party shall organize experts experienced in engineering and safety management and other related personnel to conduct overall risk assessment and classify the risks according to the different categories of construction activities or different subjects possibly involved in the entire Project, and define high-risk operation activities and key points in safety management, and control them through the measures e.g. optimizing resources allocation, improving standards and procedures and adjusting work plan.

7.4 Risk assessment of construction activities

Prior to all construction activities, risk assessment shall be finalized by the related personnel of the Contractor who is responsible for the construction activities.

As for the following operation activities which may have high risks, risk analysis shall be done and the corresponding control measures shall be taken for each step of activities prior to the work.

a) New work which has not been implemented at site or non-conventional work;
b) The work is very complicated or might have potential hazards of incident, or needs many people to jointly coordinate;
c) There’s no available safety work procedure, or existing procedures are not sufficient to control risks;.
d) The work which has changes.

Regarding low-risk and relatively simple construction activities, the previous results of risk assessment and construction experiences can be applied to compile itemized control measures which shall be confirmed and implemented prior to construction activities so as to simplify the process of risk evaluation and facilitate the practical operation.

7.5 Risk assessment prior to the transition from construction to production

Prior to the transition from construction to production, new risk will be brought about because the energy and media are to be introduced and there might be changes in various conditions. At this moment, the Management Party shall organize the relevant personnel from the construction side and production side to conduct risk assessment in order to identify the changed aspects and potential risk, and formulate corresponding preventive measures. During this period, it’s important to define clearly the responsibility of each side.

8. Training and Its Validation

8.1 Training Requirements

Before the start of construction, the Management Party and the contractor shall reach an agreement regarding personal ability and requirements of training on various personnel of the Project and define their responsibilities. The Contractor shall be responsible for organizing and conducting appropriate training and drills for its employees to ensure that its employees work safely with adequate knowledge and skills. The Management Party shall be in charge of checking whether the Contractor's employees have received training, If necessary, the Management Party may have re-training on some of the contents which need to be emphasized.

8.2 Types of Training

Training normally includes the following types:

a) Induction training prior to entry into site: Before the access into the site, all personnel from the Owner, the Management Party and the contractor, visitors and other related parties should receive the induction training so as to understand the basic status of the site and universal safety management requirements.

b) Training for personnel at managerial level: The Owner, Management Party and the project managers of the contractors shall receive training so as to let them understand their roles and responsibilities in safety management, and acquire skills in system safety management.

c) Training for safety management staff: The safety management staff shall receive training on project safety management standards and procedures so as to ensure all safety management staff can fully understand the safety management standards and these standards can be implemented strictly and uniformly in all construction activities.

d) Training for special disciplines: Personnel that are involved in special activities or play special roles in the safety management shall receive special training so as to let them grasp the knowledge and skills related to their responsibilities or solve some special problems through the training.

8.3 Validation of Training

Either Management Party or Contractor shall keep the records of training activities. The Management Party shall regularly review its and the Contractor's training records in order to check whether such training activities tally with requirements; the Contractor shall also regularly review the training schedules and relevant materials so as to check whether they are feasible.

The training results can be verified through written or oral examinations, site demonstration or implementation of work assessment etc. If the training fails in the validation, re-training shall be conducted to meet the training requirements.

9. Construction process control

9.1 Work Management

All work in construction shall be performed under applicable operating procedures. It should be noted that the "work permit system" shall be implemented for activities of high risks. Procedures ranging from work permit application, review and approval shall be compiled for such activities. The personnel participating in the approval, supervision and implementation of such activities shall all receive special training. This type of activities mainly include but not limited to:

a) Hot work;
b) Entry into confined space;
c) Ground disturbance;
d) Radioactive work;
e) Heavy lifting activities;
f) Energy isolation (electricity, gas, heat, light, pressure, etc);
g) Erection and removal of scaffolds.
h) Work at height;
i) Cross jobs in running plants.

The work which needs Work Permit shall be identified by the Management Party and be communicated to all contractors. All Work Permits shall be registered and filed.

9.2 Management for equipment and tools

Both the Management Party and the contractor shall establish procedures for management of equipment and tools; in normal situations, the Management Party shall mainly control and inspect the introduction of equipment into site while the inspection of introduction of tools into site is under the contractor's responsibility. The Contractor is responsible for the routine inspection and maintenance of equipment and tools while the Management Party can organize double check and spot check on the equipment and tools that are used by the Contractor.

According to the government requirements, some special types of equipment or lifting equipment (e.g. tower crane, gantry crane, etc.) that are assembled at the site shall not be put into operation until the Permits to Use issued by the authorities designated by the government are acquired.

The Management Party shall clearly definite the requirements for periodic inspection, labels, repair and removal of equipment and tools.

9.3 Management for power supply in construction

The Management Party shall design and lay out temporary power systems used in the entire construction site, define management responsibility of the Management Party and the contractor, and formulate procedures to manage power use. The constructor shall also design temporary power use in its contracted area, and dispatch qualified personnel for management.

9.4 Management on use of Personal Protective Equipment

The contractor shall provide its employees with on-spec Personal Protective Equipment (PPE) including additional protective devices required for special work as per national relevant standards and the Management Party's requirements. The Management Party can consider showing the on-spec PPE.

The contractor shall conduct training on the use, method of application and maintenance methods for the PPE.

9.5 Management for housekeeping

Before start of the construction, the Management Party shall carry out overall planning and lay-out for the areas with specific functions, and keep reasonable arrangement. The contractor shall prepare necessary facilities for living and rest in its contracted areas.

The contractor shall define the requirements for housekeeping at jobsite and keep the order, cleanness and smooth traffic at the jobsite.

The Management Party shall establish management systems for vehicles, pedestrians and roads and keep excellent traffic order.

9.6 Management for firefighting

During the project construction period, due to limited firefighting resources at site, the Management Party shall consider preparing an emergency firefighting pre-plan which might also take the outside fire brigades into consideration, equip with necessary firefighting equipment and organize proper drills.

Aiming at site conditions and fire risk, the contractor shall work out the plan to prevent and control fire.

Being a part of the Emergency Response Management, the firefighting management shall be subject to the Emergency Response Management.

9.7 Security management

The Management Party may consider using the Enclosed-type of Security Management for construction site and the management duties shall be clearly defined. The entry and exit of personnel and vehicles form Project site shall be under strictly management so as to ensure traceability of personnel and vehicles. The normal construction order shall be maintained and the assets and commercial information of the project shall be protected. Especially in certain key areas, the security measures shall be enhanced so as to minimize the impact on the project due to the loss of important equipment and parts.

9.8 Management of warning signs and marking

Warning signs and marking shall be applied to the equipment, location, etc that have hazards or deserve special care. The meanings, requirements on application and replacement of the warning signs and marking shall be clearly defined by the Management Party and the contractor and shall be communicated to the relevant personnel.

9.9 Medical treatment and first aid

The Management Party shall establish essential medical appliances and facilities according to project scale and layout in order to provide immediate and efficient medical treatment and rescue. The contractor shall also supply appropriate medical conditions as per the Management Party's requirements. All the personnel who receive medical treatment shall be recorded.

9.10 Management of Hazardous Materials

The Management Party shall set up the management procedures for the hazardous chemicals introduced into the jobsite and establish the related management procedures for the procurement, transportation, loading and unloading, storage, use and disposal, etc as per the relevant state laws and regulations.

9.11 Management of Changes

The Management Party shall set up the procedure for the management of changes, implement control and management on the changes to project design, construction technology, construction mechanics, key operation personnel, operation procedures, media and energy, etc.. It shall also identify and analyze the possible risks brought about by each change, to lower the risks to be at acceptable level through adopting measures of technology, management and training, etc.. The contents of all changes shall be communicated to the related personnel.

9.12 Management of Environmental Protection

The Management Party shall apply clean production, save resources and energy in an all-round way. Any discharging of pollutants to water body, soil or the air shall tally with the relevant national or local standards. Any

waste oil, waste liquid, solid waste or trash generated in construction process shall be put into proper containers and be recycled as much as possible. As for the wastes that might have impact on the environment, the local environmental protection bureau shall be notified and proper disposal shall be carried out.

The requirements of relevant laws and decrees on environmental protection shall be met in the project construction. The impact on the original soil, vegetation, animals, water body, atmosphere, etc shall be mitigated and necessary measures shall be taken to protect the environment.

9.13 Management of Occupational Health

In order to guarantee the health of personnel, the Management Party and the Contractor shall provide necessary facilities and conditions such as the provision of rest rooms, dressing rooms, etc; heating and heatstroke prevention measures; daily supply of drinking water; rationally time arrangement for work and rest; enhanced measures and monitoring and supervision for prevention of noise at jobsite; intensive prevention and control of local epidemic, and so on.

Working conditions shall be continuously improved, proper PPE shall be provided and prevention of vocational diseases shall be properly carried out. As for personnel engaged in toxic and hazardous jobs or work with special requirements on health, they shall be provided with regular physical examinations under the relevant state regulations.

10. Supervision of construction process

10.1 Safety performance report and survey

The contractor shall provide safety performance report to the Management Party on a regular basis as per the requirements of the Management Party. The report shall include the basic information such as the man hour, injury and sickness related to work, loss of man hour etc.. The Management Party can know relevant situations of the contractor from the reports which can be the basis for assessment of the contractor's performance.

The Management Party shall conduct investigation to the safety items concerned according to the requirements, and the survey may aim at a sort of bad safety performances, implementation case of one safety management procedure, or an incident or a near miss incident, etc..

10.2 Inspection

During the process of checking and supervising the contractor, the Management Party and the contractor play respectively different roles. The Management Party's responsibility is mainly to conduct supervision, responsible for transferring the feedback of discovered problems to the contractor and supervising and urging the Contractor to correct them. It is the Contractor's duty to directly supervise, guide and manage its employees.

The way of inspection and frequency will depend on the scale of construction project, the number of contractors, and the risk level in work of the contractor. The normal ways the Management Party adopts for inspection are:

a) Informal site inspection: Carry out stochastic inspection or observation at site, correct breach of regulations in work process, when necessary, inform the discovered problems to relevant department and personnel to facilitate fast handling of the problems. The inspection shall be as complete as possible and the inspection records shall be complete and the records are the basis for evaluation and penalty to the Contractor.

b) Formal inspection: Conduct inspection to the contractors' performance on a regular basis. The inspection shall be as complete as possible and the inspection records shall be complete and the records are the basis for evaluation and penalty to the Contractor.

For the contractor's internal inspection, the above-methods can also be adopted but the inspection scope and objects differ. The inspection to subcontractors shall be included in the management range of the contractor.

It's necessary that the Management Party and the contractor have joint inspection at a proper frequency; which will help both parties to form a consensus view to the existing issues at site and facilitate the fast solving of problems through proper measures.

10.3 Rectification

The Management Party and the contractor shall establish corrective and preventive measures on the basis of full analysis to the problems discovered during the inspection and verify the effectiveness of such measures. All non-conformity items identified in the inspection shall be tracked and the effective rectification shall be guaranteed. The Contractor shall set up the procedure for tracking the rectifications and give feedbacks about the rectifications in a timely manner. And the Management Party shall double check the results of rectification.

10.4 Assessment of the contractor's performance

The Management Party and the contractor shall hold meetings on a regular basis to review, discuss and assess the contractors' performances. The following contents may be regarded as the basis of the assessment:

a) Records of routine performance;
b) Incident Records;
c) Inspection record;
d) Training level and training record;
e) Ability to meet the work undertaken.

It is ideal to use the quantified data to publicize the assessment on contractor's performance. The items that cannot meet the expectations and requirements of the Management Party shall be discussed and rectified.

The assessment for the contractors' performances can be the key basis for updating the List of Qualified Contractors.

10.5 Rewards and Punishments

The Management Party shall periodically evaluate the Contractor's safety performance and prepare the Plan for Rewards and Punishments on the basis of such evaluation. The Contractor's scope of work, site operating level and potential risks associated with the operations shall be included in such a plan. Through the implementation of the plan for rewards and punishments, the Contractors with good safety performances can be recognized and rewarded, and the contractors with poor safety performance will be punished properly so as to urge them to improve.

11. Emergency Response Management

11.1 Requirements for emergency response

Conduct identification and analysis to emergencies which cause personnel injury or death, property loss and environment damage, and compile corresponding preventive measures and emergency response plan, establish emergency response network with the local government, fully utilize the outside emergency response resources in

order to minimize the impact of the emergencies.

11.2 Object of emergency management

The Management Party and contractor shall make systematic analysis to analyze and identify potential incident and emergency, and take the incidents which are easy to cause serious consequence and affect larger range as the objects of emergency management, mainly including: personnel injury, fire, release of hazardous material, natural disaster etc.

11.3 Emergency organization and duty

The Management Party and contractor shall organize emergency command organizations at every level, when emergency occurs, such organizations are responsible for emergency command, information liaison, supervising implement of emergency measures and informing to the higher administration the handling of the emergency incident. This kind of organization shall play a key role during emergency response; each member of the team shall receive the pre-job training.

11.4 Emergency plan and equipment

The Management Party and contractor shall establish emergency response plan when specific emergency occurs, this plan shall has enough adaptability, mainly including:

a) Emergency command system;
b) The duty, authority and tasks of the person in charge and designated action personnel;
c) Detailed description of measures to adopt for all crew during emergency, including outside unit personnel staying in emergency area;
d) Rescue and Evacuation procedure;
e) Communication network, liaison & PR
f) Protection of extremely important records and equipment;
g) Availability of necessary information during emergency, such as plant layout; identification, location, required emergency measures, procedure, and work instructions of hazardous materials;
h) Countermeasures for emergencies;
i) List of emergency response personnel.

The Management Party and contractor shall identify the demand of emergency equipment, and provide enough quantities of equipment. To keep the continuous operability of such equipment, they shall be tested and maintained at specified intervals.

11.5 Training and drilling

Besides necessary training on emergency plan, its' essential to conduct periodic drills in order to test the employees' emergency response ability. Practical drills shall be done as per schedule with the purpose to test the effectiveness of the most important parts of the emergency response plan and the completeness of the emergency response plotting. If appropriate and feasible, it is advisable to invite the outside emergency response service organizations to participate in the actual drills.

11.6 Evaluation and revision of emergency plan

The emergency plan shall be assessed for its suitability, operability and results of drills on the basis of effects of drills and any changes in construction; the defects and deficiencies shall be amended. The revised emergency pre-plan shall be communicated to the relevant personnel in a timely manner.

12. Incident Management

12.1 Requirements for incident management

In case of accidents, reports and investigation shall be made in a timely manner. Corresponding corrective and preventive measures shall be taken according to the analysis of causes of accidents. The lessons learned are the important way to continuously improve the safety management.

12.2 Incident reporting and first aid

The contractors shall inform all the incidents related to project work to the Management Party, and submit a primary written report on the incident within the limited time.

The Management Party and the contractor shall train his employees on rescue of the injured and protection of incident site so as to facilitate the first aid and incident survey.

As for Near Miss Incident, especially those that might have severe consequences or impact, it is recommended to carry out the reporting and investigating and analyzing as per the incident management procedures.

12.3 Incident Investigation

The Management Party shall establish incident investigation procedure to determine the direct and root causes of the incident. The Management Party shall identify the scope of work, personnel, duty and purpose of the Incident Investment Team (the government requirements shall be followed, if any). The Incident Investment Team shall put forward correct rectification measures and recommendations according to the causes of the incident so as to avoid the reoccurrence of the similar incident. The final investigation report shall be generated for the incident investigation. The Management Party and the contractor shall record and keep the investigation reports for future reference and ensure that all rectifications have been finalized per schedule.

At the Owner’s request, reports and investigation conclusions of any incidents shall be submitted by the Management Party to the Owner in a timely manner.

12.4 Tracking protective measures

The Management Party and the contractor shall prepare detailed rectification plan according to the recommendations in the incident investigation report and follow up till the rectifications are finalized. The action plan should identify the contents, the responsible personnel and the deadline of specific measures.

12.5 Incident bulletin

In case of incident, the Management Party and the contractor shall communicate the information of the incident in a timely manner, analyze and discuss in regular meetings so as to summarize the lessons learned from the incident, predict incident trend through statistical data, identify and correct the deficiency in safety management so as to continuously improve the safety management level.

In the course of incident handling, the principle of “Four Never Letting-Off Statuses” shall be upheld, i.e., never letting off the unclear cause for incident, the responsible person not received strict punishment; the majority of staff’s failure to draw lessons from the incident; and relevant precautions not in place, so as to sort out the causes of incident, take preventive measures and avoid the reoccurrence of incidents.

12.6 Exchange of Experience

The Management Party and the Contractor should obtain the related information from the Project and external resources and carry out the exchange of experiences in order to ensure that employees learn the

experiences and lessons in a timely manner. And the control over similar incidents can be enhanced through the updating of procedures, if necessary.

13. Audit

The Owner can organize audit on safety management system at the different phases of the Project construction so as to identify whether the safety management status of the Project tallies with the relevant state laws and decrees and whether the safety principles, objectives and commitment of the Project have been met. The results of audit and the requirements for improvement shall be communicated to the Management Party and the Contractor and the improvement status shall be followed up so as to continuously improve the safety performance of the Project.

Auditors with their own field of expertise can be organized to carry out the audit depending on the features of different phases of the project, results of risk assessment and the results of the previous auditing. When necessary, a third party can be entrusted to carry out the auditing. Detailed auditing plan shall be prepared for the audit. The auditing plan shall cover the guideline, scope, procedures, frequency and methods, etc. The results of the auditing can be summarized into the audit report and be filed into related records. The audit shall be complete and systematic, covering the site audit and document audit. The audit is different from the general safety inspection.

Objectivity and fairness of the selection of auditors and implementation of audit shall be maintained.

The contractor shall also organize the similar auditing, which can help to attract the attention of the Contractor’s Headquarters and to continuously improve the performance of the Contractor in the Project.

Appendix A

(APPENDIX OF REFERENCE MATERIALS)

Cases of Using the Guideline of Safety Management

Implementation by **the Management Party for** Petrochemical Construction Project

A.1 Project Profile

Project Name: Petrochemical Construction Project A, (Project A for short.)

Mode of Management Party: The Management Party of Project A is called as the Integrated Project Management Team (IPMT) which is the comprehensive project construction management organization established by the Owner and exercises power on behalf of the Owner in the Project construction.

Management Mode: The HSE (Health, Safety and Environment) Department is set up in the IPMT to be responsible for carrying out and handling the specific affairs of health, safety and environment (hereinafter called as HSE). The detailed organization chart is shown in Figure A.1.

Note: In the current international construction projects, HSE is managed as an entity.

A.2 The policy, resources and responsibilities of safety management

A.2.1 The HSE Policy, Target and Commitment of Project A

Table A.1 Sample Text of HSE Policy, Target and Commitment of Project A

Our HSE Policy is:

HSE shall be the first priority; prevention is the primary measures with all staff involved and comprehensive approach adopted to improve the environment and protect the health. The scientific management and sustainable development shall be maintained.

We believe that all injuries and occupational illnesses, as well as safety and environmental incidents, are preventable, and our target is zero accident. Protecting our employees, users of our products, and the communities in which we operate is a core value of our project management. We will conduct our business with respect and care for the environment.

Our HSE Goals：

- No accidents
- No harm to people
- No damage to the environment

Our HSE Commitment：

All managers and supervisors of PROJECT A are accountable for HSE performance and leadership. Everyone who works for PROJECT A anywhere is responsible for getting HSE right. HSE Commitment is a prerequisite of employment. We believe that excellence in HSE is critical to the success of our company.

We will continue to drive down the environmental and health impact of our operations by continually reducing the discharge of waste water, waste gas and waste solids and using energy efficiently. We will produce quality products that can be used safely by our customers.

We will：

- Strictly comply with applicable national and local HSE laws and regulations;
- Make our HSE performance status public;
- Extensively consult, listen and respond to people from all walks of life to continuously improve our HSE performance and management systems;
- Recognize those who contribute to improved HSE performance;

Our business plans include series of measurable HSE targets. We are committed to fulfilling all the requirements and providing necessary manpower, material and finance resources.

Signature：

Chairman of BOD

Date：

Project A's HSE policy and target were signed off by Chairman of Board of Directors for publication and implementation.

A.2.2 IPMT's detailing of HSE target and promotion of HSE notion

During the implementation of HSE Policy of Project A, IPMT further broke down the HSE target into 6 ZEROs, namely ZERO DEATH ACCIDENT, ZERO DAY AWAY FROM WORK ACCIDENT, ZERO RECORDABLE ACCIDENT, ZERO ENVIRONMENTAL ACCIDENT, ZERO FIRE ACCIDENT, ZERO VEHICLE ACCIDENT.

PROJECT A regards excellent HSE management concepts as one important integral part of the corporate culture, and IPMT summarizes Project A's HSE management concepts as the following clauses which are actively advocated in the project:

- HSE issue is the factor that the first priority shall be placed upon when considering each step in the course of the construction.
- People are the most important resources of the company;
- All accidents, injuries and environmental accidents are preventable;
- All the accidents can be attributed to management mistakes;
- Good HSE performance is the key to success of our enterprise;
- HSE is the responsibility and duty of every employee; safely working is the basic condition of the corporate employment;
- The corporate management has the obligation to instruct the staff to work safely and cultivate the enterprise culture of Safety Work.
- To Work Safely is one attitude to work, meanwhile, HSE is a way to live;
- HSE is one investment;
- No work is so important that we have no time to safely accomplish it.

A.2.3 HSE management standards

To facilitate the integrated management, IPMT worked out a full set of HSE management codes specific to the characteristics of the project and in conformance with international practice, including one Comprehensive Project HSE plan, 64 jobsite HSE procedural documents and relevant tables, managerial systems, managerial regulations etc.. The titles of the 64 procedures are as follows:

— HSE Plan for Civil Work

— Safety Roles & Responsibilities

— Response to Injury

— Incident Reporting & Site Investigation

— Emergency Response

— Near Miss Report and Investigation

— Incident Classification and Notice

— Policy on the Control of Alcohol & Drugs

— Smoking & Fire

— Site Safety Inspection

— Methods Statement (MS) & Job Hazard Analysis (JHA)

— Fire Fighting Management

— Selection & Use of Personal Protective Equipment

— Security Procedure

— Standards of Construction Equipment & Vehicles

— Ground Disturbance

— Mobile Heavy Equipment

— Safety Use of Crane

— Elevated Work

— Vehicles & Equipment Commanders

— Management on Special Disciplines

— Welding, Cutting & Grinding

— Management of Temporary Power Supply Equipment (Low Voltage)

— Housekeeping

— Drilling

— Regulation on Use of Ladder

— Mechanical Protection

— Entry into Confined Space

— Safety Work of Scaffold

— Handling of Soft Foundation Using Percussion Method

— Sand-blasting, painting & coating

— Radiation Safety

— Control of Hazardous Matters

— Vehicle Management & Inspection

— Safety Operation of Forklift

— Safety Signs & Safety Barriers

— Procedure of Identification & Response to Threat of Bomb

— Lifting Activities & Lifting Equipment

— Protection of Hand & Arm Vibration

— Office Safety

— Emergency Response to Typhoon

— Logout & Tagoff

— Ability Assurance

— Permit To Work

— Manual Transportation

— Safety Plan for Work at Night

— Management of Wastes

— Emergency Leakage Response Plan

— Environmental Noise Control

— Management of Changes

— Stand-down & Resumption of Work

— Emergency Calling Procedure for the HSE of the Project

— Procedure on Incentives & Penalties to Contractors

— Procedure on Permit to Ground Disturbance

— Procedure on Permit to Installation & Removal of Grating

— Traffic Safety Standard---Vehicle Emergency Response Procedure

— Management of Vehicles, Bicycles & Pedestrians at Jobsite

— Safety Traffic Code --- Inspection of Vehicle

— Safety Traffic Standard --- Driver

— Safety Traffic Standard --- Requirements for Vehicle

— Use of Low-pressure Fire Hydrant/System

— Procedure of Permit to Hot Work

— Procedure of Permit to Nacelle Activities

— Theft Prevention in the Project

These HSE management procedures are developed with regard to the specific work activities, covering all aspects of HSE management of the project, primarily including site HSE discipline, HSE procedures of individual construction work activities, reporting and investigation of accidents, Permit To Work system, training and capability assurance, environmental noise control, emergency response, HSE information communication etc.

IPMT regards Energy Isolation, Management of Changes, Permit To Work, Entry into Confined Space, Ground Disturbance, Lifting Work, Elevated Work, Vehicle Management as the work activities and HSE management links of the most importance, therefore, IPMT worked out HSE GOLDEN RULES for these eight aspects of the managerial system. All staff getting involved in construction of Project A must strictly observe the HSE GOLDEN RULES.

A.2.4 IPMT's channel and method to convey HSE policy

a. HSE Training

All personnel (including those of the Owner, IPMT, contractors and subcontractors) must take part in the induction training provided by IPMT prior to entering the jobsite. The managers and professionals at various levels had to receive HSE management training and other professional trainings.

b. Performance Assessment

IPMT emphasizes that HSE is everyone's duty, signs HSE performance contract with every employee, specifying the HSE goals and requirements for assessment of their behaviors and linking the individual HSE performance with the annual performance assessment.

c. HSE Management Commitment

At the beginning of the project, Chairman of the Board of Directors of the enterprise that owns Project A, IPMT leadership and principal leaders of the Contractors have all made commitments for strict compliance with Project A's HSE policy. For contents of HSE commitment of Project A, see A.2.1 Project A's HSE Policy, Target and Commitment.

At the peak of the construction, IPMT launched HSE Commitment Day campaign and the jobsite work was suspended for half a day for commitment convention which was held at one main venue and five branch venues at the five project packages. At the main venue, IPMT made the HSE commitment, and IPMT director, HSE director and supervisors of individual departments all signed on the specially-made commitment board. At the branch venues for the package HSE commitment, individual package project managers, project HSE managers and contractors' principal leaders signed the commitment board. Then the signed commitment boards were duplicated and exhibited in conspicuous places of the office area and jobsite for supervision. The other constructors signed on the commitment attendance book. Each worker that has signed was offered a souvenir from IPMT.

d. Diversified HSE Activities

IPMT worked out a detailed HSE activity plan each month which primarily covered various HSE theme activities such as HSE Theme Month, HSE Theme Week, Shoulder-By-Shoulder HSE activity, invitation of children of staff and pupils from the adjacent school to have HSE Drawing Competition, Traffic HSE Propaganda Day with traffic police, scaffolding erection competition, etc..

e. Extensive publicizing

Through the HSE billboard, HSE Status Warning Indication Lights and Safe Man-hour Statistic electronic clock in the office building lobby, periodic HSE briefing newsletters, visible HSE propaganda through Project A's INTRANET, in the office area, at the construction jobsite and in the worker's rest rooms, on-site HSE broadcasting established at the construction peak period, IPMT made HSE concepts deeply rooted in each person through various ways of HSE education.

A.3 Resources and Responsibilities

A.3.1 Guarantee the HSE Fund

The fund appropriated for HSE was planned when the Project Investment Plan was made for Project A, mainly covering Personal Protective Equipment for civil work, facilities, training expenses, three simultaneity cost, and incentives. The detailed Cost Plans were developed in various years of project construction so as to meet the needs of HSE management at different construction stages.

The IPMT adjusted the HSE Cost Structure within the scope authorized by the Owner, for instance, to set up special incentives, special HSE guarantee fund, etc..

A. 3.2 Organization

Six departments are set up under IPMT, one of which is HSE Department consisting of the core team and the corresponding HSE teams in individual project packages with HSE director and HSE senior construction manager in ultimate charge of the departmental matters. Under the core team are the specialist team (including lifting, mechanical inspection, electrical, scaffolding, NDE experts), training team, security team, clinic, emergency response center, comprehensive management team (including procedure management, publicizing, emergency response, governmental liaison) etc.. The HSE team of each package comprises HSE manager, construction HSE manager and several HSE engineers. See Figure A.1 for corresponding organization chart.

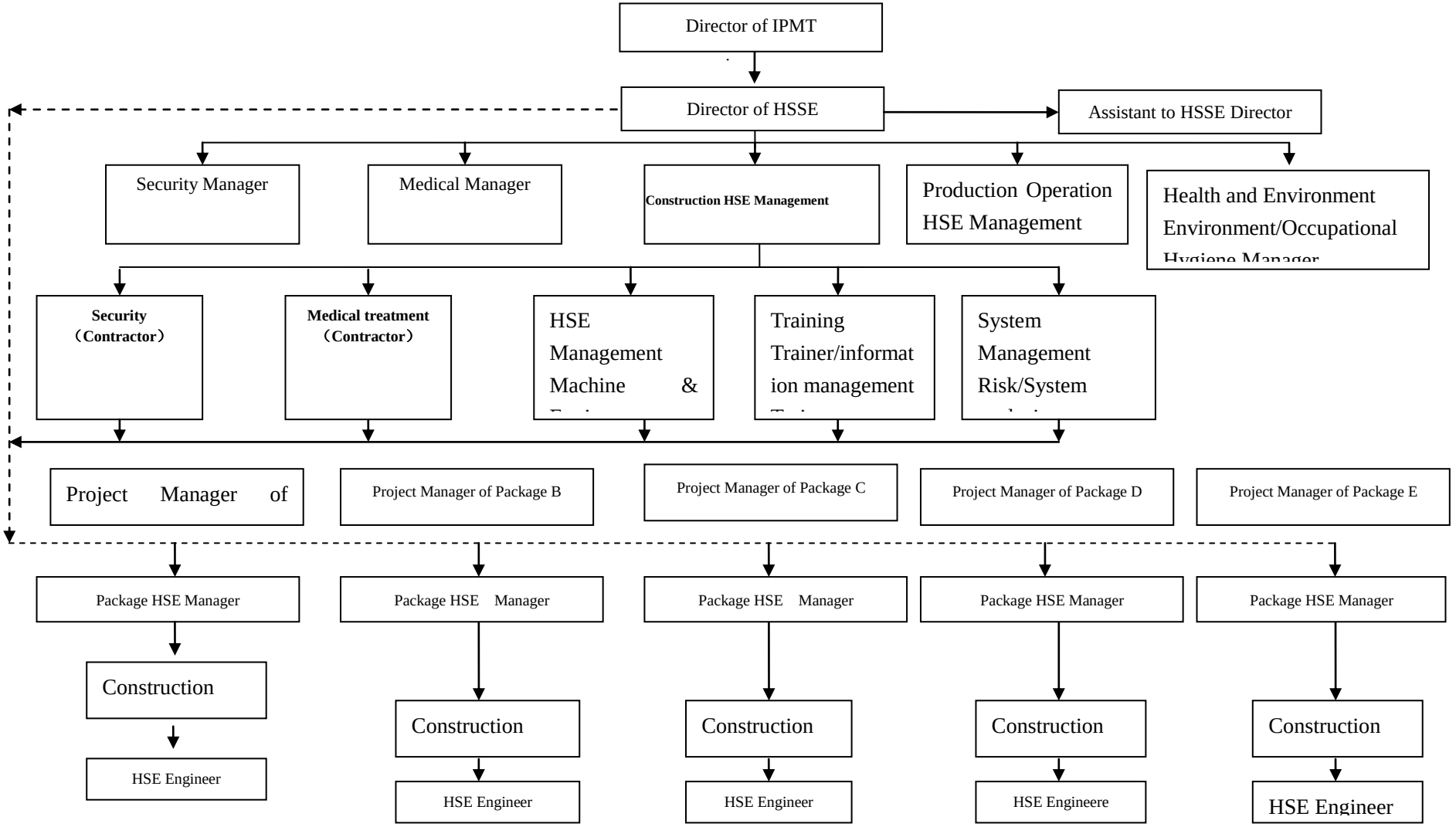

Figure A.1 HSE Management Organization Chart of the IPMT

The contractor, subcontractor and supervision company have their own internal HSE management departments responsible for their own HSE matters and subject to the supervision and guidance of IPMT HSE management personnel. Dedicated HSE management personnel are provided at the ratio of 50:1to construction workers at the jobsite. All the project HSE personnel must be certified and registered at IPMT HSE Dpet. Demobilization or replacement of these personnel must be approved by IPMT.

A.3.3 Responsibilities

IPMT sets out the HSE duties and responsibilities of the Owner, IPMT, contractors, subcontractors and every employee during the project construction in the form of detailed procedural documents.

For example, HSE duties and responsibilities of IPMT director:

The director shall be responsible for complying with and implementing the HSE policy and guideline of the Project, be accountable for HSE performance in all aspects of construction of the project. The director shall take an active part in HSE planning, which will help to improve overall HSE influence and effect. The director shall guarantee all the management personnel, supervising personnel and the people who report to them are accountable for the HSE performance within their own scope. The director shall periodically review the implementation of the construction HSE plan and HSE performance during the construction.

Following is the HSE duties and responsibilities for general employees:

During the construction, the drug and liquor are forbidden for all staff who must strictly observe the HSE rules and system and make use of the safety equipment and devices provided so as to integrate HSE into their work. All staff must take an initiative part in site HSE planning to ensure their own HSE and no harm to others, and warn the workmate of the unsafe behaviors. All staff shall report the unsafe conditions, practices or behaviors within their own construction areas to the supervisors, and make rectifications if possible. The staff shall be encouraged to put forward recommendations to improve the jobsite HSE performance. It is hoped that each employee shall observe these requirements. Every employee shall be obliged to participate in the project HSE planning and training activities and come up with recommendations for improvement. In addition, he/she shall report any injury/death accident and unsafe measures and conditions to the supervisor. Each staff member has the obligation to maintain the site, tools, equipment and materials in safe and tidy order on his own initiative, not necessary to be specially instructed by the supervisor.

A.3.4 Coordination and communication

A 3-level coordinative mechanism is established for Project A: IPMT, project packages and contractors. All construction work activities must be carried out in accordance with IPMT instructions with HSE as the first priority of the coordinative mechanism. Moreover, IPMT holds monthly contractor HSE meeting, weekly HSE and quality meeting, daily HSE focus meeting etc to coordinate and solve HSE management problems dedicatedly and publicizes HSE management status.

A.4 Selection of Contractors

A.4.1 Prequalification of contractors

IPMT follows fundamental steps to pre-qualify contractors as illustrated in Figure A.2 Contractor Prequalification Flow:

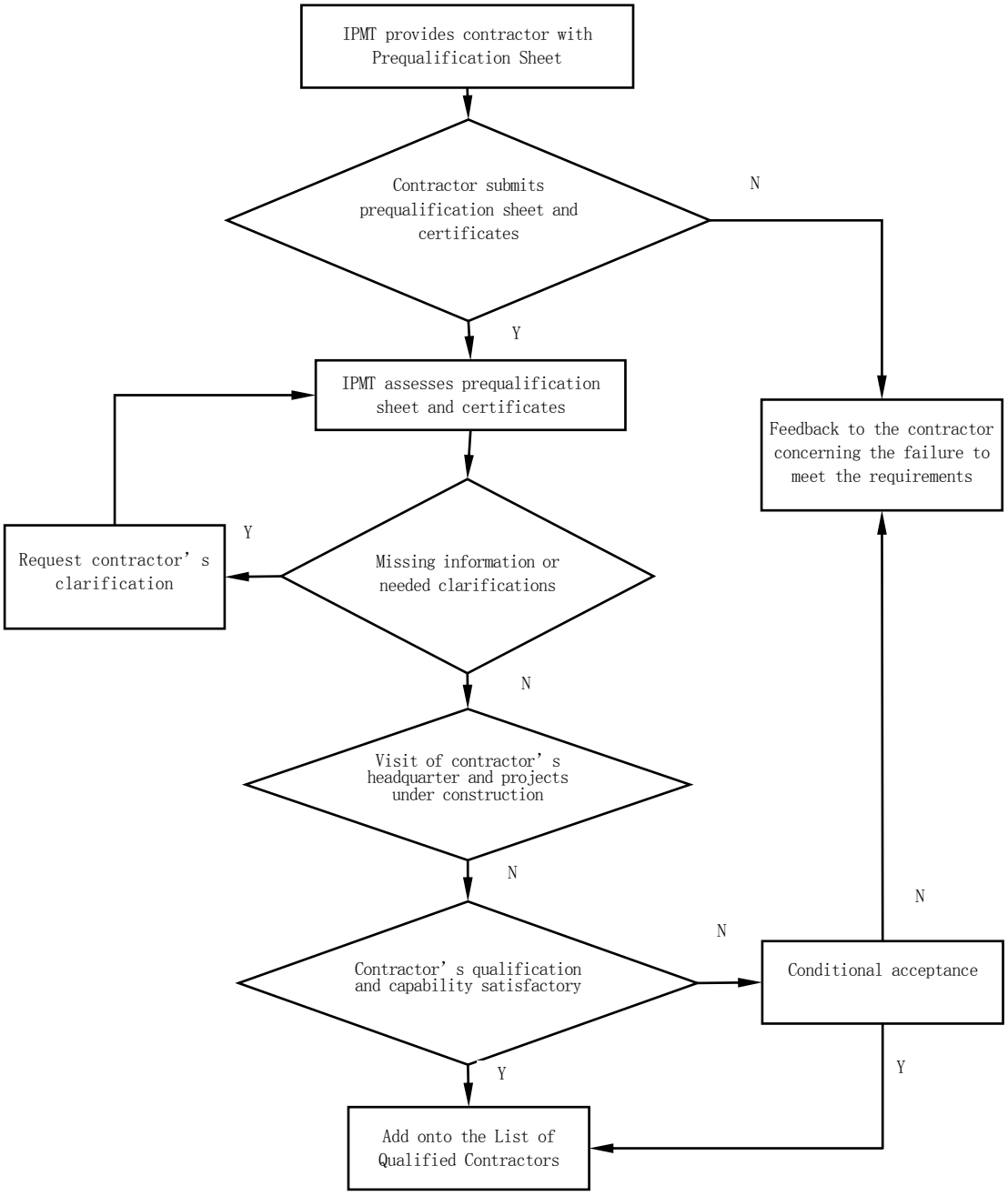

Figure A.2 Contractor Prequalification Flow

See Table A.2 for sample of Contractor Prequalification Sheet.

Table A.2 From of Contractor's Prequalification

General information			
Organization			
Experiences			
HSE performance			
1.Data of injury or illness			
a. Working time of staff for the last three years (excluding subcontractor):			
Year	Site (hr/a)	Total (hr/a)	
b. The following data for the last three years			
Year			
Fatality			
DAFW			
Medical treatment			
Environmental accident			
Occupational illness			
2. Major HSE events for the last three years			
HSE Management			
1. Top HSE Manager in your company:			
Position:	Tel:	Fax:	
2. Does Your Co. have:			
a. Full-time HSE Head		Yes☐	No☐
b. Full-time site HSE Head		Yes☐	No☐
c. Full-time HSE coordinator		Yes☐	No☐
3. Does Your Co. have:			
a. Procurement of insurances for staff		Yes☐	No☐
b. Procurement of personal insurances		Yes☐	No☐
c. Incentive plan for HSE		Yes☐	No☐
d. Special expenses for HSE training		Yes☐	No☐
HSE Plan & Procedure			
1. Does Your Co. have any written HSE plan?		Yes☐	No☐
Are the following key elements highlighted in the HSE plan?			
● HSE policy & commitments		Yes☐	No☐
● Staff's participation in HSE		Yes☐	No☐
● HSE duties of managerial personnel, supervisors & staff		Yes☐	No☐
● Allocation of resources suitable for HSE		Yes☐	No☐
● Regular appraisal of staff HSE performance		Yes☐	No☐
● Hazard identification & control		Yes☐	No☐

2. Are the following procedures included in the HSE plan?

a. Lockout & tagoff warning identifications on equipment	Yes☐	No☐
b. Confined space entry	Yes☐	No☐
c. Record of injury & illness	Yes☐	No☐
d. Fall protection	Yes☐	No☐
e. Personal protection equipment (PPE)	Yes☐	No☐
f. Portable electric tools	Yes☐	No☐
g. Vehicle HSE	Yes☐	No☐
h. Compressed gas cylinder	Yes☐	No☐
i. Earthing protection of electric power equipment	Yes☐	No☐
j. Special equipment	Yes☐	No☐
k. Housekeeping	Yes☐	No☐
l. Incident reports	Yes☐	No☐
m. Emergency response plan	Yes☐	No☐
n. Disposal of wastes	Yes☐	No☐

3. Does your Co. have any written plan for the following items:

a. Hearing protection	Yes☐	No☐
b. Respiratory protection	Yes☐	No☐
c. Information communications for hazards	Yes☐	No☐

4. Medical treatment

a. Does your Co. make regular physical checkups for staff?	Yes☐	No☐
b. Does your Co. have any trained first aid personnel?	Yes☐	No☐

5. Did your Co. hold any HSE site meetings for the following personnel?

Supervisors	Yes☐	No☐	Frequency ___
Workers	Yes☐	No☐	Frequency ___
Contractor	Yes☐	No☐	Frequency ___
Were the meeting elements documented?		Yes☐	No☐

6. PPE

a. Are suitable PPEs provided for staff	Yes☐	No☐
b. Are there any plans for inspection & maintenance on PPEs?	Yes☐	No☐

7. Equipment & materials:

a. Is there a HSE specification system for equipment & materials	Yes☐	No☐
b. Are checks made on special equipment for compliance?	Yes☐	No☐
c. Is there any appropriate record for inspection & maintenance on operating equipment?	Yes☐	No☐

8. Check & Audit

a. Does your Co. make regular HSE checks?	Yes☐	No☐
b. Did your Co. make HSE audits?	Yes☐	No☐
c. Were rectifications of defects documented?	Yes☐	No☐

HSE Training

1. Professional training programs

a Were proper trainings given for staff in job skills?	Yes☐	No☐
b. Did staff receive their qualification certificates according to requirements	Yes☐	No☐

c. Make a list of types of work with qualification certificates:

2. Pre-job Training		
a. Is there a HSE training plan for new employees?	Yes☐	No☐
b. Are the following items contained in the plan?		
● Safe operating procedures	Yes☐	No☐
● HSE supervision	Yes☐	No☐
● Team/group meetings	Yes☐	No☐
● Emergency response procedure	Yes☐	No☐
● First aid procedure	Yes☐	No☐
● Accident investigations	Yes☐	No☐
● Fire prevention & protection	Yes☐	No☐
● Information communications for hazards	Yes☐	No☐
c. How long is a pre-job training? Number of hours		
3. Training records		
a. Is there any record of training programs for staff?	Yes☐	No☐
b. Are the items below contained in the training records:		
Staff register	Yes☐	No☐
Training dates	Yes☐	No☐
Names of training teachers	Yes☐	No☐
Examination of comprehending degree	Yes☐	No☐
c. How to identify staff's comprehending degree of training:		
☐ Written test	Work monitoring	
☐ Oral test	Others (to be listed) _____	
☐ Performance test		

Reporting documents

- Insurance certificate;
- HSE plan;
- HSE incentive plan;
- Plan for information exchange of hazards;
- Respiratory protection plan;
- Accident investigation procedure;
- HSE checklists;
- HSE audit procedure;
- Pre-job HSE Training outline;
- HSE training plan (outline);
- Specimen record of Staff HSE training activities.

Based on Contractor Prequalification Sheet information, IPMT specialists fill in the Contractor Prequalification Evaluation Sheet, and determine whether this contractor will be listed onto the Qualified Contractor List on the basis of the Contractor Prequalification Evaluation Sheet results. See Table A.3 for sample of Contractor Prequalification Evaluation Sheet.

Table A.3 Contractor Prequalification Evaluation Sheet

Performance of HSE/health/environment	**Acceptable**	**To be improved**	**Unacceptable**
Accident rate documented by Safe Production Supervision Bureau in which the enterprise is located	□	□	□
Accident rate of DAFW	□	□	□
Punishment notification(s) from the Government HSE department and environment management department	□	□	□
HSE Plan	**Acceptable**		**To be improved**
Commitments to HSE	□		□
Resources allocation for HSE	□		□
Written plan for HSE	□		□
Safe Work procedure	□		□
Plan for medical treatment	□		□
Plan for preventing drug abusing	□		□
HSE Meetings	□		□
Management of subcontractors	□		□
Check & audit	□		□
Training in HSE/health/environment	**Acceptable**		**To be improved**
Professional training	□		□
Pre-job training for new employees in HSE	□		□
Pre-job training for supervisory personnel in HSE	□		□
HSE Training Plan	□		□
HSE training records	□		□
Overall evaluation	**Acceptable**		**To be improved**
	□		□

Contractor is: Yes □ No □

☐ Can be listed onto the List of Qualified Contractors

Conditionally be listed onto the List of Qualified Contractors,

The conditions

_____

_____

☐ Feedback comments on contractor:_____

Assessor： Date：

A.4.2 Selection of contractors

The contractors passing the prequalification enter bidding competition stage that determines the successful winner of the bid.

Prior to bidding, IPMT issues Project A's HSE requirements to all bidders.

Prior to bidding, all bidders shall have developed their own HSE plans, which must be compliant to the HSE requirements raised by IPMT and correspond to the works to be carried out for Project A, including primarily the following:

- Project overview
- Compiling basis and referenced standards and codes
- Policy, target and project manager commitment
- Management organization and responsibilities
- Risk Evaluation and Elimination
- Capability assurance and training
- Inspection and rectification
- Incentives, award and penalty
- HSE information communication
- Refusal to Work
- Reporting and investigation of accidents/near misses
- PPE management
- Material Abuse Preventive plan
- Management of individual construction work activities (or the list of written procedures of the contractor for this works).
- Work environment management
- Vehicle and site traffic management
- Warehouse and hazardous article management
- HSE identification and lockout, warning labeling
- Office HSE management regulation
- Security
- Emergency response plan
- First aid and medical care management
- Review, assessment and continual improvement

After the tender documents were submitted by the bidder, IPMT comprehensively assessed how well they satisfied HSE acceptance criteria and other demands (such as cost, effectiveness, technical qualification), and eventually selected several contractors. While signing the formal contracts, IPMT signed HSE agreement with these contractors in the form of appendix to the contracts.

A.5 Preparations Prior to start of construction

A.5.1 Site review prior to start of construction

Prior to start of construction, IPMT organized a site review for all the contractors. For contents of the review, see Table A.4 “Site Condition Inspection Confirmation prior to Start of Construction”.

A.5.2 Review of the contractor’s construction plan

The construction plan (or construction statement) compiled by the contractor shall be submitted to Supervision Company for review prior to implementation. For the construction plan of great importance, IPMT would participate in the review to ensure the contractor’s managerial measures are in compliance with the requirements of project construction.

HSE manager of each project package shall be responsible for the review of the contractor’s HSE plan. The HSE plan passing the review would be returned to the contractor for implementation; The HSE plan that fails to pass the review would be returned to the contractor together with comments for revision, and the revised plan

shall be submitted for IPMT review again.

Table A.4 Site Condition Inspection Confirmation Prior to Start of Construction

Time： Day, month, year

Site conditions for jobs to be carried out	Yes	No	N/A
1. Roads to the project and job area			
2. Place where Contractor is situated			
3. Locations, capacities & details of electricity, water, fuel and compressed air			
4. Transportation means and procedure for materials			
5. Field investigation plan (such as boring, sampling, digging pits, burrowing soil pit & digging)			
6. Owner's permit & Contractor's permit			
7. Facilities and available schedule by Client & Owner (such as field office area, warehouse, unloading of building materials & equipment; Contractor being responsible for (un)loading & storage of materials supplied by Owner & Contractor)			
8. Contractor's participation in the Owner's planning for HSE & first aid			
9. Other jobs to be done or may be done during the contractual period			
10. Possible Contract work scope & any unusual operations to be required or difficult operations			
11. Indication of building location, access, burrowing pit & features of other important sites			
12. One job with similar nature, when being carried out at site, please show its operating standard			
13. Establishment of traffic & communications inside and outside the site			
14. Site location for disposal of wastes & one or more cleaning areas of Contractor for the cleaning purpose			
15. Overall status of outstanding projects & facilities affecting the jobs specified in the bid			
Participants:			

Cc: Owner's Contract document

A.5.3 Review of contractor's pre-mobilization prior to start of construction

Before individual contractors entered the jobsite to kick off works, HSE managers of each IPMT project package carried out Pre-mobilization Construction Review.

The project package HSE manager shall be responsible for HSE recommendations for all the work activities outlined in the contractor's construction execution plan and HSE plan, listing the recommendations in Project Pre-Mobilization Construction Review: Action Plan sheet, and distributing this sheet to contractors and project departments concerned. See Table A.5 for specimen of Pre-mobilization Construction Review Sheet.

Table A.5 Naphtha Tank Piling Pre-Mobilization Construction Review: Action Plan

Priority	Recommendations	Responsibilities	Target Date	Actual Completion	Responses/Planned Action	Actions Taken
B	**If work hours for pile driving are planned to extend into darkness, a JSA must be conducted and work approved by IPMT.**					
A	**Assure that contractor's HSE inspection checklists are complete and effectively cover all HSE aspects of equipment.**					
A	**Identify who is responsible from IPMT to ensure that HSE checks are conducted by the contractor and are effective. Ensure that the construction manager is responsible for all activities at the construction site.**					

Priority Level:

A – Must be completed prior to starting of piling work
B – Must be completed ASAP, but can be completed after the start of piling work
C – Should be completed consistent with project progress schedule

Project package HSE manager organized the pre-mobilization construction review meeting which the project package construction HSE manager, the contractor's project manager, construction manager and HSE manager as well as HSE engineer attended. At the meeting, the responsibilities of individual parties, completion target dates and necessary actions were jointly identified for finalizing the actions identified in the Project Pre-mobilization Construction Review: Action Plan, and a final Project Pre-mobilization Construction Review: Action Plan was developed.

IPMT and contractors took actions in line with the final Project Pre-mobilization Construction Review. After the actions are completed, they were registered in the Action Plan Form stating the actual time of finish and the actions taken. During the action implementation, once one recommendation was completed, the action party would inform all participants of the completion status in a timely manner.

IPMT package HSE manager and construction HSE manager were responsible for verifying the completion of Project Pre-mobilization Construction Review: Action Plan. The party that fails to make good progress would be urged to complete the task in the specified time limit, and would be penalized in accordance with the Owner's Contractor Award and Penalty Procedure. The party that finalized the actions well would be awarded. IPMT

would permit the contractor to commence the works when all Category A items have been rectified.

A.6 Risk Appraisal

A.6.1 Overall project construction risk evaluation

IPMT carried out overall project construction risk evaluation depending on the characteristics of the hazards at different construction stages in order to identify the existing work activities with the highest risk by analyzing and evaluating relevant construction activities at certain construction stages, identify the focuses of the current HSE management and provide decision-making evidence to the leadership of the project.

For example, at the initial stage of the project with civil construction activities as major work, the HSE management focused on excavation; at mechanical installation peak, HSE management focused on the lifting work; at the end of the project construction, hot work became the priority of HSE management.

Overall project construction risk evaluation was carried out in the form of dedicated HSE risk evaluation meeting, which was organized by IPMT HSE director and participated by engineering technology specialists with rich experiences, HSE specialists and other relevant personnel as well as contractors' HSE managers or HSE specialists. The overall project construction risk evaluation would be carried out as follows:

a. Analyze the major work activities at current project stage, and identify the potential hazards of those activities. Factors to be considered in identifying hazards include:
   - Risky construction activities(such as lifting, underground work, elevated work, NDE work etc);
   - HSE supervision and control;
   - High strength and long-enduring work;
   - Overlapped work;
   - Temporary power supply and use;
   - Road traffic.

b. Evaluate all risks depending on the probability and impact severity, and divide these risks into high potential, medium potential and low potential risks in terms of the risk severity. The evaluation outcome shall be documented in the risk registration table.

c. Response to the risk evaluation
   - HSE leadership shall review the high risk issues and report them to IPMT leadership to draw attention;
   - The current HSE tasks and duties shall be reviewed to ensure sufficient resources be allocated to the current high risk items;
   - HSE management criteria and contractors' HSE management capability shall be reviewed. When necessary, HSE management criteria shall be improved, or measures shall be taken to help the contractor enhance HSE management capability;
   - The risk registration table shall be reviewed, and the risk distribution shall be re-evaluated with the site HSE team and contractor's representative.

A.6.2 Risk evaluation of the construction activities

As per IPMT regulation, the contractor shall carry out risk evaluation prior to commencement of all construction activities. The construction work activities risk evaluation was carried out in the two forms: Job Hazard Analysis and Safe Task Assessment Review.

a. JHA

JHA was normally carried out by the people who would implement the job and who would be involved in the job, such as engineering technical people, HSE management personnel, and work supervisor (shift supervisor). JHA could be performed as per the following steps:

- Describing the work to be implemented;
- Listing all necessary tools, equipment and materials;
- Listing the main tasks or listing the steps in sequential order;
- Identifying risks accompanied with each task or step;
- Assessing the risks in terms of severity and probability.
- Detailing the control methods to eliminate or reduce the risk;
- Determining whether the control measures have reduced the risks to an acceptable extent;
- Double checking if each work/task satisfies the logic sequence.

JHA was submitted in the form of Job Hazard Analysis Report to IPMT authorized personnel for approval. See Table A.6.1 for sample of Job Hazard Analysis Report and the evaluation description is shown in Table A.6.2, Table A.6.3 and Table A.6.4.

Approved Job Hazard Analysis Report attached with implementation recommendation would be returned to the contractor. Prior to the implementation of this job, the person in charge shall explain and clarify the contents of the JHA to all the persons taking part in the work so that they are aware of the potential risks accompanied with the work activity to be undertaken and the preventive measures. The persons participating in the explanation/clarifying meeting shall all endorse Job Hazard Analysis Report to indicate fully understanding of the report. During the work implementation, Job Hazard Analysis Report or its duplicate shall be conspicuously available at the work site for random consultation of the workers and supervisors.

b. Safe Task Assessment Review（STAR）

For some conventional work activities, IPMT implemented one simplified method of job hazard analysis, namely, Safe Task Assessment Review (STAR). IPMT worked out one set of STAR sheets with contractors on the basis of previous JHA reports, including one STAR table and hazard information control sheets of 42 work activities. Each of these hazard information control sheet corresponds to one single work activity, all the hazard information and control requirements of this activity are listed in the sheet. The STAR sheets are a set of hazard information control sheet summary which the workers fill in every day, in addition, it includes the information about the place, weather, conflicting work and emergency plan etc.(see Table A.7: STAR Sheet, and Table A.8: Job Hazard Information Control Sheet 1-Structural Steel Installation).

Generally the work activities included in the STAR Sheet can be evaluated in this way in terms of the construction work activity hazard, but when any work activity is started, hazards of which are uneasy to identify, or the work is so complex that the generic control measures described in the STAR sheet can not describe the hazards involved in the work, this method shall not be adopted for evaluation.

Prior to work every day, the work supervisor (shift supervisor) shall fill in STAR sheet based on the work contents with relevant Job Hazard Information Control Sheet attached. Then the work supervisor shall be responsible for explaining/clarifying the work to all people involved in the work, and explaining the control measures to be taken and PPE necessary to the work activity to each worker or work team according to the requirements of Hazard Control Information Sheet.

Table A.6.1 Report on Job Hazard Analysis (JHA)

Co.			Job:				
No			Date:				
Serial No	Job procedure	Possible hazard & loss	Appraisal method for hazards from job conditions			Control method for hazards	剩余危险 Residual hazards
			S	P	R		
JHA prepared by:			Contraction Head:：_____Date_____			HSE Manager_____Date_____	
HSE Manager of the Project Package:_____Date_____						Construction Manager of Project Package: _____Date_____	

Notes: For approved hazard analysis report, Construction Head or Shift Supervisor should give the clarification to all job staff prior to job, and job operators should sign it on the back side.

Description of Method for Appraisal of Job Condition Hazard:

Table A.6.2 S:（Severity）

Severity	**Injury or damage**	**Rating**
Catastrophic	Imminent danger	3
Critical	Serious injury, property or equipment damage	2
Marginal	Can cause illness, injury equipment damage. Not expected to be to serious	1
Negligible	Will not result in serious injury or illness, first aid.	0

Table A.6.3 P:（Probability）

Probability	**Rating**	**Value**
Probable	Likely to occur, immediately or shortly	3
Reasonably probable	Probably will occur in time	2
Remote	May occur in time	1
Extremely remote	Unlikely to occur	0

S multiplied by P equals R, Risk evaluation conducted as per Table 6-4:

Table A.6.4.R: Risk Coefficient

CONCLUSION	PROBABILITY			
SEVERITY	HIGH	MODERATE	LOW	DEFINITELY NOT
Fatality Large Scale Damage Massive Release	9	6	3	0
Major Injury Major Damage Major Release	6	4	2	0
Minor Injury Minor Damage Minor Release	3	2	1	0
No Injury No Damage No Release	0	0	0	0

Table A.7 Form of Job HSE Assessment

PROJECT		CONTRACTOR		SUPERVISOR	

No	Job activities	√	No	Job activities	√
1	Installation of steel structures		26	Forklift operation	
2	Erection of pipes		27	Scaffolding	
3	Welding		28	Traffic control	
4	Gas cutting		29	Thermal insulation	
5	Grinding		30	Hydraulic test	
6	Binding/roping		31	Job by Work Permit	
7	Assembly/disassembly of lifting machine		32	Manual haulage	
8	Lifting by crane		33	Bench saw	
9	Radiographic inspection		34	Low voltage electrical test	
10	Cable laying		35	High voltage electrical test	
11	Cable installation of electrical/instruments		36	Electrical locking out/identification	
12	Installation of cable tray		37	Machinery locking out/identification	
13	Digging/ditching		38	Electric tools	
14	Scaling ladder/lifting platform truck		39	Hand tools	
15	Brackets/hangers/baskets		40	Equipment maintenance/service	
16	Mobile equipment/facilities		41	Concrete/form board job	
17	Air compressor		42	Brickwork	
18	Painting		43		
19	Sand blasting		44		
20	Confined space		45		
21	Installation/removal of grillage		46		
22	(Un) loading of materials		47		
23	Work at height		48		
24	Use of ladder		49		
25	Use of chemicals/MSDS		50	Others	

Emergency response plan	Job environment
The nearest Muster Point	Weather situation
Receptionist phone in the project office area	Wind direction
Emergency phone	Ground conditions
Site clinic	Whether there is conflict/job at height in the vicinity
Ambulance phone	Indication of hazard/control actions
Other emergency phone	Indication of the intention of nearby enclosure/warning signs related to the job:
Contractor’s emergency phone	
Other related hazard control actions	
Place Date	Type & number of permit

Table A.8 Installation of Steel Structures

Applicable Control Measures	Indicated √
Abidance by the job permit of assembly/disassembly of grating.	
Job in sequence –complete installation of all rails and planks before installation the next layer staircase or ladder. In the absence of components, temporary planks/rails/covers should be erected.	
Check your life belt for fitting you. Notify your supervisor as soon as there are any defects or failures found.	
Tie your life belt where working at height. One hook is hitched – the other one is unhitched – one hook is hitched again – the other one is unhitched again! 100% are tied or hitched – the anchor point above your waist is used as far as possible.	
If there is no appropriate anchor point – cease job – notify your supervisor.	
When job on steel structures in the open air, use netted knotted strip so as to walk freely.	
When job on uncompleted platform, life-saving rope/fall limit rope should be used and life belt should always be tied in the rope.	
Ensure that there is a proper guard rail under your job area – the guard rail may be moved with job progression. Warn people under you for clearing off.	
Where there is a hazard that tools probably fall, the tools should be always tied up the rope.	
Never put screw caps and bolts in platform, grating or netted structures – should put them in a kit bag or barrel.	
Before moving or sliding gratings for position in an open steel structure, must always connect one end of rope onto the grating, connect the other end to a firm anchor point.	
Once the grating is in place, bind it securely with iron wire, never allow the grating to be in unfirm condition.	
When positioning/lifting steel structures, must pay attention to possible nipping points.	
When welding cable wires and gas hoses, must keep away from walkways & staircases.	
As job is being carried out, housekeeping should be done in the job area.	
Any incident & event, unsafe act or unsafe condition should be reported to your supervisor.	
As soon as any defect/failure is found in sling, chain hoist, or steel cable, should immediately report to your supervisor.	

A.6.3 Risk evaluation prior to transit from construction to production

IPMT developed systematic HSE handover plan for this stage. IPMT carried out real-time control of the handover plan in five steps depending on the direction of the risk handover: 1st step: handover from construction to pre-commissioning; 2nd step: handover from pre-commissioning to mechanical completion; 3rd step: handover from mechanical completion to linked commissioning; 4th step: handover from linked commissioning to feedstock commissioning;5th step: handover from feedstock commissioning to production performance test. See Table 9 for sample of HSE Handover Table.

When the management right of the system is shifted (from construction to production), or before the energy or medium (such as power, chemical feedstock, nitrogen, HP steam etc) are introduced, the HSE handover plan shall be finalized.

The HSE handover plan shall be implemented by the System Completion Team(a work team made up of

IPMT, Production Dept of the Owner and contractors personnel, responsible for closeout of the outstanding items and startup), organized by the project package HSE manager and production HSE manager. The relevant departments of IPMT and contractors shall be notified of the completed System Handover Plan. IPMT shall keep the contractor that is affected informed of the implementation status of the handover plan in a timely manner, and the contractor supervisor or the shift supervisor who is working in the area under the impact shall explain and clarify this circumstance to the related personnel working there.

TABLE 9 SYSTEMS HSE TRANSITION FORM

STEP 1. TRANSITION FROM CONSTRUCTION TO PRECOMMISSIONING

System #		Plant Name	
Contact Person		System Name	
Issued By:		Date:	

WHAT HAS CHANGED:	
1	
2	
3	
4	
5	
6	

SYSTEM IDENTIFIERS:	
1	
2	
3	

	POTENTIAL HAZARDS:	PRECAUTIONS:	Responsibility
1			
2			
3			
4			
5			
6			

A. 7 HSE Training

A.7.1 Requirements of HSE Training

The contractors and subcontractors in Project A shall be responsible for providing their own employees with necessary HSE training, and keep all the training data, records and certificates for random verification by IPMT.

IPMT provided the project staff and contractors with HSE training in various disciplines on a free and rolling basis, mainly including induction training, training for leadership and management personnel, training for HSE

management personnel and various dedicated trainings.

IPMT provided sophisticate facilities and excellent personnel for HSE training purpose, and invited external specialists as instructor for certain rather professional training subjects, such as gas testing training. In addition, theory combined with practice was also an training method adopted, for example, a dedicated training site for scaffold erection was provided, so that the scaffold workers of contractors could be trained in practice; human dummies were provided for the first aid training for the trainee to practice binding up a wound, fixing fractures and artificial respiration; the lifting work HSE training course was given at the lifting work site where every cycle of the lifting work was explained, and noteworthy work details and parts of the equipment to be checked were identified.

A.7.2 Induction Training

Induction training is a basic HSE training provided to the people entering project jobsite with an aim to enable them to learn the fundamental and general HSE requirements. Depending on work duration at the site and work nature, IPMT divided the induction training into long-term, temporary and visitor trainings.

Prior to work at site, the personnel to work on site on long-term basis would get about 4 hours of induction training. The site Pass would be issued only to those having received the complete training and passed the test. The induction training includes but limited to the following contents:

- HSE policy and notion of Project A;
- Main hazards existing on construction jobsite;
- Personal HSE requirements and behavior norms;
- Potential HSE risk reporting;
- Accident and near miss reporting;
- Emergency response procedure;
- Work involving chemicals;
- HSE campaign and procedure, including discipline measures and award methods;

The people to work at site for no more than three days or people to provide service would get about one hour of induction training. After the training the temporary pass would be issued for entering the jobsite. This induction training normally includes:

- HSE policy and notion of Project A;
- Main hazards existing at construction jobsite;
- Personal HSE requirements and behavior norms;
- Emergency response procedure;

People came to visit the jobsite on temporary basis would get about 15 minutes' brief induction training so as to obtain the visitor Pass before entering the jobsite accompanied by IPMT personnel. This induction training mainly was chiefly concerned with the existing hazards at jobsite, personal HSE requirements and behavior codes etc.

A.7.3 Leadership training

IPMT and contractors' leaderships and management personnel would get management-specific HSE training. This training covers extensively, normally including HSE policy and notion, HSE management knowledge and main HSE management procedures etc.

A.7.4 Training of HSE management

The dedicated HSE management personnel of IPMT and contractors would receive further professional training in addition to the above 2 HSE trainings.

Trainings of this kind is relatively professional, covering accident investigation and analysis, work

observation and recording, Job Hazard Analysis(JHA), environmental management, high potential work control (for instance, lifting work, entry into confined space, elevated work, excavation), gas testing, respiration and hearing protection, Permit to Work management, construction electricity management, emergency response, scaffold criteria and scaffold inspector training etc.

Trainings of this kind required longer time, cumulatively as many as more than 10 days, for example, 3 days for accident investigation and analysis training, 5 days for lifting work training.

A.7.5 Dedicated training

Trainings of this sort include PPE, hazards and safe use of electricity, vehicle and equipment command/signalman, HSE of excavation work, scaffold safe work, ladder/stair HSE, elevated work and fall protection, lifting work HSE, fork truck HSE, structure steel installation, radiographic work HSE, staff fire prevention and extinguisher use, bicycle HSE etc. The trainees were primarily those related to these work or items.

A.8 Control of Construction

A.8.1 Management of Permit To Work System (PTW)

The IPMT required that the work with high risk needs PTW, such controlled work include: night work, hot work, work in confined space, electrical work, excavation, radiographic work, pressure test, lifting of 80T plus equipment or lifting requiring 2 cranes, erection and dismantling of grating, man basket work etc. For Permit To Work used, please see Table A.10.

Table A.10 Sample of Permit To Work

Project A			
Fire Permit			
Project:		**Contractor**	
Starting time/date:		**Ending time/date:**	
Location:			
Job to be implemented/equipment used			
Ignition source			
Inflammable liquid/materials involved with job or being near job area			
Control measures needed			
Person watching fire	Fire-proof cloth	Bucket	Gas detection
Fire extinguishing agents			
Dry powder	Carbon dioxide	Water	
Note/additional control actions			
Contractor's responsible person			
Position	**Name**	**Signature**	
Site supervisor			
HSE engineer			
Person watching fire			
Statement: through signing here I recognize that the responsibility should be borne in order to ensure I always abide by all the above-mentioned control measures during the job. I promise to extinguish all ignition sources upon completion of the job, and remove inflammable materials/liquid to a safe place, and clean the job site, and then return the work permit to HSE Dept of Project A.			
Approved by			
Position	**Name**	**Signature**	
Construction Manager			
Construction HSE Manager			
Designated HSE Engineer			

Prior to commencement of above-mentioned work activities, the contractor must fill in the application form

for PTW and JHA (if necessary) and submit them to IPMT. IPMT would review the contents of the application and attachments, and the HSE engineer responsible for supervising this contractor would verify the HSE conditions at site. If the requirements for the application were met, the construction HSE manager and construction manager would approve and return it to the contractor for implementation under the supervision of the HSE engineer designated by IPMT. For the implementation flow of PTW, see Figure A.2.

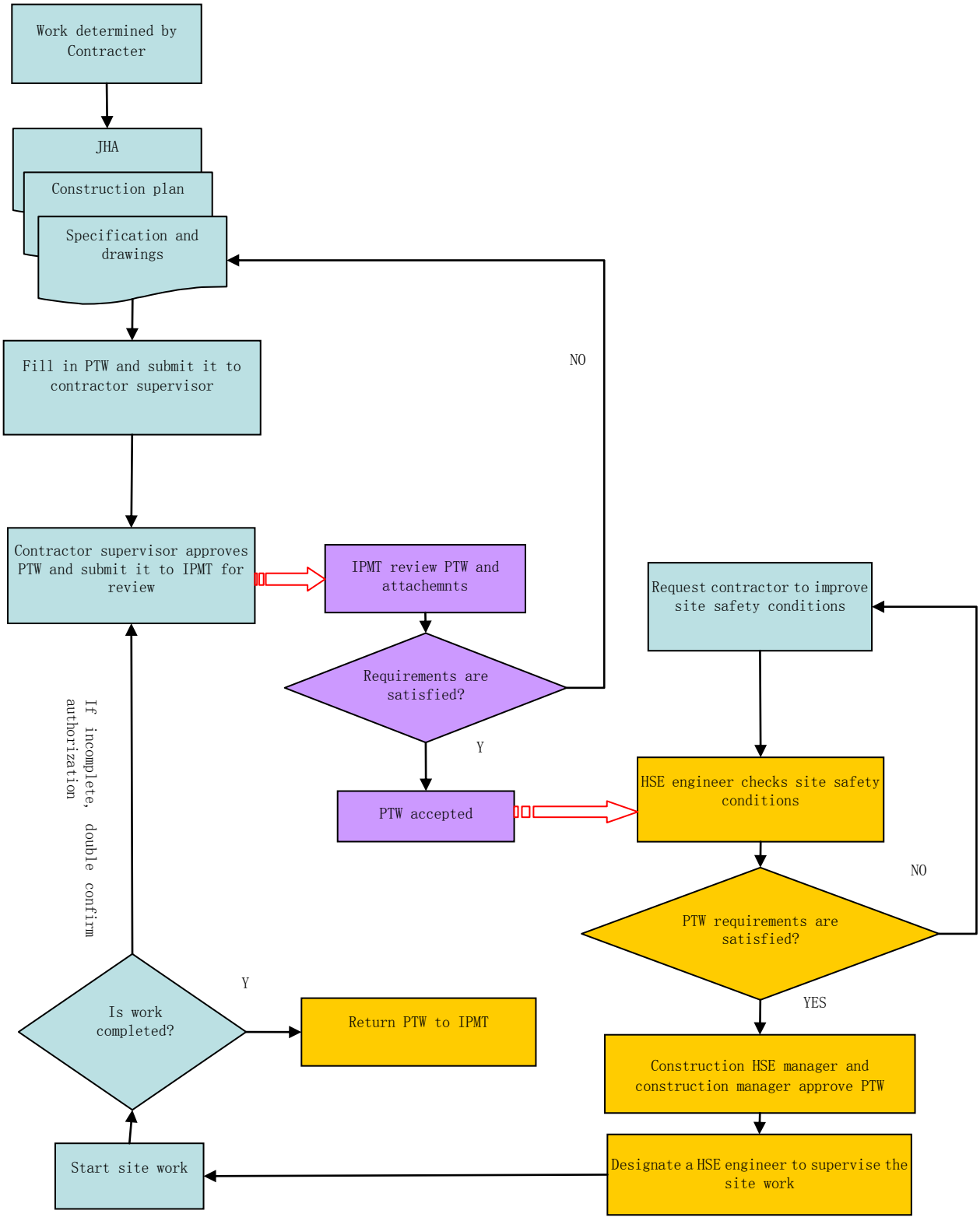

Figure A.2： Work Flow of Permit To Work

Prior to work implementation, the supervisor would provide technical explanation to all the people getting involved in the work, and the duplicate of PTW would be posted in the work area or kept by the operator.

All the people implementing PTW must be trained for relevant disciplines, including managers on various levels, supervisors, site HSE engineers, persons who approve PTW and relevant personnel of the contractor.

A.8.2 Management of construction equipment and tools

Before mobilized into jobsite of Project A, all small-scale lifting equipment, hoists, generators, electric welding machines, gas cutting tools, electric tools, manual tools, electrical equipment fire extinguishers etc would be fully inspected by the contractor itself. The items passing the inspection would be identified with color marks as per *Equipment Inspection Color Identification* while those incompliant equipment and tools would not be brought into jobsite. Monthly inspection of the equipment and tools would be carried out after they are put into service, and the color identification would be updated on those compliant items. The inspection would be performed by the competent contractor personnel; relevant IPMT HSE management personnel would supervise the inspection.

All the special equipment such as crane, fork truck, and shuttle bus would be first inspected by IPMT lifting /equipment specialist for compliance and permits are issued before they were put into jobsite service. During the service, the certification would be renewed every three months. The contractor would request for IPMT inspection after successful self-inspection together with following deliverables:

- Shop certificate copy of the equipment;
- Truck crane, shuttle bus would be provided with vehicle permit.
- The crane should be provided with lifting machinery service permit issued by the municipality level governing department.
- Photocopies of driving license and ID of drivers.

After IPMT lifting/mechanical specialist checked the above-mentioned information for compliance with the requirements, the equipment would be checked against Table A.12 Crane Checklist and Table A.13 Quarterly Vehicle Checklist, and the service permit would be issued for those equipment identified as compliant. Special equipment without service permit is not allowed to be used.

The special equipment drivers would inspect the equipment prior to work every day and fill in the daily equipment check records.

Table A.11 Color Mark Specification for Equipment Inspection

Color Mark Specification for Equipment Inspection			
Red	Jan	May	Sep.
Blue	Feb	June	Oct.
Yellow	Mar.	July	Nov.
Green	Apr.	Aug.	Dec.

Crane driving gear – sling/shackle/lift hook, etc. **Electrical generating equipment – generator, electric welding machine, etc.** **Electric tools - angle grinder, circular cutting machine, electric drill, electric saw, etc.** **Hand tools - hammer, chisel, saw, crowbar, etc.** **Electrical equipment-cable/junction box/distribution meters** **Ladder, cross-bar type ladder, tripod, etc.** **Full HSE belt** **Extinguishers**	All such equipments must be numbered and registered, respectively. Such equipments should be inspected by qualified/competent personnel monthly, and they will stick color marks on those equipments in good condition, and carry out registration and signatures. Once these Equipments that are found damaged or unchecked shall be suspended from the service and be sent for repair or be removed from this project.

*** Hand tools do not need to be numbered and registered.**

Table A.12 Crane Checklists (Part)

Crane Checklist

General Status

Crane Owner/Contractor Crane No

Government's inspection authority Equipment serial No

Name of operator Deadline date

Project/job site:

Acceptance personnel after installation:

Equipment condition Acc. – Acceptable, Rej. – Rejected, N/A – Not available

Item		Status			Remarks
		Acc.	Rej.	N/A	
Operator cabin	- Glass/visibility				
	- Load meter & caution mark				
	- Fire extinguisher				
	- Whistle function				
	- Suitable access (staircase/walkway)				
	- Instruments & controls				
	- Angle indicator of gibbet				
	- Level indicator				
Engine	- Cleanliness/free from scrap/free from rubbish				
	- Drive gear/mechanical protection				
	- Available access/walkway				
	- Normal running				

Table A.13 Quarterly Vehicle Checklist

Inspector		Date		Driver	
Location:		Running years:		Driver's license No:	
Region:		Type of vehicle:		Lifespan:	
Register No:		Mileage:		Life length	
Rated total vehicle weight		Permissive carrying capacity		Actual weight	

Vehicle condition	**Normal**	**Defect**	**Remarks**
Decoration			
Painting			
Interior			
Windshield/vehicle window			
Appearance/vehicle tidiness			
Mechanical condition			
HSE belt			
Maintenance log			
Oil replacement			
Tyre			
Shock absorber			
Steering mechanism			
Hose/driving belt			
Brake device			
Windshield wiper			
Spotlight			
Tail lamp			
Parking lamp			
Directional signal			
Kit snap lock			
Interior & exterior viewfinders			
Horn			
Reversing alarm			
Exhaust			
Speedometer			
HSE equipment/procedure/checklist			
Fire extinguisher			
First aid kit (complete)			
Triangle sign, taper column or caution light			
Glisten safe vest			
Tyre charging cylinder			
Cell jumper			
Flash lamp			
Vehicle registration certificate			
Report form of accidents			
Emergency response act – auto accident form			

Any defects must immediately be corrected.

A.8.3 Management of Construction Electricity

Prior to the project commencement, IPMT had designed and arranged the temporary electricity system at the whole site and developed a sound management system of the electricity, identifying the management duties of the client and the contractors.

Any use of temporary equipment at site must be checked and approved by IPMT beforehand. The contractor to install temporary electricity facility would submit IPMT the *Temporary Electricity Installation Application Form* for application.

All the people engaging in electrical work, including power supply or wiring work, shall be duly certified by the local governing department with effective Electrician Operation Certificates.

The contractor shall designate competent personnel to be responsible for the maintenance and management of electricity-consuming equipment. Every temporary power distribution panel/cubicle must be provided with one qualified person for daily maintenance, inspection and documentation. The inspection record shall be kept or posted on every temporary power distribution panel/cubicle.

All the site low voltage temporary electricity facilities are arranged in 3 phase 5 cores manner. All the temporary electricity equipment, tools and circuits must be selected according to the power supply voltage; all relevant electrical elements must satisfy the requirements of relevant national codes and standards. The power source of the temporary electricity and relevant circuits must be in strict compliance with the specification of electrical construction and installation.

A.8.4 Management of Personal Protection Equipment

The contractor should provide their employees with free, necessary and appropriate PPE on the basis of the project codes and requirements. All the people entering jobsite of Project A shall wear helmet, goggle and toe-protection safety shoes at least; otherwise, their entry would be prohibited by the guard. For elevated work, five-point double-buckled harness shall be in place in compliance with 100% tie-off policy. During special work implementation, the contractor would provide the employees with some free accessory devices such as earplugs, masks, leather gloves etc, and provide training on how to use protection equipment.

People entering jobsite temporarily for business purpose could borrow basic PPE from the PPE management office; the driver of the truck delivering goods could enter the jobsite without PPE, but could not get off during his/her stay at site.

A.8.5 Housekeeping Management

IPMT and relevant design parities jointly designed the layout of the site temporary facilities, worked out the overall plan of the temporary office facilities, the temporary warehouses, excavation lay-down area, rubbish collection location and temporary public toilet within the plant area for IPMT and contractors.

The contractor provided necessary accommodation and rest facilities within the area allocated by IPMT on the construction plot plan, and was responsible for the tidiness and hygiene of these facilities.

The contractor assumed effective management of the materials, construction equipment and tools, compressed air cylinder, construction wastes and debris etc at the construction site to ensure the construction site is clean and tidy and has no obstacle.

The construction site was provided with places for rest, drinking water and smoking, ensuring the employee would get appropriate rest and sufficient drinking water during the construction. Smoking is forbidden outside the designated smoking area.

The contractor provided rubbish collection box or waste/disposal storage point at jobsite. The waste/disposal

must be put in the designated rubbish box or waste/disposal storage point. The waste/disposal/rubbish must be treated offsite in accordance with the local regulations. The incineration or filling of waste/rubbish in open air at jobsite is forbidden.

A.8.6 Fire Fighting/Prevention Management

As the project construction progressed, IPMT carried out fire risk evaluation for individual areas at site and furnished fire-fighting equipment in each area on the basis of the evaluation results. At the initial stage of the project construction, as the result of limited fire fighting resources, apart from the social resources in the nearby community, IPMT mainly relied on fire extinguishers put in place in sufficient quantity at site or the temporary water tank, sand pit and other small-scale fire fighting facilities as the preliminary fire fighting means. With the establishment of the site process fire fighting system and fire station, IPMT combined these internal resources with the original site small-scale fire fighting equipment as the principal fire fighting means.

IPMT developed a series of fire fighting management procedures, including hot work management, smoking policy, fire hydrant use rules, fire emergency response and so on. There were some specific regulations, for example, hot work permit must be issued for all hot works, and gas detection shall be carried out if necessary; smoking is permitted only in the designated area at site, where enough fire prevention facilities shall be in place; all acetylene cylinders shall be provided with fire resistant hood, and each day the welder shall use soap liquid to test the acetylene cylinder to be used, hose joint for leakage; the fire extinguishers shall be checked every month, the inspection and maintenance shall be documented, and defective extinguisher shall be replaced in due time.

In addition to development of the fire fighting emergency response plans, IPMT and contractors trained all the staff on firefighting and carried out regular and irregular exercises.

A.8.7 Security Management

IPMT carried out the enclosed management of construction site, controlled the access and egress of the construction site in a robust manner so as to protect the properties and commercial information of the Project, meanwhile, nobody was allowed to enter the site without the consent of the Owner and the IPMT.

All personnel that passed the Induction Training would obtain the pass permit to enter the jobsite, which shall be worn visibly all the time after entering the site. Based on the purpose and duration of the people entering the site, the construction site Pass Permits were classified into Contractor Pass Permit, Temporary Pass Permit, and Visitor Pass Permit.

- The contractor Pass Permit would be issued to the contractor personnel who would get involved in the site construction on long-term basis and who had received the HSE induction training;
- The temporary Pass Permit would be issued to those temporary operation or service personnel who intended to work at site for no more than 3 days and had received HSE induction training.
- The Visitor Pass Permit would be issued to those who came to visit project site, attend a meeting or deal with businesses.
- Temporary freight drivers would enter the jobsite with the temporary vehicle Pass.

IPMT HSE personnel and security guards were entitled to confiscate the pass of those people who violated regulation and request the person to leave the site immediately. Anyone who leaves the site has to return the Pass to IPMT.

All vehicles must enter the jobsite with the Pass. The vehicle pass is divided into long-term and temporary passes.

Long-term pass is issued to the contractor for the vehicle that needs to enter the jobsite on long term basis and has been checked and approved by the HSE engineer and security guard. The long-term pass normally has validity of half a year, and was issued through following procedure:

- The contractor should submit a prior application in writing to the project package HSE manager,

construction HSE manager or the designated engineer;

- With the application form signed by HSE department and relevant documents, the contractor would contact the security department and set time to inspect the vehicle;
- The relevant documents used in the application for PASS are duplicates of the following: vehicle driving permit original and copy, driving license original and copy, vehicle insurance certificate, driver's Pass to the jobsite;
- The authorized security guards would check the vehicle against the vehicle checklist;
- After the vehicle inspection, the security guards would issue the Pass with the project sequential number and stamp;
- The security guards would keep the information of this vehicle and relevant application submittals.

The temporary pass would be issued to the contractor after the site security guards checked briefly the vehicle to enter the jobsite. The temporary pass would be valid for the same one day, and could be obtained through following procedure:

- The site security guards check the vehicle;
- The security guards should give the driver a simple HSE orientation and issue the jobsite guidance to the driver who comes first time.
- The driver of the temporary vehicle shall get the vehicle pass with effective certificate, and properly check in.
- When the temporary vehicle leaves the site, the temporary pass must be returned.

The vehicle speed limit control was implemented at the jobsite. All the vehicles were not allowed to drive at a speed more than 15km/h. Parking on the main roads is forbidden. Except construction vehicles and goods delivery vehicles, no other vehicles were allowed to park at the construction jobsite.

A.8.8 Management of Warning and Identification

IPMT requested that appropriate warning identifications or barricade should be put in place where there were potential hazards to warn the project site people entering the risky area. For example, for lifting work, the work area of the crane shall be roped off, warning people from entering the work area; the excavated pit shall be barricaded with circumferential fence against falling of the passers-by; NDE, pressure test, blasting work etc shall all be provided with area warning; the work related with the confined space and energy isolation shall be conspicuously warned of, and provided with lock measures when necessary.

The contractor must ensure that the HSE identification and protective fence corresponding to the potential hazards be in place at the construction site. The contractor and IPMT HSE engineers shall periodically inspect the HSE identifications and protective fences of individual project sites, and request immediate rectification of the identified faults. The watchmen of the HSE warning area is responsible for reminding irrelevant personnel to keep away from the hazardous area. All the staff at jobsite must always act in compliance with the HSE identification. Anyone doubting that the control measure is insufficient to prevent occurrence of the hidden hazards shall immediately advise the personnel on the scene or HSE engineer.

A.8.9 Medical Care and First Aid

Project A established its own Emergency Center and medical clinic, and the first-aid station was stationed at the construction site. These medical institutions were equipped with qualified doctors and nurses as well as medical devices for emergency and non-emergency scenarios. The medical clinic was meant to provide work-related harm and illness treatment to all the project staff, visitors and contractor personnel.

The contractor provided its own medical facilities to meet the minimum requirements of IPMT.

IPMT and the local hospital established relationship to ensure all the vocational harm and illness would be treated rapidly and professionally. IPMT provided the hospital with information about the project policy, operation

flow, potential risks and importance of good medical care. Any patient that needs treatment shall be re-treated by doctor designated by IPMT after having been treated by other doctors, and this designated doctor shall propose the medical advice for the second time.

For serious injury cases, the medical personnel shall comply with the emergency transfer procedure developed by IPMT. If necessary, the local ambulance could be called in to carry the patient to the designated hospital emergency room equipped for emergency handling. For the injured that does not need to be sent to the hospital for treatment on emergency basis, the appropriate vehicle available at jobsite could be utilized. Except for emergency cases, the contractor shall be responsible for delivering its staff to the site medical office, and the employer shall provide all the equipment with the vehicle (such as medical needles and thread, physical therapy etc) necessary for the medical mission.

IPMT requested the medical treatment should be recorded. When the patient was treated at the site clinic, the medical nurse shall register in the daily emergency report, including injury/illness date/time, name of the employee, ID, and name of the foreman, category of the injury/illness, treatment received and arrangement.

A.8.10 Control of Hazardous Chemicals

Prior to commencement, all contractors shall conduct all-around assessment of all hazardous materials associated with their construction activities and submit their assessment findings to IPMT for filing. All the assessments shall be carried out in accordance with the relevant laws of the PRC, covering the following:

- What hazardous materials will be involved in the construction activity?
- What hazardous impact may be caused?
- Where will the hazardous material be used? How will it be disposed?
- What hazardous materials will be generated?
- Who will be affected? To what extent? How long?
- Will persons expose to hazardous materials?
- To what extent will persons expose to hazardous materials?
- What actions shall be taken?

Approval must be obtained from Project Package Manager and HSE Department before any hazardous materials are moved into the construction site. Following procedure shall be implemented before any hazardous materials are used in the project.

- The Contractors shall identify any hazardous materials that will be used at their work sites.
- The individual contractors shall list the hazardous materials to be transported into their construction sites in Declaration Form of Hazardous Materials, and attach Material Safety Data Sheet of each hazardous material, indicating their control means, and submit them to HSE department for approval.
- Before handling, check the container or package of any hazardous materials for damage, leakage and identification in order to further identify what is contained. Carry the least amount of hazardous substances necessary for the work only. Handle and store hazardous materials as per the vendor’s instructions.
- During the execution of any site jobs associated with hazardous materials, the Contractors shall ensure that one copy of the approved list of hazardous materials is kept at site.

- If the work task or the hazardous chemicals are changed, the Contractors must resubmit the Declaration Form of Hazardous Materials, MSDS sheet and the relevant control measures for hazardous materials for approval by the Project again.

Before starting any jobs involved with hazardous materials, the Contractors must prepare technical clarification document and JHA, detailing relevant control measures.

All hazardous materials stored at site must be identified, classified and indicated in accordance with the relevant laws and regulations of PRC and international practices, and the inventory of hazardous materials must be limited to a level meeting the construction demand for two working days.

The location where hazardous materials stored must be provided with conspicuous warning signs. The warehouses for hazardous materials must have facilities for fire prevention, theft protection, leakage protection and corrosion protection. During application and before storage, the container or package of hazardous materials shall be properly sealed and separately stored in the proper area as instructed by the manufacturers. Any hazardous materials in storage, if not reused, shall be immediately disposed of after having been approved. If it continues to be used, the following information shall be recorded:

- Names of hazardous materials - hazardous materials shall be denominated as common names. No special chemical names are required.
- Physical form – the form in which the hazardous material is received and stored, such as liquid, solid, powder, etc.
- Unit dimensions;
- Point of storage;
- Point of application;
- Usage;
- Supplier;
- Material Safety Data Sheet (MSDS)

The contractor shall develop an inventory list of hazardous materials stored/ used at the project site. This inventory information list of hazardous materials shall contain all the hazardous materials involved at the site.

A.8.11 Management of Changes

IPMT listed the changes that need to be approved through the Management of Changes procedures which include but not limited to:

a. All HSE procedures, rules, regulations, codes and standards in the battery limit of Project A;

b. The related laws and regulations of P.R.China;

c. Various industrial and international standards used in Project A;

d. Other related procedures, rules, regulations, codes and standards.

The IPMT stipulates that the following procedures shall be followed once certain changes should be made due to variation from the original procedures:

a. Before the contents of changes are identified, the related personnel trying to propose changes shall make careful study on the Change Requisition so as to make the final decision whether the changes should be made.

b. Clearly identify the scope involved in the changes: the procedures, personnel and areas that might be impacted by the changes, time and degrees of the changes, etc..

c. Explain the causes of changes reasonably.

d. The HSE Dept at the corresponding level and the department or personnel applying for the changes shall jointly carry out careful evaluation on the possible threat to safety caused by the changes. In the process of such evaluation, the industrial standards and general HSE requirements shall be considered.

e. Get the approval of the related departments/authorities.

f. To implement the changes.

A.8.12 Environmental Protection

IPMT established the environmental protection policy of Project A on the basis of the relevant national environmental protection policy.

a) Keep all sites (or lands) free of wastes as far as possible;

b) Whenever deciding on procurement, the potential impact of optional solutions (including disposal and emission of wastes) on the environment shall be taken into account.

c) Try to use products made of reusable materials (according to the principle of lower costs and better effects).

d) Guarantee implementation of the governmental policy for disposal of wastes, and upgrade the waste on the principle of reducing generation of wastes and developing better disposal solution for re-utilization of the wastes.

The contractor and subcontractor shall follow the points below:

- No oil, grease, fuel, lube, paint, solvent, acid, base, chemicals or contaminated wastewater are allowed to flow into the sewer system at site, or be directly discharged into soil.
- The leakage of petrochemicals, chemicals or other materials occurred must be immediately reported to IPMT, and at the same time immediate actions shall be taken for containment and cleanout. The expenses incurred therein shall be borne by company causing the trouble. A written report on the leakage event must be submitted to IPMT within 3 hours after the occurrence of the event.
- Loading/ unloading and storage of all storage tanks, chemicals, fuels and similar materials must be carried out on the roadside, at the jetty or within the dike (except for the tank trucks fueling the equipment). Separate drum shall be placed within the bund or similar equipment to contain possible leaks.
- The equipment cleaning, washing or flushing of chemicals, oils, acids, bases or other pollutants must be executed in a closed area approved.
- Flushing or maintenance of vehicles can only be carried out in the designated area.
- Application of any toxic or hazardous materials or chemicals must be approved by IPMT.

- Paints, rock wools and polyurethane for corrosion prevention and heat insulation and materials prone to generate dusts shall be properly stored. When the pavement or facilities at site are contaminated, clean them in due time.
- The jobsite shall be regularly cleaned and kept tidy. The construction debris shall be collected in centralized manner removed and transported to the designated location in time. Non-toxic wastes such as office rubbish, construction materials, concrete pieces and metal scraps generated from the project construction activities shall be properly handled.

A.8.13 Management of Occupational Health

The Staff Is The Most Precious Resource of The Company. IPMT stipulated the comprehensive and detailed regulations on occupational health and issued individual procedures for special jobs, such as noise control, arm vibration protection, radiation safety, night job, etc.

IPMT addressed the occupational health issues at the monthly HSE performance assessment of the contractors, e.g. the medical treatment facilities provided by the contractor for its workers; the drinking water /washing facility provided at the camp and the site; conditions for workers' dormitory and lounge; MSDS for materials associated with jobs; control measures for health hazards, etc.

IPMT would take emergency responses against events posing harm to workers' health. For example, when the whether was very hot (over 35℃), IPMT made an urgent decision to adjust the working hours and extended the lunch break. The extended rest at noon effectively reduced heatstroke events among workers.

A.9 Supervision of Construction

A.9.1 Work Safety Observation System

Everyone at the site has the duty of filling in Work Observation Card, the format of which is shown in Table A.14.1 and Table A.14.2.

Everyone at site can fetch a Work Observation Card at the designated place, and then select one random work activity within the range of the jobsite for observation of the work contents, PPE use, tool & equipment use, existing hidden hazards of this work activity, control measures that having been implemented against the hidden hazards etc.. The observer shall stop any incompliant behaviors immediately and document the implementation status of the measures on the card. If the problem can not be solved on spot, the recommendation shall be raised on the card.

After the task of one work observation activity is completed, the observer shall put the observation card in the designated collection box, and IPMT would periodically collect the cards in the box. IPMT would input the data collected on the observation card each time into the database, determine the trend of the hidden hazards and areas with problems by means of analysis methodology and publicize the results of analysis.

The work safety observation system enhanced the HSE awareness of each employer, manifesting the notion "HSE IS EVERY EMPLOYEE'S RESPONSIBILITY". Meanwhile, the work observation system helped IPMT grasp the tendency of HSE hidden hazards at site in a timely manner and adjust HSE policy and training orientation in due time.

Table A.14.1 The Front Side of Job Observation Card

JOB Observation Card
Date :…….. Time :…….

Project/location Company Observed Task Observed……..			
Hazard Exposure Analysis		No. of Unsafe Exposure	
	Striking Against or Being Struck by Objects		
	Caught In, On or Between Object		
	Falling down		
	Contacting temperature extreme		
	Contacting Electric Current		
	Inhaling, Absorbing or Swallowing a Hazardous Substance		
PPE Compliance		Number Observed	Non Compliance
	HSE Glasses		
	HSE Helmet		
	HSE Shoe/boot		
	Fall Protection		
	Gloves		
	Face Protection		
	Hearing Protection		
	Respiratory Protection		
	Temperature Protection		
Hazard Control Required		Number Observed	Non Compliance
	Fire Extinguisher /Blanket/ Bucket		
	Signalman/Standbyman/FireWatch		
	Barrier/Warning Sign		
	JHA/Permit/Procedure		
Tool & Equipment Condition		Number Observed	Non Compliance
	Right for the job		
	Use correctly		
	In Safe Condition		

Table A.14.2 The Back side of Job Observation Card

Observations (Both safe and unsafe acts/conditions)
Immediate Actions
Recommendations

A.9.2 The Contractor's Weekly/Monthly HSE Report

The contractor would submit HSE weekly and monthly reports to IPMT as scheduled. See Table A.15 and A.16 for the sample of HSE Weekly Report and Monthly Report.

Table A. 15 Contractor HSE Weekly Report

Serial No.

Contractor HSE Weekly Report

Contractor		**Date**		**Report Period**	
Contract Number					
Construction Scope:					
Engineering HSE Issues:					
Procurement HSE Issues:					
Construction HSE Issues:					
Incident Statistics --- Including sub-contractors					
Fatality		Occupational Illness		Electrical	
DAFW		Property Damage		Environment	
Medical Treatment		Vehicle		Theft	
First Aid		Fire		Near Miss	
Other(specify)					
Current Average Manning Level					
Contractor		Sub-Contractor		Total	

PROGRAM IMPLEMENTATION – Including sub-contractors

Related Training			
Program Name	**Conducted By**	**No of Attendees**	**No of Session**

Inspection / Audits (I/A) – Do not include daily inspections			
Program Name	**No. of I/A**	**Conducted by**	**No of Action Item Identified**

HSE Related Meeting		
Meeting Name	No of Meeting	Participants

HSE Promotions
Current Topic: **Activities Conducted:**

In-house Disciplinary Action for HSE Violation		
Violation	**Number**	**Action Taken**

Other HSE Program Conducted
HSE problems need to be solves by the IPMT:
HSE Work Plan for next week:

Filled by		**HSE Manager**	

The report must be submitted to IPMT HSE Department before 12.00 p.m. each Saturday.

Table A.16 Contractor HSE Monthly Report

Contractor HSE Monthly Report

Contractor		**Date**		**Report Period**	
Contract Number:					
Construction Scope:					
Engineering HSE Issues:					
Procurement HSE Issues:					
Construction HSE Issues:					
Incident Statistic --- Including sub-contractors					
Fatality		Occupational Illness		Electrical	
DAFW		Property Damage		Environment	
Medical Treatment		Vehicle		Theft	
First Aid		Fire		Near Miss	
Other(specify)					
This month's Total Man hours					
Contractor		Sub-Contractors		Total	
Vehicle Driven Distance (km)					

PROGRAM IMPLEMENTATION – Including sub-contractors

HSE Related Training			
Program Name	**Conducted By**	**Number of Attendees**	**Number of Session**

Inspection / Audits (I/A) –Do not include daily inspections				
Program Name	**No. of I/A**	**Conducted by**	**No. of Action Item**	
			Identified	**Corrected**

Inspection / Audits

Total No. Identified To Date	**Total No. Resolved**	**Outstanding**

HSE Related Meeting		
Meeting Name	No of Meeting	Participants

HSE Promotions
Current Topic
Activities Conducted

In-house Disciplinary Action for HSE Violation		
Violation	**Number**	**Action Taken**

Other HSE Program Conducted
HSE problems need to be solved by IPMT:
HSE Work Plan for next month:

Filled by		**HSE Manager**	

The report must be submitted to IPMT HSE Department by 3rd of every month.

A.9.3 Inspection

IPMT implemented an overall supervision and inspection of HSE performances of the contractor. These inspections include regular joint weekly and quarterly HSE inspection with contractors and routine patrol and random inspection.

a. Joint weekly HSE inspection

The construction HSE manager would organize the joint weekly HSE inspection and decide the time, areas and contents of the inspection. The inspection team consists of project construction manager (leader of the inspection team), project HSE manager, construction HSE manager, HSE engineer and contractor project manager as well as HSE manager. The inspection normally would cover following contents:

- Emergency response equipment
- PPE
- Creepage protection equipment or operation procedures
- Acceptable industrial hygiene management regulation
- Proper use and work status of tools and equipment
- Proper identification/storage of hazardous materials and other chemicals.
- Temporary power distribution panel/cubicle, wire and lead
- Equipment inspection record
- Appropriate color identification of the equipment (for example, steel wire and rigging drive device updated each month/quarter with color marks).
- The inspection team must identify the places and conditions probably leading to following accidents or hidden hazards:
- Traffic accidents
- Explosion accidents
- Fire
- Congested work area
- Work activities simultaneously taking place /mutually intervening
- Chemical spillage or spraying phenomenon that could result in pollution of the land, water or air
- Lack of oxygen
- Source of ignition
- Contact points of power equipment and lines

The inspection team must evaluate the following compliances:

- Contractor construction execution plan
- Job Hazard Analysis
- Various provisions and conditions specified in the Safe Work Permit or other site permits

The construction HSE manager was responsible for compiling the inspection report, putting forward recommendations and modification measures as well as follow-up and inspection measures. The compiled report would be dispatched to the parties and personnel who participated in the inspection. All the outstanding issues not solved immediately during the inspection would be handed over to the construction manager or designate appropriate representative for follow-up and solution. For Weekly Joint Inspection Report, see Table A.17.

Table A.17 Weekly Joint HSE Inspection Report

PROJECT		Total No. of Action Items Identified	
INSPECTION DATE		Total items resolved during/after inspection	
AREA INSPECTED		Total items resolved after 1 week	
INSPECTION TEAM MEMBER		Total items resolved after 2 weeks	
Drafter of the Report		If an item is not closed within 2 weeks transfer it to outstanding item list	

Item	Location	Findings/Issues	Correction Action Required	Hazard Rating	Action Party	Deadline	Status

Hazard Rating:

Class A (Major) – A condition or practice likely to cause permanent disability, loss of life or body injury, and/or extensive loss of structure, equipment or material.

Class B (Serious) - A condition or practice likely to cause serious injury/illness resulting in temporary disability or property damage that are disruptive but less severe than in Class A.

Class C(Minor) - A condition or practice likely to cause minor, non-disabling injury/illness, and/or non-disruptive property damage.

Distribution: Project Construction Managers (Project Packages and contractor)

Inspection Team Members

HSE department

b. The quarterly site HSE joint inspection

The quarterly site HSE joint inspection was an inspection by project construction senior management, led by IPMT Director and participated by HSE Director, Construction Director, contractor project managers, contractor HSE managers. The inspection covered following contents:

- Influence of contractor HSE leaderships
- Compliance of the site construction personnel with the site HSE rules, regulations and procedures;
- The holistic status of each construction work area

The inspection team leader was responsible for compiling the inspection report, documenting recommendations raised by the inspection team and tracking the implementation of the recommendation.

c. Routine patrol

The construction HSE managers, HSE engineers, HSE specialists and scaffold inspectors must carry out routine HSE inspection and supervision and document the daily inspection.

A.9.4 Rectification

IPMT and the contractor would put forward remedial measures after full analysis of the identified problem, and the rectification action would be carried out by the contractor. The rectification would normally follow the principles below:

- The hidden hazards, behaviors and conditions incompliant to or in violation of HSE regulations identified in the inspection would be referred to the contractor for immediate rectification;
- Anyone violating the Zero Tolerance policy would be deprived of the pass card, expelled and listed in the Black List of Violators of Rules, making impossible for such a person to return to site (ZERO TOLERANCE means that the person violating the rules will not be forgiven or warned, and immediate and most stringent penalty will be enforced once violation is identified).
- In case high potential risk was identified during the inspection, immediate action would be taken to stop the relevant work activity until the problem was solved.
- HSE manager would suspend the construction when the contractor HSE performance was bad or the construction area was managed in a mess, request for rectification and hold a dedicated topic discussion with the contractor project managers (the manager of the company that owns the contractor would be invited when necessary). The construction activity could be resumed only after the rectification measures had been carried out proactively.

A.9.5 Evaluation of the contractor performance

IPMT assessed the HSE performances of the contractors every month depending on the daily performance records, main accidents and incidents, the inspection records, training level and training record, capabilities to satisfy the need of work activity and the control over the construction work processes etc. The project HSE manager and construction HSE manager would evaluate the contractors' HSE performance on the basis of the items and criteria specified in Contractor Loss Preventive Inspection Report (see Table A.18).

The monthly performance scores would then be transformed into the performance evaluation tendency diagram which could reflect the contractor's HSE performance trend for certain period. Project HSE manager would adjust the HSE administrative plan specific to the contractor in question with reference to this tendency.

Table A.18 Contractor's Loss Prevention Inspection Report (Part)

PROJECT – CONTRACTOR – LOSS PREVENTION INSPECTION REPORT

Package / Area：			**Package HSE Managers：**		
Contractor:			**Package Project Manager：**		
Scope of Work:			**Contractor HSE Manager：**		
Number of Workers:			**Number of HSE Engineers：**		
Month of Inspection:			**Inspection Number：**		
Item No	**Inspection Checklist**	**N/A**	**Possible Score**	**Actual Score**	**Comment**
1	**HSE Administration**				
1.1	HSE Procedures / Project Rules		**10**		
1.2	Enforced by management / supervision		**20**		
1.3	Participation/Attendance at Meetings/Inspections		**10**		
1.4	HSE Personnel Authorized		**10**		
1.5	HSE engineers in 50 to 1 Ratio/Active		**10**		
1.6	Internal HSE Committee		**10**		
1.7	Incident Investigation / Reports		**10**		
1.8	Loss Prevention Inspections		**10**		
1.9	Documents are complete and in Order		**10**		
Items 2 through 28 were omitted					
29	**Environmental**				
29.1	Water Usage / Wastage		**10**		
29.2	Separation of scrap metal / general waste		**10**		

29.3	Disposal of waste oil / paint residue / chemicals		**10**		
29.4	Prevention of ground contamination		**10**		
			A	**B**	
	B divided by A multiplied by 100 equals compliance score	**Totals**	**2440**		**Compliance Score**

Adjustment based on number of workers :	**< 100**	**=**	**0**	**Point**	
	100 to 200	**=**	**+1**	**Points**	
	200 to 400	**=**	**+3**	**Points**	
	>400	**=**	**+6**	**Points**	

Adjustment based on Scope of Work:

Golden Rule - Work Permits	**0 to 3 points**	
Golden Rule - Working at Height	**0 to 3 points**	
Golden Rule - Ground Disturbance	**0 to 3 points**	
Golden Rule – Entry into Confined Space	**0 to 3 points**	
Golden Rule - Energy Isolation	**0 to 3 points**	
Golden Rule - Vehicle HSE	**0 to 3 points**	
Golden Rule - Lifting Operations	**0 to 3 points**	
Golden Rule - Management of Change	**0 to 3 points**	
	Total	

Evaluation Scoring Criteria

0	**Never Implemented / Total Non-Compliance**
1	**Rarely Implemented / Rarely Compliant**
2	**Inconsistently Implemented / Frequent Deviation**
3	**Not Implemented Fully / Not fully Compliant**
4	**Implemented / Compliant - Rare Exception / Deviation**
5	**Always Implemented / Full Compliance**

5 points to be deducted for failure to score 60% in any Golden Rule

Compliance Score plus adjustment equals:

A.9.6 Award and penalty

Immediate award: the field HSE engineer was appropriately authorized to award workers with good performance with small prizes during the routine patrol to promote the HSE performance of the workers.

Dedicated rating: For example, to improve the HSE and stability of the scaffold erection at site, IPMT launched scaffold erection competition. IPMT scaffold specialist assessed the large-scale scaffolding system at the whole site within certain timescale and picked the erectors of the excellent scaffolding to be the winners of the award from IPMT;

Monthly rating: IPMT ranked all the contractors by the assessment scores on the basis of contractors' performance, then implemented award or penalty policy as specified below:

- Award certain sum of money to the contractor with excellent HSE performance each month;
- Award great prize to the first 3 contractors in the rank;
- Appropriately award the contractors with average score more than 60 plus;
- Fine the contractors with average score less than 60;
- Serious violation behaviors would be severely penalized;

Accumulative safe man-hour award: IPMT celebrated the achievement of continuous 5 million and 10 million safe man-hours and dispatched souvenirs to every staff member.

ZERO TOLERANCE: for incompliant behaviors that existed commonly and had serious impact on the construction HSE, such as elevated work without tie-off of the harness, entry into the confined space without authorization, the un-trained staff members brought into jobsite by the management people, IPMT established policy of ZERO TOLERANCE. Anyone violating ZERO TOLERANCE policy would be expelled and blacklisted, forbidden from entering the jobsite.

Work suspension: with respect to commonly existing hidden hazards or violation phenomenon in certain work/ work areas or to individual contractors, or as the result of the accident, IPMT would suspend the work as the penalty to this work/contractor/work area. Unless the contractor involved had taken effective measures, IPMT would not permit the resumption of the work activity.

Notifying the headquarters of the contractor: for the contractor having many HSE management problems and slow in improvement, IPMT would issue one letter to its headquarter, requesting the higher management in the headquarters to come and discuss improvement measures at jobsite in order to constrain the behaviors of this contractor on project and keep an eye on the future HSE performance.

Contractor's regulations of award and penalty: To improve their own HSE performance, the individual contractors carried out rules of award and penalty on the subcontractors, for instance, labor HSE competition, penalty, termination of the contract and establishment of HSE retention etc.

A.10 Emergency Management

A.10.1 Determine the category and class of emergency response object

The categorization criteria established by IPMT for emergency response objects：

Table A.19 Categorization of Emergency Objects

ER object category	ER Object Categorization		
	Class I	Class II	Class III
Injury	A slight injury that	Serious injuries that need	One death or multiple injuries that needs

	needs only first-aid	medical treatment, or transference to hospital or hospitalization, such as fracture, needling, prescriptive medicine treatment etc (recordable injuries).	transference to the local hospital (2 or more than 2 injuries).
Fire	A fire can be put out by use of the fire extinguisher or one ER team.	Fire risk that needs on-scene ER service team or external resource, but without impact on the corporate or neighboring business;	A big fire that needs use of external ER resource and might have an impact on the corporate entity and business in the neighborhood, which shall be advised of the outside, media or government departments.
Environmental emission, steam release or liquid spillage	The slight release to atmosphere or slight discharge to land or water that are enclosed by fencing in the Project/Plant and that can be handled merely by resources of the Owner;	Severe emission to atmosphere or severe discharge to land or water that needs blockage of road at site to great extent. The emission may last or becomes hard to be isolated, and ER operative on duty and other resource are in need.	A major emission or spillage that needs evacuation and external ER resource. The emission may have impact on the corporate entity and businesses nearby, and the 3rd party, media or governmental departments shall be notified. The release expands to outside of the site and will affect activities of the Owner.
Civil turbulence	The fighting at site without or with minor injury	Fight at site leading to serious injury(same as "injury to personnel"), whipping together of people nearby at site to harm others or damage the properties;	Multiple injuries on site resulting from turbulence;
Atrocious weather	Severe lightning and gale resulted from thunderstorm;	The storm affecting the site construction and work activities; Typhoon predicted to effect the site construction.	Typhoon that will affect the site construction activities in next 72 hours. IPMT management shall determine the need of evacuation depending on the severity of the storm;

Determine the category of the ER object depending on the influential extent of the emergency

- Minor event: normally can be tackled with the available resources at site, external aid is not needed;
- Serious event: demanding external aid, and the authentic evaluation on the potential hazards in the proximity shall be carried out as soon as possible. A serious accident needs the response of ER management team, and the evacuation of the project personnel and the people in the neighborhood shall be considered;
- Major event: will have serious impact on the areas outside of boundary of the site, the initial response is same as that of the serious event with the only difference in the broader extent of the impact and the higher level response than that of the serious accident.

Upon an event occurs, personnel with the highest title at site must contact the construction HSE manager or IPMT HSE manager on duty without as soon as possible. The severity of an event shall be identified by

construction HSE manager of the project package or HSE manager on duty, and appropriate emergency response procedure shall be activated.

A.10.2 Emergency Response organization and responsibilities

a. Minor incident

When an event is identified as the minor incident, normally the project package construction HSE manager would stay at site as ER command. The minor incident shall be handled as quickly as possible. As the emergency response command, the project package construction HSE manager would collaborate with relevant construction managers to ensure appropriate site responses would be made by the contractor organization and IPMT ER team and ensure the coordinative use of the available site recourses. Following is the ER command structure diagram of the minor incident ER command:

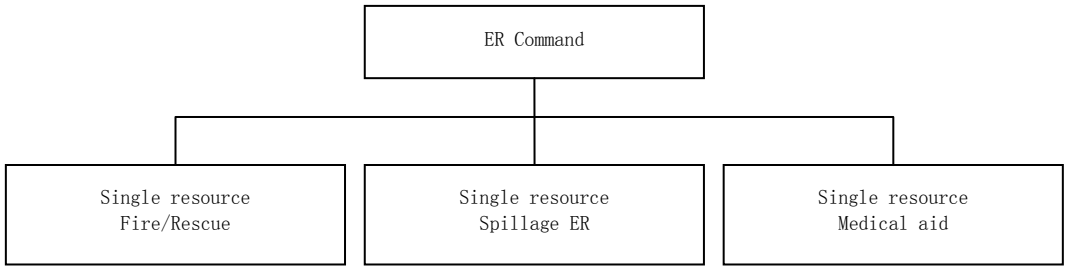

Figure A.3 ER command structure diagram of the minor incident ER command

b. Serious incidents

When an event was identified as the serious incident, the authentic evaluation on the potential threat in the proximity shall be carried out as soon as possible. IPMT ER team shall respond to the serious incident and alarm shall be triggered in compliance with the warning procedure as soon as possible for getting support from external ER resources. Consideration shall be given to evacuation of the personnel of the project and people in the neighborhood.

For a serious incident, the involved project package's project HSE manager shall act as ER command, while the project manager of the Project Package and the Construction Director of IPMT would act as the top leader for the emergency response of the serious incident and shall be jointly responsible for ensuring that the contractor organization would make appropriate site response. Before the Project Package HSE manager arrives, IPMT senior employee at site would act as the ER command. If IPMT personnel are not available at site, the senior security officer shall act as the ER command until IPMT personnel take the place. The command right shall be transferred to the senior employee at the earliest stage of the incident.

ER command structure diagram for a serious incident：

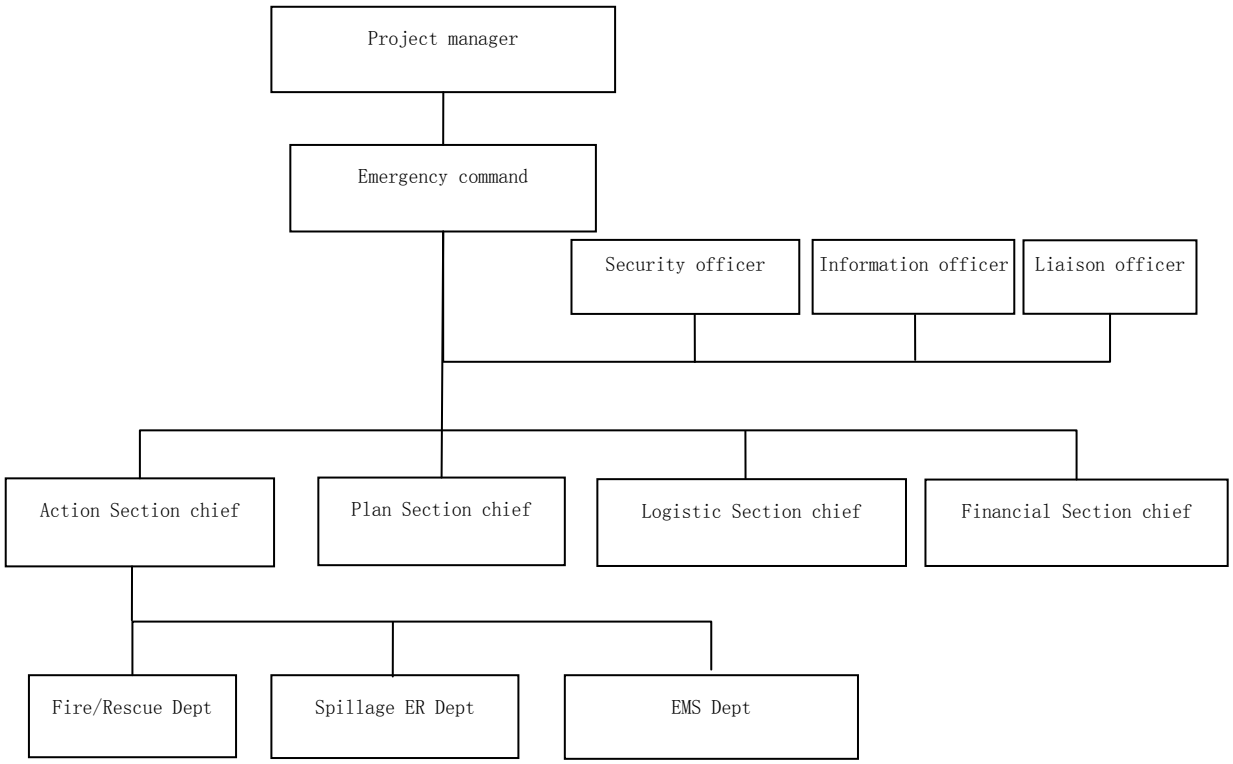

Figure A.4 ER Organization for Serious Incident

c. Major event

A major event will seriously affect the area outside the boundary of the site. The initial response to a major event is same as that to a serious incident with the only difference in the broader impact of the major event. Once a major event is identified as a serious incident, the unified command system must be activated, the external ER organization and the response level is higher than that for a serious incident.

For a major incident, IPMT HSE director shall act as ER command while IPMT director as the top leader of the emergency response shall ensure that the contractor organization would make appropriate site response. Before HSE director arrived at the incident scene, the senior IPMT employee at the scene would act as the emergency response command. If no IPMT employee is available, the senior security officer shall act as ER command until IPMT person takes the place. The commanding right shall be transferred to the senior employee at the earliest stage of the incident.

Following is the typical ER command structure diagram for major incidents:

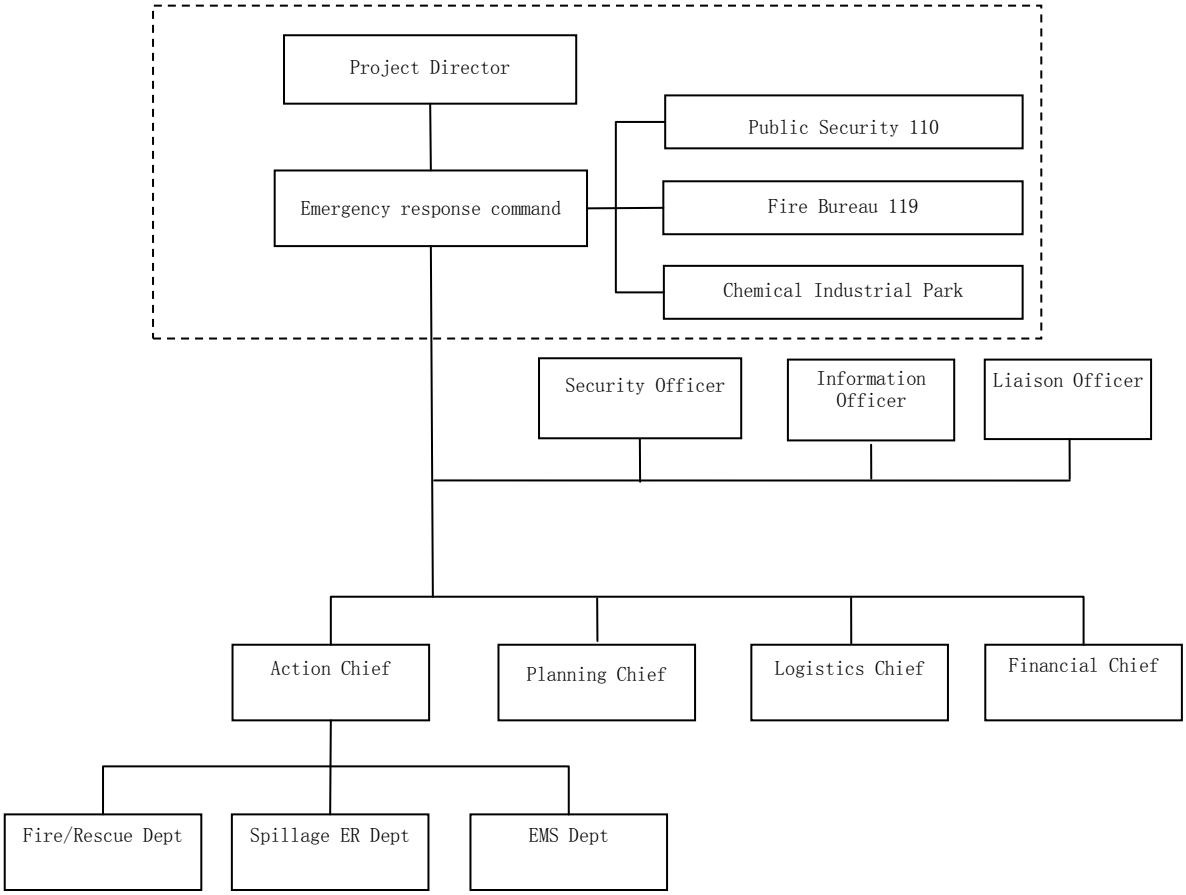

Figure A.5 ER Organization for Major Incidents

A.10.3 Provision of ER resources

ER equipment: ER equipment shall be provided by the Owner to satisfy the need of the project, for example:

- Fire fighting equipment
- Rescue equipment
- First-aid facilities
- Chemical release and spillage elimination equipment

Emergency facilities:

a. Accident command post

Accident command post is the place where the command function is assumed. For a small-scale emergency, the command post can be established on the ER vehicle while emergency response center (ERC) for big-scale accident.

b. Media center

The No.8 Conference Room in the Temporary Office Building is designated as media center. Without prior consent of accident command and IPMT director and without being accompanied by the personnel of the Owner or IPMT, the media representative would not be allowed to enter the plant area.

c. Muster point

The muster point is a place where resources can be assembled and prepared for distribution. It shall be established outside of the project fence with easy egress and access to the barricaded area and the project entrance.

A.10.4 ER procedure

IPMT worked out multiple ER procedures, including: ER plan, injury response, bombing threat and

identification response procedure, Typhoon ER, spillage ER plan, HSE ER Calling procedure etc.

ER plan: The procedure detailed the principle and specific contents for IPMT to set out the emergency response plan, specifying the ER action organization and fundamental ER actions after occurrence of any of the 3 level of accidents and the responsibilities of the role of each relevant person in case of each level of accident.

Injury response: This procedure detailed the emergency response actions in case of the injury accidents, specifying the level of injury response and duties of ER personnel on various levels and necessary ER resources.

Bombing threat response: This procedure indicated how to identify a bomb, and specified the emergency actions necessary to be taken after bomb identification and receipt of threatening message, including evacuation, suspect area isolation, alarming and personnel return after the threat was lifted.

Typhoon ER: This procedure specified the level of Typhoon emergency response and actions on various levels.

ER spillage response plan: This procedure specified the emergency response actions that shall be taken in case of a hazardous spillage.

Emergency calling procedure: This procedure specified the alarming or calling activation actions in different emergency response plans, listing the contact numbers of the personnel involved in various ER plans and the related resources.

A.10.5 ER exercise

IPMT carried out various emergency response drills depending on the nature and severity of the hazard existing in various construction stages.

A.10.6 Evaluation and revision of ER plans

After each ER drill, IPMT carried out careful evaluation of the effect of the drill, identified the existing deficiency and revised the ER plan accordingly.

A.11 Accident Management

A.11.1 Reporting and investigation of Near-misses

A near miss means that the slight change in the environment might result in injury/death or occupational illness or harm to the property, environment or the corporate reputation but has not actually taken place;

The near miss occurred at site shall be reported and handled as specified in following procedure:

a. Employees of the Owner and IPMT

- Anyone who identified a near miss shall take immediate remedial actions to rectify the unsafe condition or action, and shall report to project HSE team or the person in charge as soon as possible.
- The person who identified the near miss shall fill in the near miss report, be sure to accurately and fully document the details of the near miss. To prevent the same or similar near miss reoccurrence, the necessary measures shall be recommended.
- The near miss report is to be submitted to the construction HSE manager of the relevant Project Package who will assign and experienced local HSE engineer with enough experience to follow up the near miss, sum up the monthly near misses and forward the duplicate of the near miss report to IPMT and the Owner.
- If the near miss is a typical or serious case, the project package construction HSE manager shall notify the construction manager of the relevant Project Package and IPMT HSE Director, and submit a near miss report to the Owner in due time. If necessary, HSE director shall be responsible for interfacing with the contractor HSE manager for detailed investigation and putting forward with improvement

recommendation to further improve the unsafe conditions and behaviors at site and submitting the final investigation conclusions to the Owner. The investigation procedure for the near miss is same as that for the accident reporting and investigation.

b. The local HSE engineer shall follow up the implementation of the control measures for the site near miss and report to the construction HSE manager. He/She is responsible for stopping any unsafe conditions or behaviors that could result in potential hazard or accident, and shall investigate the near miss when authorized by the construction HSE manager.

- All the contractors shall establish the reporting system of near miss, encourage their staff to report any near misses occurring at their project sites.
- Anyone of the contractors who identifies a near miss shall take immediate actions to rectify the unsafe conditions or behaviors and report to HSE manager or supervisor in charge in time.
- The contractor supervisor or HSE manager shall immediately set out to investigate and put forward with recommendations to improve the site HSE conditions. The contractor is responsible for monitoring and follow-up the implementation of the recommended measures.

All the near misses shall be recorded and filed, and the duplicate of the near miss report shall be submitted to the project/construction HSE manager as soon as possible.

At the weekly HSE site meeting, the project package construction HSE manager shall brief all the typical or grave near miss happened in the week, and shall check contractor involved for the implementation of control measures.

After collecting all the near miss reports each month, IPMT shall analyze the near miss reports and job observation cards, identify the detailed high risk/hidden hazards existing at the current site, and submit the report of analysis results to HSE director for review and approval. The approved analysis report shall be dispatched to project/construction HSE managers of all project packages.

IPMT shall publicize the monthly near miss summary on the HSE Bulletin.

All the near miss reports and control measures to be taken shall be input into the database to facilitate the follow-up of the further actions and filing.

A.11.2 Reporting and Investigation of the Accident

a. Reporting of the accident

Everyone is responsible for immediate reporting of any hazards or accidents to the supervisor, whatever the severity of the hazard or accident is. At the occurrence of an accident, the contractor shall:

- Immediately advise (orally) the Package/Construction HSE managers of his/her project package;
- Submit an initial investigation report of the accident to the Package/Construction HSE managers of his/her project package by the end of his/her shift. For the format of the initial investigation report of the accident, see Table A.20.

TABLE 20 INITIAL INVESTIGATION REPORT

GENERAL INFORMATION

1 COMPANY/DEPARTMENT	***2 PROJECT***	***3 REPORT DATE***
4 INCIDENT LOCATION	***5 INCIDENT DATE***	***6 INCIDENT TIME***
7 INVESTIGATOR(S		
8 REPORTED BY (NAME/DEPT/ COMPANY/TEL.)	***9 CONTRACTOR REF. NO.***	
	10 PROJECT PACKAGE REF. NO.	

INCIDENT TYPE & RISK EVALUATION

11 INJURY/ILLNESSES

First Aid	☐	Fatality	☐
Medical Treatment	☐	Occupational Illness	☐
DAFW	☐	Others	☐

Name of the Injured ……

Sex/Age ……..

Occupation ……..

Loss Days ……...

Experience in Current Job……

Nature of Injury ……

……

12 OTHER INCIDENT

Property Damage	☐
Vehicle	☐
Fire	☐
Electrical	☐
Environment	☐
Theft	☐
Near Miss	☐
Other (specify)	☐

Estimated Loss

Nature of Loss……

13 POTENTIAL RISK EVALUTION

Probability of Occurrence 发生几率 \ Severity Potential	High 高	Medium 中	Low 低
High 高	H,	H,	M,
Medium 中	H,	M,	M,
Low 低	M,	M,	L,

DESCRIPTION

14 DECSCIBE HOW INCIDENT OCCURRED

CAUSE ANALYSIS

15 IMMEDIATE CAUSE(S) – UNSAFE ACTS AND USAFE CONDITIONS – WHAT ARE THE ACTS/CONDITIONS CONTRIBUTED DIRECTLY TO THE INCIDENT

16 INDIRECT CAUSE(S) – PERSONAL FACTORS AND JOB FACTORS – WHAT ARE THE REASONS FOR THE EXISTENCE OF ABOVE UNSAFE ACT & UNSAFE CONDITIONS

PREVENTION ACTION (S)

17 IMMEDIATE ACTION TAKEN AND COMPLETED AT THE TIME OF THE INITIAL REPORT

18 FOLLOW UP ACTION REQUIRED – (THIS CAN ALSO BE A REQUEST FOR FURTHER INVESTIGATION)	***19 TARGET DATE***	***20ACTION PARTY***	***21 STATUS***

STATUS: - C- Completed； O – Outstanding

IPMT REVIEW

DEPARTMENT	***NAME***	***DATE***	***24FURTHER INVESTIGATION REQUIRED (YES/NO)***
22 LINE DEPARTMENT (specify)			
23 HSE DEPARTMENT			

--- To decide whether further investigation is necessary according to the contractor's internal procedures or the recommendations from the Management Party.

In case the medical team is needed in the accident response, following procedure shall be observed:

- The accident scene shall be protected to prevent further hazards and maintain the evidence;
- Provide aid to the injured;
- The project/construction HSE manager of the Project Package shall be advised;
- Carry out investigation of the root cause of the accident;
- Comment upon the accident and implement the measures to prevent reoccurrence;
- Monitor the implementation of remedial recommendation to ensure complete implementation;
- Contractor/subcontractor management shall report all injury accidents to IPMT and the Owner;
- In case of death or hospitalization accident with multiple injuries, the Owner and relevant local authority shall be immediately informed. A duplicate report shall be issued to the Owner for any and all injury accidents leading to disability;

b. Investigation Procedure

All the injury and near-miss accidents must be investigated. The investigation of an accident shall be carried out in following steps:

- Rescue and help the injured and protect the scene;
- Interview the witness and collect and maintain the evidences.
- Collect and organize the useful data;
- Analyze the data and determine the major and root causes resulting in the accident;
- Work out effective recommendations and measures;
- Draft necessary accident report;

Once an accident occurs, the first priority shall be given to the treatment of the injured and the accident scene shall be protected. Prior to the completion of the investigation, nobody is allowed to remove any objects from the scene, and all the witnesses shall be protected and isolated.

The direct supervisor shall carry out the investigation of the accident and can ask the management or project/ construction HSE manager of relevant project package for assistance. All the management personnel and supervision personnel shall be trained for accident investigation. After investigating, the reports, recommendation and rectification measures to be taken shall be made public to all the site personnel that are under potential impact.

The following is the typical injury accident investigation procedure:

- First Aid: If the medical team treatment is not needed in the injury accident, the direct supervisor can investigate the accident with the help of the injured. The project/ construction HSE manager of the relevant Project Package involved may assist. The written report of the remedial measures shall be submitted to the project manager, or project/ construction HSE manager of the Project Package. However, if the medical team is needed to carry out treatment in the injury accident, the project manager, or project/ construction HSE manager of the Project Package involved shall be immediately informed so as to lead the investigation in which the direct supervisor, the injured and management people from other work areas will participate;
- Recordable accident and DAFW accident: the project manager of the relevant Project Package or his substitute who can skillfully carry out the root cause analysis and investigation shall lead the investigation. The investigation team shall be made up of IPMT senior representative, the project/ construction HSE manager of the Package, the direct supervisor and contractor HSE manager/engineer. Interrogation must be forbidden in robust manner and a feel-at-home atmosphere shall be maintained as much as possible during the investigation. Mutual collaboration is encouraged so that the objective statement can be obtained from the personnel involved.
- In case of death accident, IPMT shall assign a dedicated death investigation team which is under the leadership of HSE director and supported by the root cause analysis professionals. The investigation report prepared by the investigation team shall be issued within 2 weeks after the occurrence of accident.

c. The procedure for follow-up of recommended measures

Once the written report of the accident is publicized, the follow-up of the recommended rectification measures shall be activated. The delivered accident report shall recommend at least one measure against the reoccurrence of the accident. For each of the recommended measures, a person shall be identified to implement the action.

The construction manager and construction HSE manager shall review all the accident reports and be responsible for the implementation of all the recommended measures. Due to different natures of certain recommended measures, it may take longer time to implement these measures than others. However, as long as there's one rectification measure not implemented, the person in charge of the action must submit a report of the rectification measures implementation status. Any reports of such kind must specify the completion date for each incomplete item and justify the outstanding implementation of the measures.

d. Accident handling

Accident event communication flow is as illustrated in Figure A.6：

A.11.3 Lessons from Accidents/Near-Misses

During the project construction, IPMT HSE specialists carried out analysis of the accidents/near-misses that have taken place in Project A, the vicinity projects and other relevant projects and worked out reports on the lessons learned. IPMT, contractors and the subcontractors were organized to study the lesson report as early as possible. Each of them was requested to comment on the accident/near-miss. IPMT would change or develop a new HSE procedure on the basis of the recent accident/near-miss lesson report and the opinions of the staff members.

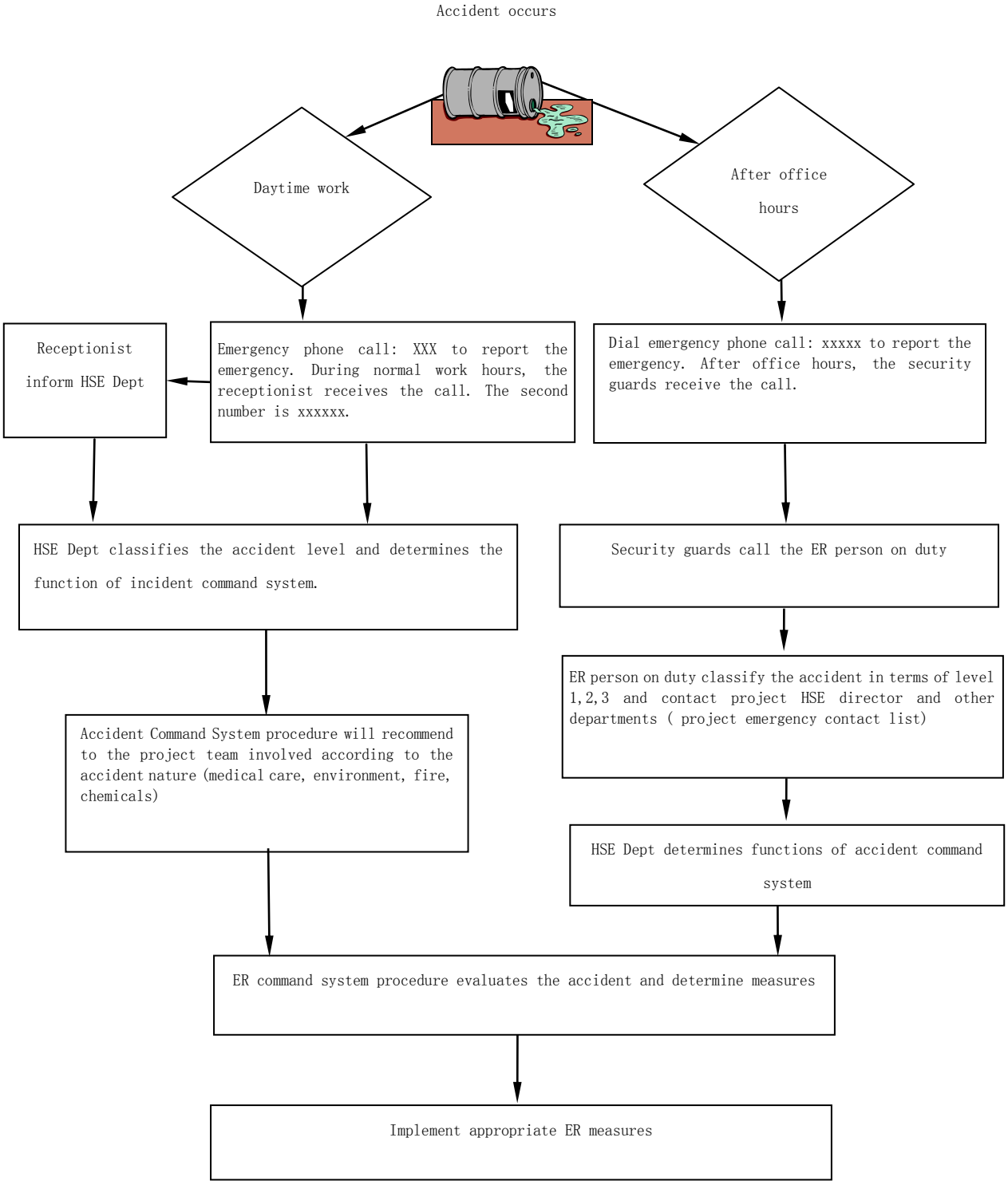

Figure A.6 Emergency Communication Flow Diagram

12 Review and approval

The parental companies of Project A carried out several project HSE reviews at different construction stages, fed back the review results and improvement requirements to the Owner and tracked the improvement progress.

The parental companies of Project A audited Project A's HSE management of the project construction process in the form of PHSER audit procedure. PHSER was divided into 7 stages. Expert(s) were dispatched from the Headquarters of the parent companies to carry out audit at each stage.

a. Evaluation stage: determined the project feasibility and major HSE issues
b. Selection stage: confirmed all defined HSE issues associated with the entire life cycle of project, new technologies and characteristics of location natures.
c. Stage prior to approval: ensured compliance with or higher than the conventional HSE requirements in the engineering design, and defined satisfactory project codes & standards as well as the design philosophy.
d. Stage prior to construction: confirmed that HSE management system including HSE plan was being effectively implemented. Reviewed the results of detailed engineering design, and confirmed that HSE issues had been taken into full consideration, and they were applicable to the construction activities.
e. Construction stage: confirmed that HSE management system including construction HSE plan had been in place, under implementation and could ensure HSE requirements at construction stage.
f. Pre-startup stage: confirmed that the pre-commissioning had been fully completed, the plant was ready for commissioning; confirmed that the deviations from the design had been solved properly without impact on HSE performance, etc.
g. Production phase: verified that the HSE performance of the operational equipment was in compliance with the design intent, and ensured that the HSE lessons obtained from project execution and early operation of the plant had been highlighted and shared.

The audits at project construction phase were mainly those carried out at pre-construction phase, construction phase and pre-startup phases.

The headquarters of several large contractors also dispatched personnel to Project A to carry out similar HSE review of their own situation so as to improve their own HSE performance in the Project.