Executive Summary

PROJECT OVERVIEW

This document represents the Environmental and Social Impact Assessment (ESIA) of the Xin'ao Project. It is guided by China's environmental, health and safety (EHS) regulations and guidance, Environmental Impact Assessment (EIA) guidelines established by the State Environmental Protection Administration, along with guidelines and policies of international financial agencies (World Bank [WB] / International Financial Corporation [IFC]).

The Xin'ao Project has implemented an approach to incorporate key design measures and optional conceptions into the design to minimize the environmental, socio-economic, occupational health and safety impacts. This approach will be continued throughout the ongoing design, construction and operation phases via the implementation of recommended environmental and social mitigation management and monitoring programs.

The Xin'ao Project is a 600,000 tpa Methanol and 400,000 tpa Dimethyl Ether (DME) project under joint development by Xin'ao Group Co., Ltd, Langfang (China) Fuel Gas Investment Co., Ltd and Xin'ao Group International Investment Limited. Methanol and DME represent recently recognised cleaner fuels and substitutes of petroleum. After evaluation, the following major manufacturing processes were proposed for the Xin'ao development:

- Coal gasification: Texaco pressurised water coal slurry gasification technology;
- Gas purification: low temperature methanol absorbing of H_2S, Super Claus process to reclaim sulfur;
- Methanol synthesis: vapor-phase synthesis;
- DME synthesis: vapor-phase dehydration of methanol at fixed bed.

The project site is located on a sandy plot of vacant land in Wangaizhao Town, approximately 8 km to the southeast of downtown Dalate Qi (County), Erdos City, Inner Mongolia, PR China. Construction is expected to begin early in 2006 and the site should be fully operational by early 2009.

The estimated capital cost of the Xin'ao Project amounts to approximately USD270 million (RMB 2.191 billion). The two major components of the Project are the Xin'ao chemical plant (Xin'ao site) and the slag landfill site for the disposal of the slag and ash, which will be generated by the facility operations. Other projects affiliated to the Xin'ao Project and financed by the local government include:

- The Dengkou Extraction Station Expansion of the Yellow River and water diversion pipelines between the Xin'ao site and the Extraction Station;
- A Municipal Wastewater Treatment Plant (WWTP);
- Off-site wastewater pipelines; and

Road access to the site from the downtown area of Dalate Qi.

The affiliated projects are not parts of the projects therefore not included in this ESIA.

Development of the Xin'ao Project will allow for a number of sustainable environmental, socio-economic benefits, via:

- the implementation of an environmental, social, occupational health and safety management and monitoring program to minimise environmental and socio-economic impacts;
- the opportunity to upgrade the local ecological environment through a water and soil conservation scheme;
- the provision of an important economic stimulus for future development in the project area, and the generation of resultant economic spin-offs to local communities through increased income, employment and training opportunities.

PROJECT SETTING

The major development site (Xin'ao site) is located in the rural area of Dalate Qi, 8km to the southeast of downtown Dalate Qi. The proposed project is the second industrial practice within a radius of 5km, in addition to an existing pharmaceutical plant also owned by the Xin'ao Group. Sandy vegetation represents the major vegetation type as sandy soil predominates in the project area. The ecological environment of the project area is vulnerable. The Yellow River is the only surface water body in Dalate Qi and also the major water source of the project area. Dalate Qi is abundant in coal resources, which is beneficial to the proposed development.

There are five major communities within a 2km radius of the Xin'ao site, which constitute the sensitive receivers concerned in this ESIA. 'Sensitive receivers' are those people, flora and fauna, which would be impacted by the activities of the Xin'ao development. The population in this area is mainly of Han nationality, with farming as the major income source, supplemented by animal husbandry. Some households derive income from employment outside the local community, or by running private businesses. Compared with rural residents in the other areas of Dalate Qi and Inner Mongolia, these local communities are relatively affluent.

SPECIFIC STUDY AREA

The specific study area (SSA) included in this ESIA includes all Project activities and that part of the infrastructure that could potentially impact the natural and human environment (directly or indirectly) The SSA encompasses 100 km^2 and focuses on those areas in close proximity to the project site. Areas that are to be occupied by government-invested affiliated projects are not included in the Xin'ao Project, thus its environmental impacts are excluded from this ESIA with the exception of ecological impacts. The Water

and Soil Conservation Study, which takes into account the ecological impacts of all Project infrastructures.

PROJECT ALTERNATIVES

The design of the Project has considered a number of alternatives including a 'no-project' alternative. The Xin'ao Group has designed the chemical project for development. The Project will realize a number of key environmental and social benefits for Dalate Qi including the following:

- Implementation of best environmental and social management practices;
- Restoration and upgrade of the local ecological environment;
- Net economic benefits;
- Increased household incomes through providing direct and indirect employment; and
- Increased training opportunities for the local residents and improvement of infrastructure.

The analysis of alternatives considered the following:

- Site location selection;
- Process technology alternatives:
  - Coal gasification;
  - Gas purification; and
  - Methanol and DME synthesis.
- Pollution control alternatives:
  - Slag and ash management;
  - Treated wastewater management; and
  - Utilization of tail gases.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Methodology

The safeguard policies, directives and guidelines of the WB group, China, and relevant approvals issued from different Chinese government organizations guided the impact assessment of the Xin'ao Project. Consistent with these guiding principles, an initial environmental review included the screening and incorporation of environmental protection measures into Project design.

Key aspects of the impact assessment process included the following:

Establishment of Baseline Conditions. The baseline conditions at the Xin'ao site and parts of the sensitive receivers' locations were established to allow cumulative impact assessment.

Establishment of Spatial and Temporal Boundaries. An area containing all Project facilities, part of infrastructure and activities that could cause potential impact (directly or indirectly) was defined as the study area. A smaller SSA was also defined, focusing on those areas in closer proximity to the Project. The assessment considered both the construction and operations phases.

Public Consultation. Stakeholder engagement is an important aspect of the Xin'ao Project. During this ESIA study, the interviews with representatives of a variety of government organizations and local residents have been undertaken, to describe the Project and gain an understanding of the important issues and concerns. The most recent consultations were conducted in late 2005.

Cumulative Impact Assessment. An evaluation of the cumulative effects of the Xin'ao Project was undertaken, considering current and future activities within the defined spatial and temporal boundaries. Cumulative impact assessments are incorporated in each section of *Part C* of the main ESIA report.

Key Environmental Impacts

Key environmental impacts of the overall project on important sensitive receivers are described below. More specific information on impacts anticipated during the construction and operations phases is given in *Sections 3* to *10* of *Part C* of the main ESIA report.

By incorporating environmental design measures into the Project design, many impacts identified during the assessment process are considered to be non-significant and fully mitigated. The Project will implement a comprehensive environmental management plan throughout construction and operations. A monitoring program will continue to provide important data and affirm the success of mitigation measures.

The key potential significant Project impacts identified during the construction and operations phases are as follows:

Resettlement of Residents Living within the Hygiene Protection Distance (HPD)

Fugitive emissions resulting from operation of the Xin'ao Project would normally affect those sensitive receivers in closer proximity to the Xin'ao site. The HPD belt between a workshop issuing fugitive emissions and residential areas should be established at the planning stage of the development based on the relevant guidelines. The fugitive emission of Hydrogen Sulphide (H_2S) was selected as the representative parameter for the estimation of the HPD. Estimated results indicated that three residential farmhouses southeast of the Xin'ao site and a residential complex under construction northwest of the Xin'ao site were within the HPD belt. Relocation of these sensitive receivers has not been considered in the initial project resettlement plan and will be projected through the implementation of the Environmental and Social Action Plan (ESAP) detailed in *Part F* of the main ESIA report.

Water and Soil Runoff

The Xin'ao Site and surrounding areas are bare, sandy, low profile wastelands with sparse vegetation; thus the local ecological environment is vulnerable. The proposed development is a coal-chemical related industrial project, in which negative impacts on the ecosystem resulting from construction activities (excavation, earth moving, land use changes etc) occur mainly during the construction phase. These impacts represent land occupation, land use changes, vegetation and soil damage, and random waste storage. These factors will eventually contribute to soil erosion and desertification in the subject location. Prevention of water and soil runoff can be achieved by the implementation of a Water and Soil Conservation Scheme, a most important plan that is scheduled to be in action throughout the construction phase. The implementation of the Water and Soil Conservation Scheme will make a significant contribution to safer production, upgrading of soil utilization, and improving the local eco-environment as well as community health. However, implementation of this long-running Scheme will need close supervision and monitoring to ensure it runs in parallel with the whole Xin'ao project development.

Slag and Ash Management

Impacts resulting from the slag and ash storage and land filling activities mainly include dust arising, potential soil and groundwater contamination from slag eluviation, and water and soil erosion. These impacts can be alleviated through good management, the Water and Soil Conservation Scheme, and engineering mitigations. However, based on the waste hierarchy, re-use and recycling of slag and ash off-site as raw materials for brick-making, road paving and cement manufacturing shall be given priority consideration as the first disposal option . The minimization of the slag and ash volumes to be disposed of in the slag site should be a special concern in the waste management plan.

Accidental Leakage of Bulk Chemicals from the Environmental Perspective

Methanol and Dimethyl Ether (DME) production involves a bulk of flammable, explosive and toxic materials, some of which are characterized as acutely toxic and malodorous chemicals. Accidental Methanol and Hydrogen Sulphide leakage can result in a higher concentration accumulation in the areas in close proximity to the leakage source, which can have severe negative impacts on human health and the environment. Therefore accident avoidance measures (bulk leakage) and the establishment of an emergency response plan are of great importance throughout the operations phase.

Potential Soil and Groundwater Contamination Resulting From the Development

The Xin'ao project involves the storage and production of bulk quantities of Methanol and DME chemicals. Long-term production and storage of chemicals, slag and ash may have potential impacts on soil and groundwater

quality at the subsurface level of the Xin'ao site and slag site. Soil and groundwater contamination can be prevented through the implementation of engineering mitigations and annual monitoring programs.

SOCIO-ECONOMIC IMPACT ASSESSMENT

To understand the existing socio-economic status of the broader areas of Dalate Qi and Inner Mongolia where the Project is located, a desk-top study of published literatures and a detailed household survey on randomly selected households within the affected communities were undertaken at the beginning of this ESIA study. The information collected was then incorporated into the qualitative assessment of the social impacts invoked by the Project. The adverse social impacts identified are summarized below:

Land Acquisition and Resettlement

Development of the Project requires a total of 1km^2 of land. Four households will lose, or have lost, houses and attachments, productive land and income to the Project. Compensation provided to these households includes cash compensation for the loss of productive land, house plots and attachments, and / or the allocation of a replacement house plot. At the time of writing this report, the Project land acquisition is nearing completion. A small number of resettlement issues, such as an unresolved agreement due to dissatisfaction with compensation rates and Project Affected Persons (PAPs)' concerns about loss of income and livelihood, remain outstanding.

An abbreviated Resettlement Action Plan (RAP), reflecting the current land acquisition status of this Project, has been developed and attached as *Annex C* of *Part D: Social Impact Assessment* of the main ESIA report. Grievance redress, adoption of livelihood restoration measures and post-acquisition monitoring are recommended as future actions, at the aim to ensure that the livelihoods of those people displaced are restored at least to pre-displacement levels.

Health and Safety

Local communities will be exposed to the health and safety risks generated as a result of the construction and operation of the Project. Upon implementation of the engineering control measures-mainly installation of pollutant treatment or abatement facilities, the impacts on human health due to point air emission, noise emission and wastewater discharges are considered acceptable and / or negligible. The health and safety risks will come mainly from:

- Operational phase fugitive air emissions;
- Construction noise;
- Occurrence and transmission of communicable diseases;
- Increased traffic;
- Occurrence of illegal activities such as theft and prostitution; and

- Accidental release of hazardous substances from production facilities.

The mitigating measures to control operational phase fugitive air emissions and accidental release have been addressed in the Environmental Impact Assessment of this Summary and, thus, are not repeated here.

Construction noise can be controlled through reasonable scheduling of construction activities and siting of construction machinery, in addition to the utilization of self-mounted mufflers on mechanically-powered equipment and vehicles.

Any communicable diseases occurring among the Project labour force might spread to the local communities, thus endangering the local residents' health. Pre-employment medical examinations and regular annual medical check-ups on the project labor force can assist timely identification of health issues and help to minimise transmission of communicable diseases. Hygiene education and the provision of hygienic food and accommodation for project employees are also effective activities for disease prevention and control.

The increase in heavy traffic during both the construction and operational phases of the project significantly increases the risk of injury to the local people when walking, on their motorcycles / bicycles or on buses. Traffic accidents can be minimised by educating the Xin'ao employees and subcontractors in basic road safety and defensive driving techniques, and also by issuing pamphlets to the local residents explaining the basics of road safety.

Illegal activities undertaken by large numbers of people in a camp situation (ie construction personnel and Xin'ao employees) might give rise to social stress and insecurity, and threaten the reputation of the Xin'ao Group. Control of potential illegal activities can be realized by establishing and implementing a *Code of Conduct (COC)* for the project's labour force, and by providing appropriate recreational, entertainment and other social outlets for employees and subcontractors.

Household Expenditure

Immigration of the Project labour force into the area may lead to inflation due to the purchase or rent of housing, the purchase of (basic and luxury) goods and services, and the tendency of non-local Project staff to pay more than the locals for equivalent goods and services. Localised inflation may contribute to the marginalisation of local residents and community resentment towards the Project. Possible options for mitigation include consideration of the local socio-economic impacts in the decision criteria for in-Country procurement and tough negotiating on price.

Cultural Resources

The introduction of a non-local labour force can unwittingly change the traditional culture of the local community. These changes are amplified for those who are vulnerable to change, including the elderly, the very young, the uneducated, the poorest sections of society and people with mental illnesses. Impacts on the local culture can be mitigated through educating the Project personnel in respect and empathy for local livelihoods, the local economy, local cultures, local ethnic minorities and local traditions and attitudes.

All the above-mentioned mitigating measures have been incorporated into the ESAP, with the aim of reducing adverse impacts to a level as Low as Reasonably Possible (ALARP).

Considering that it is not possible or not practical to fully mitigate negative social impacts, the Xin'ao Group plans to provide compensating social developments that help to increase the quality of life of project-affected people. It is expected that, as a result of the Project, the local residents can access to employment and training opportunities, increased income and improved infrastructure.

HELATH AND SAFETY ASSESSMENT

Occupational risk management is best achieved at the planning and design stage, and also by ensuring that processes are implemented, developed and operated efficiently. It is recommended that Xin'ao should:

- Conduct a pre-assessment of the occupational–disease risk factors;
- Conduct an assessment of the occupational–disease prevention measures upon project construction completion;
- Establish and implement an Occupational Health Management Program (OHMP); and
- Develop a Management of Change (MOC) program to address the technical and occupational health management requirements for changes in processes and operations, modifications to operating procedures, authorization requirements, notification and training needs for the employees affected to ensure sustainable compliance and OHMP program implementation.

To mitigate or reduce the possibility of personnel injury and unexpected emergencies, it is advisable to conduct a structural hazard assessment with the detailed design and complete process information available, to check the design for safety, operability and conformity with technology codes and other regulatory requirements. The Hazard Assessment review should also cover and be integrated with the management actions, preventive measures and emergency response procedures.

CUMULATIVE IMPACT ASSESSMENT

A cumulative effects assessment of the Xin'ao Project was completed in relation to past, present and future activities, and encompasses areas directly or indirectly influenced by the Project where cumulative effects may occur.

Cumulative Environmental Impact

Some of the cumulative effects of the Project are site-specific, while others extend further but are limited to within the study area. Some of the Xin'ao Project's key cumulative effects on the environment are related to impacts on air quality, soil and water erosion (ecosystem), and soil and groundwater contamination. Given the extent of the Xin'ao Project operations and earthworks required for the Project's construction, air emission control for both point sources, fugitive emissions and accidental leakage of chemicals, erosion control, and water management are important considerations of Project design.

The cumulative impacts of the Project, in conjunction with other non-Project activities, may lead to low cumulative loads in air quality and soil erosion. Providing that the prevention measures detailed in the ESAP are implemented in parallel with the development, these cumulative impacts can be mitigated.

Cumulative Social Impact

Existing social stress reported by the local communities during this ESIA study is related to air emissions and wastewater discharges from the pharmaceutical plant, which gives rise to concerns over the proposed Xin'ao Project.

Addressing the community's concerns regarding the existing pharmaceutical plant operated by the Xin'ao group should be a first priority since existing concerns may make it difficult for Xin'ao to secure a community "license to operate" for the new chemical plant. Where the community has raised concern regarding environmental issues, Xin'ao will respond by retaining a third party to undertake environmental monitoring of the parameters in question (ie air quality and wastewater discharges). Should the results of monitoring exceed relevant environmental standards, Xin'ao will take corrective actions and report these to the local community.

ENVIRONMENTAL, OCCUPATIONAL HEALTH AND SAFETY, AND SOCIAL MANAGEMENT

Environmental, Health and Safety Management System (EHSMS)

The Project management is committed to minimizing Project-related environmental, occupational health and safety impacts by adopting Best Management Practices (BMPs) throughout the Project life cycle. Xin'ao will

develop an EHSMS that is consistent with the Project commitments. This EHSMS will facilitate compliance to environmental, occupational health and safety requirements and define the relevant control measures adopted by the Project.

The EHSMS will emphasize application of the best available and economically feasible technologies, together with continuous improvement of EHS performance. It will include specific procedures for documentation and record keeping, operational and emergency procedures and training and awareness planning. Project-specific protocols will verify and measure compliance with both the local regulatory framework and internal Project EHS standards. Monitoring inspections and audits will be an important feature of the EHSMS.

General objectives of the EHSMS include:

- Implementation of an effective EHS management system;
- Avoidance safety incidents;
- Environmental and health compliance;
- Maximise energy efficiency relative to nickel production;
- Emergency preparedness; and
- Effective stakeholder engagement and involvement.

Environmental Health and Safety Organization

During the operation phase, an Environmental Health and Safety (EHS) Department will be established and led by the Director of Environment, Health and Safety reporting to the Vice President of the Xin'ao Group. An EHS Manager will head the day-to-day functions of the EHS Department. The Department will be responsible for implementing components of the EHSMS and the ESAP for assessing, monitoring, auditing and reporting on environmental, occupational health and safety performance.

Community Liaison Officer (CLO)

A full-time or part-time CLO will be designated to deal with social affairs in the local community during the construction and operational phases. The CLO will be responsible for regular communication with local communities, including notification of project progress and potential impacts to the local community, response to inquiries, and assistance in troubleshooting. The CLO will monitor the implementation of the social components of the ESAP.

Environmental and Social Action Plan (ESAP)

The Xin'ao group will design, construct, commission, and operate the proposed chemical plant in accordance with the ESAP described in *Part F* of this ESIA report. The ESAP will also guide the Project in addressing the interests of the local community, including respect for concerns of its people, engaging them in planning for change, emphasizing self-sustaining,

community-driven initiatives, and securing Project-related development benefits.

The ESAP is a tool for the management of potential adverse impacts, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. This ESAP details generic good practice measures that will ensure that the Xin'ao plant is built and operated to standards of international best practice.

Special concerns of this ESAP include the following:

- Environmental Management Plan;
- Ash / Slag Disposal Site Management;
- Transportation Plan for Raw Materials and Products;
- Occupational Health and Safety Management Plan;
  - Hazard Assessment;
  - Safety Operation Procedure;
  - Emergency Response Plan.
- Social Management Plan;
- Environmental, Occupational Health and Safety, and Social Monitoring and Auditing Plan.