

2 Safety and Environment



People and the environment are the world's most important resources. Caring for life and protecting the environment are two of our core tasks. We always attach importance to climate change and deal with it positively through the active promotion of energy saving and emission reduction work. We strive for "zero injury, zero pollution and zero accident" and work hard to keep pace with advanced international standard in HSE management. We are devoted to safe, clean and energy-saving operation. We advocate ecological civilization and are working hard to build CNPC into an environmentally friendly and resource-conservative enterprise.

- 2.1 Dealing Positively with Climate Change
- 2.2 Reinforcing Safety and Environment Management
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2.1 Dealing Positively with Climate Change

Climate change is an issue that concerns the entire world. Increasing temperatures, rising sea levels, the frequent occurrence of extreme weather and disasters, and the extinction of species caused by climate change are seriously threatening the natural ecological system and people's living environment. It is time to face this and deal with it.

CNPC has always attached great importance to the control and reduction of greenhouse gas emissions. We actively support *China's National Climate Change Program* and shall continue to take effective measures to reduce emissions, sequester carbon dioxide and tackle global climate change.

1. Jointly initiate and establish the China Green Carbon Fund

There are two ways to reduce greenhouse gases: one is to cut carbon emissions and the other is to increase carbon absorption. Forests are the largest source of carbon storage in the land ecological system. As research shows, unit cubic meter of tree growth can absorb 1.83 metric tons of carbon dioxide and generate 1.62 metric tons of oxygen at the same time. Carbon sink refers to the process, activity or mechanism for reducing carbon dioxide in the air. Forestry carbon sink is an effective way to reduce greenhouse gases. By tree planting and forest management, we can make use of plants to absorb carbon dioxide in the air through photosynthesis and fix it to the trees and soil.

On July 20, 2007, CNPC jointly initiated and established the Green Carbon Fund with the State Forestry Administration and China Green Foundation. It is a special national public fund managed by CGF aiming at providing a platform for businesses, organizations and individuals to participate in voluntary activities such as tree planting and forest protection. The fund was launched on the basis of a RMB 300 million donation by CNPC. All money collected shall be used to carry out forestry carbon sink activity. It is estimated that the fund can help absorb and fix 5-10 million metric tons of carbon dioxide over the next 10 years.

2. Cooperatively develop forestry biomass energy

Developing forest biomass energy can realize the sustained renewal of energy and meet increasing energy demands, while these products, with greatly reduced carbon dioxide emissions, are also cleaner. Energy forest construction can also help make the earth greener and absorb and fix carbon dioxide, making it a "green cause" which can benefit future generations.

Due to its huge population and shortage of farmland, land resources are at a premium in China. Therefore, CNPC regards forestry biomass energy as a strategic measure in promoting energy saving and emission reduction to realize sustainable development. In Jan. 2007, CNPC signed a biomass energy framework agreement with SFA and decided to jointly build 68,000 hectares of raw material exemplary bases for biodiesel production in seven provinces and autonomous regions. Following that, we signed strategic cooperation framework agreements or memorandums with seven provinces and municipalities on developing biomass energy.

By the end of 2007, CNPC had launched the construction of the first batch of forest biomass energy bases in seven provinces, municipalities and autonomous regions including Yunnan and Sichuan provinces. After their completion, these bases can provide 100,000 metric tons of raw materials for biomass energy annually.



Jatropha curcas L., an excellent biomass energy tree

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2.2 Reinforcing Safety and Environment Management

1. Strengthening the safety and environmental protection accountability system

Safe operation and environmental protection are our essential tasks. They are the basis and guarantee of our development. In 2007, CNPC further strengthened the organization of its safety and environment work and adopted effective measures to ensure employee safety and the implementation of an environment accountability system.

In Jan. 2007, the president of CNPC signed safety and environment accountability agreements with the heads of 128 enterprises and units affiliated to the company, specifying various aspects of the accountability system, e.g. responsible personnel, objectives, accident control index, and query and punishment. The affiliated enterprises then signed accountability documents internally at various levels to define responsible personnel and their responsibilities, and included a responsibility performance index into the annual assessment of leaders at various levels, fulfilling our safety and environment responsibilities at every part of the operational chain.

In 2007, CNPC adjusted its functional departments in charge of quality, safety, environmental protection and energy saving and established the Safety and Environmental Protection Department and Quality Management and Energy Conservation Department on the basis of the previous Quality, Safety and Environment Department in order to further clarify management functions in terms of safety, environment, quality and energy saving. We also set up the CNPC Safety and Environmental Protection Technology Institute, which provided a basis for the joint and optimized management of safety and environmental protection technologies.

2. Reinforcing HSE system standardization

We actively promoted the HSE system to strengthen integrated health, safety and environment management. Since health is more related to employees, we will discuss it separately in Chapter 3 "Career Development".

We regard the establishment, execution and improvement of the HSE system as the key measure in strengthening health, safety and environment management and realizing safe, clean, energy-saving and harmonious development.

HSE Guidelines: Putting people and precautions first in a continually improving system involving all staff.

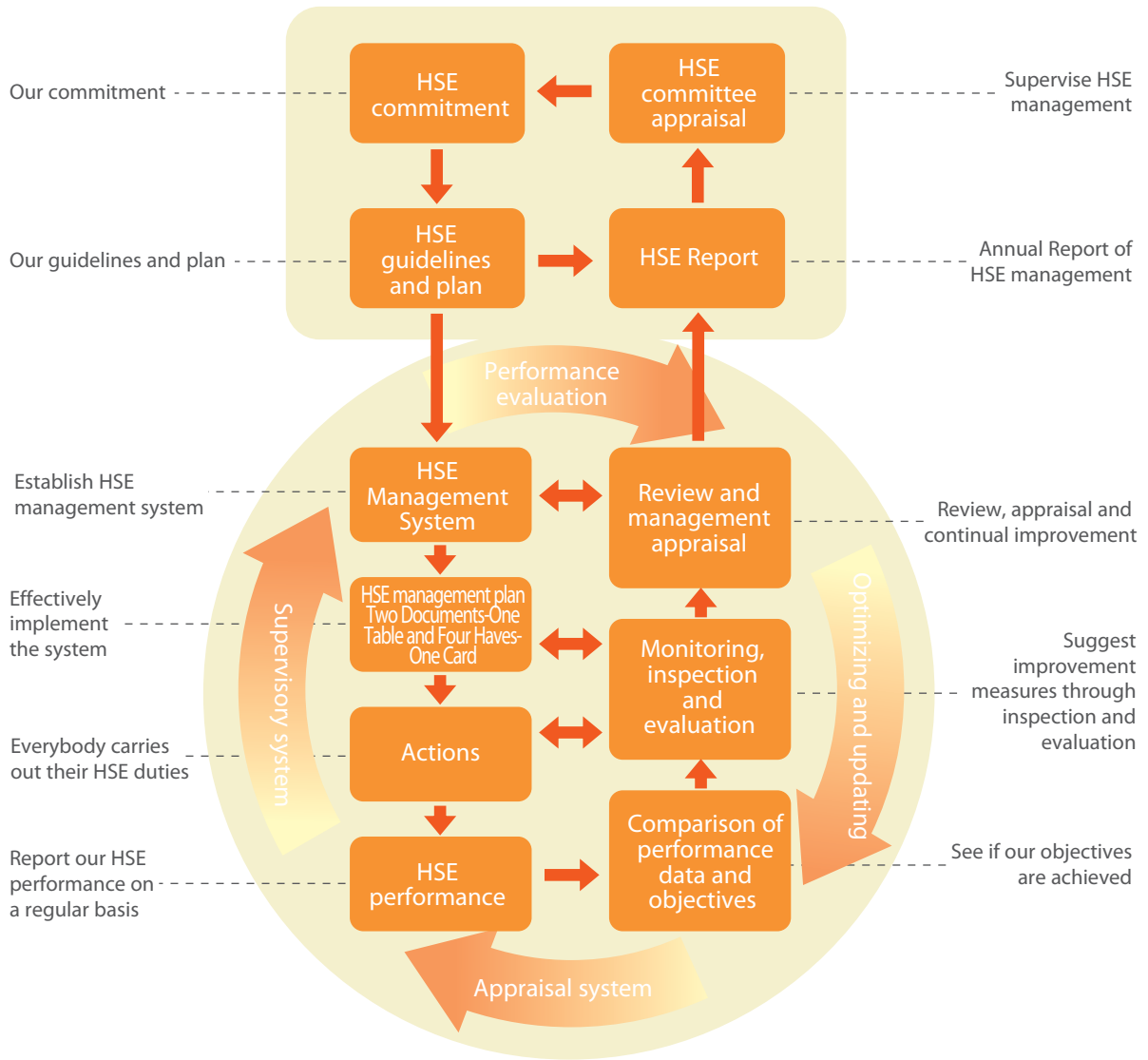
HSE Objectives: Zero injury, zero pollution and zero accident to achieve a world-class HSE performance.

CNPC's HSE Management System uses the PDCA management model consisting of planning, doing, checking and action processes. It has seven key elements—leadership and commitment, HSE guidelines, planning, organizational structure and resources and documents, implementation and operation, checking and correction, and management assessment. The seven elements interact with each other according to their own principles to form a continuously upgrading management process.

In conformity with the requirement that it is "unified, standard and feasible", construction of the HSE Management System proceeded smoothly in 2007. In the process, we unified HSE guidelines and strategic objectives, improved the HSE system and standard index system, regulated grassroots risk management, and enhanced awareness of the HSE concept among all employees. An HSE Management System with CNPC characteristics is forming.

The company adjusted its HSE committee and set up the Leading Team for Promoting HSE Management System Construction and the Office for Promoting HSE Management System and issued *CNPC HSE Management System Construction Promotion Plans*. We also held a video conference to promote the HSE Management System across the whole group and made general arrangements for HSE work. We compiled a new edition of the *HSE Management System Guide* which unified the HSE management systems framework of all CNPC members and provided a standard basis for the implementation of the HSE Management System.

Implementation Process of CNPC HSE Management System



Two Documents-One Table: HSE Operation guide, HSE operation plan and HSE site checklist

Four Haves-One Card: Have instruction, regulations, confirmation and monitoring, with the four included in one card.

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Seven Elements and Basic Requirements of the CNPC HSE Management System

Elements	Basic Requirements
Leadership and commitment	Top management at various levels is the first responsible personnel for establishing and implementing the HSE Management System. They should ensure the fulfillment of HSE management responsibilities at various levels and provide strong guidance for the continual improvement of HSE management by carrying out their commitments
HSE guidelines	The unified CNPC HSE Guidelines are the basic principles and guide for organizations at various levels. Various organizations should establish HSE target accountability systems at different levels according to the strategic objectives of HSE management.
Planning	Organizations at various levels should compile an HSE development plan and annual plan, and define objectives and an index. They should also carry out hazards identification, assessment and risk-control planning, and compile a management plan for activities and tasks
Organizational structure, resources and documents	Organizations at various levels should establish reasonable organizational structures, promote employee participation, ensure effective resource allocation, fulfill HSE responsibilities, and execute documentation management
Implementation and operation	Organizations at various levels should implement HSE guidelines in all parts of their operations, perform HSE responsibilities, and effectively implement HSE risk management to control risks resulting from changes of facilities, personnel, and technical processes; contractors' HSE management should meet the requirements of the CNPC organization
Inspection and correction measures	Organizations at various levels should carry out HSE monitoring and inspecting work, organize internal audits on a regular basis, and take prompt action to correct unusual situations
Management appraisal	Top management of organizations at various levels should periodically assess the suitability, adequacy and effectiveness of the HSE system to ensure its continual improvement

To improve HSE management, CNPC launched a training program on its HSE management system targeting middle-and high-level managers, organized "Two Document-One Table" seminars with the participation of grassroots organizations and distributed *Instructions on Grassroots-level Compilation of "Two Document-One Table"*, and designed the HSE "Two Document-One Table" template for drilling and borehole operations.

CNPC reviewed implementation of HSE management in its 15 subsidiary companies, spot-checked 260 secondary units, workshops and grassroots-level organizations, and gave on-the-spot instructions to 20 subsidiary companies on the implementation of its HSE management system, to ensure its more effective application.

Under the instruction of CNPC headquarters to promote the effective implementation of HSE management system, 84 subsidiary companies completed the editing and amendment of their management guides and drew up 8,556 safety and environmental protection regulations, while 33,900 grassroots teams and stations carried out the "Two Document-One Table" system in 2007.

In August 2007, CNPC signed an HSE service agreement with DuPont, which evaluated and interviewed management of four subsidiary companies, improved enforcement of the HSE management system, and set CNPC requirements to ensure that its HSE management system is of an international standard.

3. Issuing New Regulations on Safety and Environmental Protection

Based on its current regulations on safety and environmental protection, CNPC formulated and promulgated new regulations as required by the adjusted HSE guidelines and strategies to improve safety and environmental protection management in the company. Safety and environmental protection is now guaranteed by institutions.

4. Strengthening Safety and Environmental Protection Training

Continued training and increased awareness of safety and environmental protection are essential to guarantee safety. In 2007, high-level CNPC managers were trained by DuPont experts on the HSE

New safety and environment regulations issued by CNPC in 2007

HSE	HSE Management System Guide (Revised Version), Measures for HSE Information System Management
Safety	Special Incentive Measures for Reporting Potential Hazards, Regulations for the Production and Use of Protective Helmets, Regulations for Grading Serious Hazard Sources, Regulations for Site Safety Inspections of Petroleum Enterprises (Well-logging), Work Manual for Offshore Safety Operation Supervision Management of CNPC Branches, Measures for Managing Production-related Accidents
Environment	Implementation Plan for Pollutant Discharge Reduction, Implementation Plan for Air Quality Improvement during the Olympic Games

management system, while more than 600 middle-level managers received HSE management training. CNPC also compiled five HSE training programs for safety staff and those who work abroad, and safety manuals for seven positions such as gas recovery and ethylene units. The company also organized 41 training sessions on issues such as safety and environmental monitoring, with participation of more than 2,200 staff. Such training has substantially increased their awareness of safety and environmental protection.

Example: Drilling Company of CNPC Xinjiang Petroleum strengthened training on safety and environmental protection.

Its training programs included HSE management involving 2,163 people, safe operation skill involving 826 people, safe drilling involving 723 people, special-purpose work involving 472 people, and emergency rescue involving 142 people.

5. Cultivating a Culture of Safety and Environmental Protection

CNPC is working hard to encourage and develop its own safety culture.

We focus on building a long-term safety culture, which is part of our corporate culture. CNPC subsidiary companies compiled the *Safety Culture Cultivation Plan* and *Safety Culture Manual* composed of safety philosophy, norms, values and proverbs. The manual guides CNPC employees' activities with its safety philosophy.



Developing and encouraging a safety culture.

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2.3 Ensuring Safe operation

In 2007, with the theme of Safety and Environmental Protection Year, CNPC achieved substantial progress in safety management by further implementing the HSE management system and taking measures to improve safety management. Throughout the year, accidents and casualty caused by industrial production fell dramatically and no major accidents related to occupational diseases or radiation occurred. However, industrial production casualties involving 3+ occurred twice, causing a total of seven fatalities, which showed that CNPC needs to further standardize its technical operations, strengthen supervision of hazardous operations and increase employees' awareness of safety, all of which will be done in our future work.

1. Safety and Environmental Protection Year

In 2007, we substantially consolidated our grassroots management during the Safety and Environmental Protection Year, focusing on "strengthening grassroots development, fighting rule-violating behaviors, promoting an up-to-standard rate, and eliminating hidden hazards".

CNPC set 18 major objectives and 45 specific tasks for the Safety and Environmental Protection Year.

CNPC intensified its safety and environment supervision of major fields, sectors and links. Six task forces were organized to investigate its

36 subsidiaries and 65 polluting units listed by the state for close inspection.

All units under CNPC cracked down on irregular activities and set up database on unsafe behaviors and safe operations file for specific employees. CNPC consolidated its safety and environmental protection work by formulating rules to combat irregular activities, rewarding those who discover and deal with emergencies and who tackle irregular behavior. A culture of fighting rule-breaking operations has taken shape. All work is now done in accordance with procedures, standards and rules.

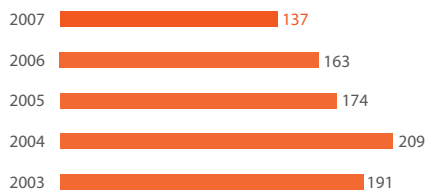
Strengthening grassroots development aims to improve employee professionalism.

Fighting three rule-violating behaviors means to crack down on rule-violating directions, rule-violating operations and violations of work discipline.

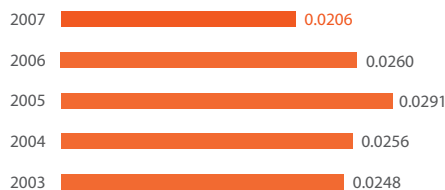
Eliminating hidden hazards intends to check and eradicate all hidden risks in operation and management.

Promoting an up-to-standard rate means to strictly control discharges of waste water, waste gas and solid waste.

Total accidents



Fatality rate per thousand in accidents | ‰



2. Controlling Potential Hazards

CNPC carried out a three-year plan to control potential hazards in order to ensure safety and control risks at the source. In 2007, RMB 11.7 billion was invested in controlling some 2,000 hidden risks such as high-pressure, high-risk and sulfur-intensive oil/gas wells, irregularly located pipelines and control of water pollution. CNPC also reinforced its oversight and auditing related to safety and environmental protection. Auditing of funds used for safety and environmental protection was conducted in 29 companies, and 40 subsidiary companies were required to audit their own funds for the same purpose.

CNPC has finished the review and approval of the environmental impact reports of six major projects, such as the 1.2 mt/a ethylene reconstruction project at Daqing Petrochemical and production test at Longgang gas field, as well as environmental reviews of eight major projects such as the Second Shaan-Jing Gas Pipeline. CNPC also organized assessments of 2,400 sets of equipments being used and phased out 63 sets of equipments that failed to meet environmental protection standards. Identification of sources of major risks, inspection of sources of pollution and on-site occupational health inspections were launched in order to establish a database of more than 20,000 sources of danger and pollution. More than 30,000 operation sites were marked and graded for monitoring to avoid health risks.

In 2007, some regions of China were hit by floods, which caused many casualties and major losses of property. Many of our subsidiaries are close to rivers, lakes or seas, and some of our facilities are located in high-risk zones. CNPC took preventive measures in preparation for the flood through scientific plans and strict inspection. CNPC improved its emergency planning to deal with natural disasters such as typhoons, storm tides and mud-rock flows to reduce the losses caused by them. As most CNPC subsidiaries are located in northeastern and northwestern China, CNPC is under huge pressure to maintain safe operation in the winter. Therefore, CNPC required all its subsidiaries to make thorough preparations to ensure safe operation in winter by increasing stockpiles and training staff.

3. Improving Emergency Response System

To build our capacity in terms of handling emergencies and

reconstruction, CNPC quickly improved its emergency response and rescue system.

In 2007, CNPC formulated the *Coordinated Regional Fire-fighting Plan* to coordinate companies in the same region in dealing with emergencies. CNPC also improved the professionalism of its firefighters by standardizing their preparations, improving their equipment and skills, upgrading their infrastructure and optimizing resource allocations.

CNPC Sichuan Oil/Gas Wells Firefighting Company is an emergency response and rescue base that integrates rescue, experimental operations, training and exercises. CNPC reinforced its 13 long-distance pipeline maintenance and rescue centers and 28 maintenance and rescue teams in six regions such as northeastern and northern China, improved its offshore emergency response center and offshore emergency response and rescue exercises, and set up three offshore emergency rescue stations in Yingkou, Caofeidian and Tanggu, which have the capacity to cope with level-2 oil spills.



On Nov. 12, 2007, PetroChina Jidong Oilfield Company and China National Petroleum Offshore Engineering Co., Ltd. conducted a joint exercise in the offshore target area in Jidong Oilfield. Offshore drilling platform, helicopters and a dozen of vessels were employed to test our capacity in well control, hydrogen sulphide prevention, offshore firefighting and oil spill recovery.

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CNPC subsidiary companies devised more than 1,800 emergency plans and conducted more than 800 exercises, while grassroots-level units devised more than 50,000 plans and conducted more than 150,000 exercises. CNPC's emergency system played a vital role in coping with natural disasters such as fires, storm tides, snowstorm and typhoons.

2.4 Advancing Energy Conservation & Emission Reduction

In accordance with the *State Council Notice on Distributing the Comprehensive Work Plan of Energy Conservation and Emission Reduction*, CNPC started to reduce energy consumption and the discharge of pollutants, as also required by the State Environmental Protection Administration and six other ministries to crack down on companies discharging pollutants illegally. CNPC regards energy conservation and pollution reduction as an important step toward transforming its economic growth mode, optimizing its structure, achieving institutional innovation and building a harmonious enterprise.

1. Establishing an Energy Conservation and Pollution Reduction Team

The CNPC management team attaches great importance to energy conservation and pollution reduction. In May 2007, a team with the CNPC president as the team leader, two vice-presidents as deputy team leaders, and 22 heads of departments as team members, was formed to control pollution and save energy. The team was also responsible for coordinating relevant work and making strategies and policies.

In 2007, CNPC drew up a plan to control pollution and conserve energy between 2008 and 2010.

Vision: CNPC will substantially improve its energy efficiency, with emissions of waste water, gas and solids meeting the criteria required by the state. CNPC aims to top the list in terms of resource consumption and environmental indicators. Its major companies should approach and reach the international criteria. CNPC aims to take the lead among the enterprises under the administration of the central government and build itself into an energy efficient and environmentally friendly enterprise.

Priorities: Carrying out ten major energy-saving projects, ten major pollution reduction projects and three demonstration units of circular economy.

Main measures: CNPC has set up a responsibility system and accelerated the removal of inefficient, energy-intensive and highly polluting

technologies and equipments, set pollution limits for equipment, established a database of best practices in the field of energy conservation and pollution reduction, compiled inventories of mature technologies that can be widely used, carried out a plan to control hidden risks in environmental protection and the 11th Five-Year Plan to reduce discharges of major pollutants, taken energy conservation and pollution reduction as a binding indicator to assess performance, allocated more resources to R&D, energy conservation and pollution control, and increased CNPC employees' awareness of energy conservation and pollution reduction.

Ten major energy-saving projects

Optimization of energy system	Improving energy efficiency of terminal equipment
Alternatives to oil for self-use	Improving operation of heating systems
Recovery of associated gas	Measurement and monitoring of energy
Energy conservation for electric motors and power systems	Development and utilization of unconventional energy
Reducing losses of oil and gas	Integrated use of water resources

Ten major pollution reduction projects

Meeting the criteria for waste gas emissions	Field sewage treatment and auxiliary pipeline network reconstruction
Sulfur dioxide control in coal-fired power plants	Advanced treatment and reuse of refining sewage
Installation and improvement of desulfurizing equipment	Pollution sources control for production equipment
Substitution with clean fuel	Demonstration of circular economy
Meeting the criteria for wastewater drainage	Automatic monitoring of pollutants

Three pilot units of circular economy

Jidong Oilfield	(Building a green oilfield)
PetroChina Dalian Petrochemical Company	(Building an ecological industrial park)
PetroChina Lanzhou Petrochemical Company	(Building an environmentally friendly enterprise)

2. Promoting advanced energy conservation modes

Years of sustained exploration and practice have led to the development of CNPC's energy conservation concept, mechanism, technology and management.

In 2007, in order to build an energy-efficient enterprise, CNPC attached great importance to optimizing its energy system, improving the energy efficiency of equipment and making an all-out effort to conserve energy and control pollution. CNPC significantly improved its management and integrated use of energy. Throughout 2007, CNPC saved 1.4 million metric tons of standard coal equivalents and 55 million cubic meters of water, 21.2 percent and 21.6 percent of the targets set by the 11th Five-Year Plan. CNPC granted the title of Top Energy and Water Efficient Enterprise to 13 regional companies and that of Energy and Water Efficient Enterprise to 27 regional companies.

CNPC also attaches great importance to the role of technological upgrading in energy conservation and pollution control. In 2007, CNPC popularized the drilling of horizontal and cluster wells and completed 806 horizontal wells throughout the year, whose output per well is 3-4 times that of vertical wells. As a result, hydrocarbon recovery and land use are more efficient.

CNPC launched associated gas recovery projects in the Tarim and Changqing oilfields in western China. Various recovery measures such as booster and reinjection into reservoirs, casing gas recovery, and gas-fired power generation were taken to improve the integrated use of associated gas resources.

In the same year, CNPC devoted more resources to the R&D of energy-efficient equipment and monitored 8,356 sets of energy-intensive

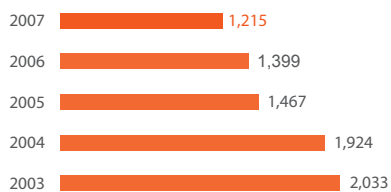
equipment such as boilers, furnaces, pump units, compressor units and transformers, and 37,850 meters of steam pipelines.

3. New progress in pollution control

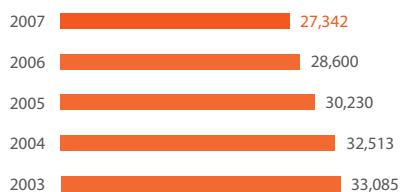
In 2007, CNPC kept its environmental protection indexes stable despite sustained output growth in crude oil, natural gas and chemical products. Oil and COD discharge in waste water were 1,215 metric tons and 27,342 metric tons respectively, 13.2% and 4.4% lower each than the previous year. A total of 157,300 metric tons of sulfur dioxide in waste gas were discharged, 0.77% higher than last year, but this growth rate was dramatically lower than in 2006. No major accidents involving environmental pollution or damage occurred.



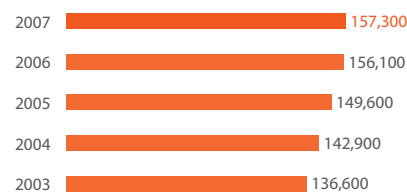
Oil discharges in wastewater (metric tons)



COD emissions of waste gas (metric tons)



Sulfur dioxide emissions of waste gas (metric tons)



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Example: Heavy oil sewage reuse in the Liaohe Oilfield

Ten years of efforts enabled CNPC Liaohe Oilfield to solve the major global problem of heavy oil sewage treatment and reuse. In Liaohe Oilfield, five advanced heavy oil sewage treatment stations had been built with a daily treatment capacity of 78,000 cubic meters, so that all the produced sewage during heavy oil recovery can be recycled, reducing COD emissions by 11,000 metric tons and oil pollutants by 570 metric tons each year.

4. Raising awareness of energy conservation and pollution control

CNPC regards it as a basic responsibility to increase employees' awareness of energy conservation and pollution control.

In the latter half of 2007, CNPC organized the company's largest-ever energy conservation and pollution control contest across the company, with the participation of more than 100 affiliates and 150,000 staff. This contest played an important role in increasing their awareness and understanding of these vital issues.



Workplace of PetroChina Dalian Petrochemical Company

2.5 Promoting Clean operation

As required by the State Council Energy Conservation and Pollution Control Working Meeting, CNPC evaluated the environmental impact of its projects and enforced the Three-tier HSE management system, and ensured the environmental impacts of all the projects were assessed, and that all the projects were checked in terms of environmental protection, so that pollution could be controlled at its source.

Jidong Oilfield, Dalian Petrochemical and Lanzhou Petrochemical launched their own demonstration projects. Jidong Oilfield turned itself into a green oilfield, Dalian Petrochemical an ecological industrial park and Lanzhou Petrochemical an environmentally friendly enterprise. All of these pilot companies devised their own circular economy plans. Grassroots-level units such as geophysical prospecting, drilling, borehole operations, oil recovery and refining and chemicals installed environmental protection facilities to improve their ability to protect the environment, with 108 grassroots-level units being granted the title of Green Teams or Green Workshops.

In 2007, CNPC launched clean operation review. Innovation and increased resources in clean operation technology improved CNPC's capacity to protect the environment. Altogether, 195 sets of equipments were approved to be used in clean operation, and 2,780 plans were made for clean operation. As a result, sulfur dioxide emissions and COD of wastewater were reduced by 3,990 metric tons and 2,660 metric tons respectively.

In accordance with ISO1400, CNPC used its identification screening systems to work out environmental management plans, improve emergency response programs at various levels, and prepared emergency response equipments. By the end of 2007, 216 subsidiary companies had passed ISO1400 attestation.

1. Improving three-level prevention and control programs

CNPC affiliates, particularly those close to water that may cause pollution, continued to implement the three-level prevention and control programs. Building on successes in 2006, CNPC completed 13 emergency prevention and control programs in four companies, which contributed to the completion of the three-level prevention and control programs. CNPC also formulated the *Standards of the Three-level Prevention and Control of Water Pollution for Refining Enterprises* to improve its capacity to manage environmental risks in emergencies.

Example: The three-level prevention and control system in Jilin Petrochemical Company

PetroChina Jilin Petrochemical Company took the lead by investing RMB 343 million to set up the three-level prevention and control system: 20,000 meters of dikes surround the tank area, and seven buffer pools can hold more than 100,000 cubic meters of wastewater. Two anti-pollution dikes can prevent the overflow of polluted water. In case of leaks, this anti-pollution system can effectively control wastewater within the plant through its blockades rather than let it flow into rivers. With detailed instructions on operation and hundreds of exercises, CNPC employees are now adept at operating this system.

2. Preparations to guarantee air quality during the Beijing Olympics

To ensure air quality during the 2008 Olympics, CNPC has formed a task force, which allocates responsibilities to individuals and coordinates these efforts. In 2007, CNPC took steps to guarantee air quality at the Beijing Olympics by controlling oil/gas pollution, upgrading oil products and supplying sufficient quantities of natural gas. CNPC formulated the *Action Plan for Olympic Air Quality*, whereby 1,351 service stations, 19 tank farms (including four production tank farms) and 346 tank trucks in Beijing, Tianjin and Shijiazhuang, Langfang, Baoding and Tangshan in Hebei Province, are to be transformed. By the end of 2007, 47 service stations, two tank farms and two tank trucks had been transformed.

3. Protecting biodiversity

Biodiversity, an integral part of the ecosystem, safeguards the ecological balance and ensures a favorable environment for human being. CNPC believes it is essential to preserve biodiversity in its environmental protection endeavors. CNPC does its best to protect biological habitats, biodiversity and the ecological balance. CNPC has achieved some progress in this respect.

Example: Clean operation and environmental protection at CNPC Liaohe Oilfield

CNPC Liaohe Oilfield is located near Liaodong Bay, or Liaohe delta wetland, one of the three bays forming the Bohai Gulf. It is inhabited by 409 kinds of wild species such as Saunders Gulls and red-crowned cranes. As a national nature reserve, this place is one of the largest areas with the best-preserved and most complete vegetation. Underground is the heavy oil and super-heavy oil reservoirs. Thousands of wells are scattered in the hundred miles of reed marsh with an annual output of millions of metric tons, making Liaohe Oilfield the largest heavy oil and super-heavy oil production base in China.

Given that this is such a special environment, Liaohe Oilfield has been attaching great importance to environmental protection. As required by state laws on environmental protection, Liaohe Oilfield has achieved 100 percent up-to-standard of environmental indicators such as sewage discharges, oil sludge treatment, harmless treatment of drilling wastes and harmless treatment of waste mud. Use of horizontal and cluster wells have saved land resources and protected the natural landscape and water sources. Thanks to CNPC's efforts in wetland protection during field operation, no oil spill has ever occurred in these thousands of wells scattered in the reed marsh. By practicing the philosophy of "Giving Green Energy and Sharing Clear Water and the Blue Sky", CNPC has written a harmonious chapter in the history of industrial development and environmental protection.



Biodiversity preservation during operation, Liaohe Oilfield

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2.6 Improving Overseas HSE Performance

CNPC enforced HSE arrangements overseas and set up a safety emergency response mechanism. CNPC also took measures to protect the environment where it operates. No major safety or environmental accidents occurred throughout the year.

1. Strengthening overseas HSE management

In 2007, China National Oil & Gas Exploration and Development Corporation (CNODC), mainly specializing in overseas investment, passed *ISO14001 Environmental Management Standard* and *OHSAS18001 Occupational Health and Safety Management System* and secured five certificates granted by the US, UK and China, showing that CNPC has reached a new high in its overseas HSE management. All overseas projects set up or improved their HSE management system which was essential to their business development, and laid a solid foundation for an HSE management system with CNPC characteristics.

To give better on-the-spot HSE support and guidance, CNPC formed three regional companies based in South America, Sudan and Kazakhstan and added the position of an HSE business manager so that part of the routine HSE management functions could be transferred to these regional companies and CNPC HSE management could achieve synergy between units. Meanwhile, CNPC increased the number of its HSE professionals. These three regional companies now have a total of 327 Chinese and foreign HSE professionals.

In the same year, CNPC set up HSE agencies in eight countries—Sudan, Iran, Nigeria, Niger, Chad, Algeria, Indonesia and Venezuela. CNPC improved its emergency response plan and strengthened its safety evaluation, enabling it to solve many safety issues and reduce risks to its overseas projects and staff.

All overseas project companies conducted a great deal of HSE training based on the characteristics of the host country's environment. CNPC Andes Petroleum in Ecuador compiled a six-grade training program from elementary to expert level and developed a complete Learning Management System (LMS) to qualify staff for their jobs.

CNPC PetroKazakhstan Inc. organized intensive HSE training, and was presented the 12th International Rescue Training Major Contribution Award by the Ministry of Emergency Situations of the Republic of Kazakhstan in honor of CNPC's outstanding achievements in HSE training.

Supported by project companies, CNPC held activities such as the Safe Operation Month, Safe Operation Warning Day and the HSE Achievement Exhibition, and distributed the *HSE Guide*. These efforts greatly helped to raise awareness of HSE.

2. Protecting the environment of the host country

Following the principle of maintaining harmony between energy development and environmental protection, with a strong sense of responsibility for each host country it operates in, CNPC employed environmentally friendly technology and formulated protective



Example: Great Wall Drilling Company (GWDC) intensified foreign employees' HSE training.

CNPC GWDC provided HSE training to foreign staff in a bid to improve its overseas frontline HSE management, and especially foreign employees' awareness of safety and the skills required by safe operation. In 2007, GWDC organized two HSE training sessions for foreign staff with the participation of more than 100 people from over 10 countries. The training revolved around HSE ideas, the HSE management system, HSE procedural documents and safety regulations on operation sites. Mr. Abbs, an Iranian operation coordinator, said: "I can really learn many useful things here, and I'm happy to talk with our staff from various countries about safety at work."

measures. Throughout the year, no major pollution incidents occurred, making CNPC a role model in terms of abiding by its host countries' environmental laws.

In 2007, CNPC PetroKazakhstan Inc. invested heavily in accelerating the integrated use of natural gas in order to reduce natural gas emissions. The company also used advanced bio-technology to restore more than 5,000 square meters of damaged vegetation. After the first-phase project of the Third Oil & Gas Processing Plant in Aktobe started production at the end of the year, it recovered the regenerated gas of the emission torches, thus improving the ecological environment of oil producing regions. In addition, the company invested USD 5 million to start the preliminary work on building sewage treatment facilities with a treatment capacity of 7,000 cubic meters, USD 700,000 in the phase-I of the sewage treatment project in Kenkiyak, and USD 230,000 in ecological restoration.

CNPC's 1/2/4 project in Sudan continued its industrial sewage biological degradation and set up five sewage biological/plant treatment stations. In Sept. 2007, CNPC once again won the Environmental Protection Award granted by the Ministry of Energy & Mining of Sudan.



Strictly monitor environmental indexes during operations in Sudan

Example: Protecting Ecuadorian tropical rainforests in operation sites

Located in tropical rainforests in northeastern Ecuador, CNPC Andes Petroleum used 3-D seismic exploration technology to avoid damage to rainforest vegetation. The company also drilled new wells in old well sites to minimize the operational land use in order to protect biodiversity. It adopted European or US environmental protection standards to minimize its waste discharges from power generation, oil refining and water treatment.

Thanks to its painstaking efforts to protect the local tropical rainforest, CNPC Andes Petroleum was granted the World Oil HSE/Sustainable Development Award and listed as a candidate for the London-based Energy Institute Awards: Environment.