



中海壳牌石油化工有限公司
CNOOC and Shell Petrochemicals Company Limited



14th Monitoring Report on the Environmental and Social Management Plan — *Environmental and Social Performance 2006*



PA-HSEQ-Operations-001

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Section 1 Introduction

1.1 Purpose

The Environmental and Social Management Plan (ESMP), in conjunction of the Monitoring Reports, is the mechanism by which CSPC (CNOOC and Shell Petrochemicals Company Limited) manages the environmental and social impacts associated with the CSPC Nanhai Petrochemicals Project. The goal of the management effort is to avoid or minimize adverse impacts and maximise beneficial impacts upon the local communities and environment. The goals of each monitoring report are:

- a. To track and report on the effectiveness of the measures and responsibilities identified in the ESMP.
- b. Inform on the augmentation or adjustment of mitigation measures.
- c. Identify any potential new areas of exposure, and
- d. Ensure findings are integrated into HSE and other appropriate management systems for the operational phase.

1.2 Structure

The report structure addresses the environmental, social and health effects as well as the effects of accidents and emergencies. Each section will in turn deal with potential effects that were identified in the ESMP and will evolve to include future effects as and when they are identified. For each potential effect one or more indicators of performance have been identified for ongoing monitoring.

As the project has now entered the operational phase a number of specific construction effects identified in the ESMP are no longer appropriate and will not be included. In addition, CSPC will expend efforts to encourage involvement with other local industries and governmental agencies in collaborative monitoring of potential environmental and social effects as a result of industrial activities in the area. It should be recognized that collaborative monitoring of potential environmental and social effects is a positive step and has as its main purpose collective responsibility for all stakeholders, in the environmental and social conditions in Dayawan.

Wherever possible data reported is derived from independent or externally verifiable sources.

Section 2 Sustainable Development – Executive Summary

CSPC has successfully managed social impacts during the Construction Phase of the Complex, as indicated by the follow-up monitoring of approximately 60 social economic and health parameters. The Complex has now successfully moved into the operational phase. It is CSPC intent to carry on meeting the commitments made in the Environment and Social Management Plan. These commitments will need to be reviewed over-time to ensure that the prevailing influence for responsibility is properly assigned, for example, greater involvement of the Local Authorities in collaborative monitoring and action.

In addition to the social and environmental monitoring, CSPC continues to exert efforts to promote the development of the local communities while paying special attention to vulnerable groups.

In 2006, 135 visits, to meet and consult with 44 stakeholders in the local communities were made. Maintaining dialogue and open communication is a critical element that CSPC are committed to establish.

In total, 1800 students and teachers from local schools attended the CSPC Open Day Program held in 2006. This event was educational, raising the awareness and creating a better understanding of what part CSPC plays in the Local Community and the benefits that CSPC products bring to the continuing growth and development of China.

Social empowerment initiatives have seen 122 resettled villagers attend the free craft training courses organized; approximately 2500 pieces of computers, office furniture and equipment were donated to local schools, hospitals, resettled villages and the local training center of the Dayawan Labour Bureau to improve their basic amenities; 121 local primary and middle school students and 10 college students from the resettled villages received scholarship and grant aid to help them bridge their financial difficulties.

Contracts have been awarded to the resettled village companies that include laundry services for Fire Retardant Clothes and the collection of domestic waste from the CSPC Complex. In Oct 2006, CSPC awarded a North Diversion Channel project with contract value of RMB 4.25 million to one of the three resettled villages. These as with other contracts awarded have the purpose to provide CSPC with value for money services and the resettled villagers with sustained employment and income opportunities while helping build their capacity through interactions with and coaching from CSPC.

In addition, About 60 resettled villagers currently work for CSPC's office service contractor and 60 resettled villagers work as either forklift truck operators or general workers for CSPC's logistic contractor.

Section 3 Social Impact Monitoring

The Project has now entered the Operations phase. Adjustments have been made and will continue to be made in the parameters being monitored, measured and reported as a result of the potential impacts and effects of the Operation on the community. The parameters included below are presented as impacts that can result in either adverse or positive effect. A number of impacts that have been included below are recommended not to be included in future reports with reasons given.

3.1 Impact: Growth / Decline in Industry and Business in Dayawan Economic and Technology Development Zone (ETDZ) CSPC Project related major investment and the potential for this investment to result in the development of other industries.

Monitoring result: Industry growth / decline and change represented as a delta year on year. In 2005 the number of large enterprises in the Dayawan ETDZ increased by 81.5% compared to 2004. The number of small and medium enterprises in the region increased 31.9% compared with 2004.

Data source: Huizhou Statistic Yearbook 2006

Recommendation: CSPC is not the main influence on the decline or development of industries in the Dayawan ETDZ and as a result this parameter will not be included in future reports.

3.2 Impact: Employment opportunities for local population as a result of CSPC operation

Monitoring result: Employment and wage levels in Dayawan ETDZ Average annual wages in Dayawan increased by 11% between 2004 and 2005. There was also an increase of 26% in the number of employees over the same period.

Data source: Huizhou Statistic Yearbook 2006

Recommendation: CSPC is not the main influence on the employment and wage levels in the Dayawan ETDZ and as a result this parameter will not be included in future reports.

3.3 Impact: Income levels of households of resettled villagers

Monitoring result: Average household income increased 5% from 2005 – 2006. Average household expenditure increased 3% from 2005 – 2006 resulting in average households +2% positive in disposable household income.

Data source: Resettlement Internal Monitoring Team

Recommendation: The income levels of resettled villagers will continue to be monitored until it is verified by a third-party independent consultant that CSPC has attained its goal of helping villagers restore or improve the livelihood of resettled villagers.

3.4 Impact: Status of vulnerable groups in resettled villages Those sectors of the population that may not benefit from the economic growth of the area.

Monitoring result: The official poverty threshold for Dayawan of 1,560 RMB per person per year has been raised to 2,496 RMB per person per year in 2006. This definitional change leads to an increase of 258% in the number of the vulnerable from 26 to 93.

Data source: The Dayawan Civil Affairs Bureau

3.5 Impact: Economic migration to the Dayawan area as a result of CSPC project

Monitoring result: In 2005 the number of migrant workers decreased by 33%, reflecting the phase out of 25,000 project workers.

Source data: Huizhou Statistic Yearbook

Recommendation: CSPC is now in the operational phase and as such is not the prevailing reason for the changes in migration to Dayawan ETDZ. This parameter will not be included in future reports.

3.6 Impact: Property speculation as a result of CSPC operation

Monitoring result: The number of planning and building permits issued per year indicates the degree of property speculation. Planning permits issued in 2005 have increased 57% compared to 2004. New building construction permits issued in 2005 have increased 516% compared to 2004.

Data Source: Dayawan Property Bureau and Dayawan Construction Bureau

Recommendation: This parameter is no longer considered as a direct consequence of CSPC operation and as a result will not be included in future reports.

3.7 Impact: Level of community knowledge and concern about project

Monitoring result: CSPC have been very active with Community Liaison activities and appointed an Officer to deal with any concerns raised by the Local Community with the project. All concerns raised during the construction period have been addressed to the satisfaction of the local stakeholder community.

Recommendation: As the project is now into the Operations phase the monitoring of community knowledge and concern will be transferred and applied to the continued operation of the Complex and its impact.

Active engagement with the Local Communities and stakeholders will be ongoing. All complaints from the Public will be recorded and investigated and the results of the investigation will be reported back to the complainant.

3.8 Impact: Implementation of RAP The RAP (Resettlement Action Plan) has specified mitigations concerning the direct impacts on resettled people and villages. This included loss of houses, outbuildings, agricultural land, other losses assigned to individuals, loss of community land and loss of village infrastructure.

Monitoring results: The RAP resulted in the following categories of mitigation:

- 2.1 Payment of compensation
- 2.2 Provision of housing
- 2.3 Payment of allowances
- 2.4 Provision of land entitlements to village collectives

As of March 2004, for the phase 1 resettlement, all terms have been 100% complete in accordance with the RAP.

For phase 2 resettlement, all terms are 100% complete in accordance with the RAP. This is specific to housing.

The replacement of community facilities is at 100% in accordance with the RAP.

The attention to the special needs of vulnerable groups: The number of poor and very poor households have been masked through the payment of living allowance. Households earning less than 130 RMB per month receive monthly financial support from the government. As of June 2004, there were 26 households from two resettled villages that are receiving financial support from the government. By December 2006, the number of vulnerable households increased to 93 due to a raising of the support threshold to 208 RMB per person per month.

Recommendation: The attention to the special needs of vulnerable groups of the resettled villages will be included in subsequent reports.

3.9 Impact: Fishery and Aquaculture Production (*annual*) Marine transportation related to CSPC operation and its potential impact on the aquaculture and customary fishing industry.

Monitoring result: Whilst the fishery production in tonnage remained stable in 2005 compared to 2004, the total value of the fishery production declined by 14%. In addition, fishermen have reported that their production has been decreasing over the past few years. These concerns are included in the “*Stakeholder Consultation Report 2002*”. Whilst fishery production figures can reflect both changes in human activity (less fishermen) and the availability of marine resources, that which can be outside the direct impact caused by marine transportation to and from the Complex,

Recommendation: The monitoring and reporting of this social impact will be included in future reports.

3.10 Impact: Status of those dependent on fishery and aquaculture (*annual*) Marine transportation related to CSPC operation could impact aquaculture and customary fishing industry.

Monitoring: The level and degree of economic health of fishing individuals / communities.

Monitoring results:

Income levels – Based on the Ocean Fishery Bureau survey (households) of fishing villages, the average income is 5,946 RMB per person in 2004. This is a 44% increase compared to 2003.

Aquaculture / fishing activity levels – According to the data collected by the Dayawan Ocean and Fishery Bureau, the total number employed in Aquaculture / fishing activity remained stable between 2003 and 2004.

Recommendation: The status of those dependent on fishery and aquaculture will continue to be monitored though CSPC is not the sole contributor to the impact.

3.11 Impact: General Health Indicators As the project has moved from the construction and into the operation phase, the health impacts to 25,000 migrant workers are no longer an issue.

Monitoring results: A number of health indicators that include any growth or improvement in health infrastructure and capacity is measured to determine the degree of positive health impacts. This monitoring and reporting is undertaken by the Local Governmental Agencies and includes:

- a) Health Status – Life expectancy at birth (10 years).
- b) Health Status – Life expectancy at 65 years (10 years).
- c) Health Status – Infant mortality rate (10 years).

A census was carried out in Dayawan in 2000 and includes data for all the above three indicators. This census will be carried out every 10 years.

- d) Community Health Care resources – Number of practicing physicians and nurses (annual).
- e) Community Health Care resources – Number of hospitals and clinics (annual).
- f) Community Health Care resources – Number of hospital beds (annual).

The Health Department of Dayawan Administration Committee publishes annually the data for indicators (d, e and f).

- g) Health care utilization (annual) – Ongoing and historic data for the following indicators are provided by Huizhou CDC:
 - i. Number of consultations with Doctors.
 - ii. Childhood immunizations.
 - iii. Number of inpatient admissions.
 - iv. Numbers of acute care admissions.
- h) Community health expenditure (annual) – Average health expenditure per urban individual includes the expenditure on pharmaceutical, healthcare insurance and anything related to healthcare.
 - v. Total expenditure on health.
 - vi. Total expenditure on health as compared to Huizhou GDP.

Source: Huizhou Statistic Yearbook.

- i) Non-medical determinants (annual).
 - vii. Tobacco, alcohol and tea consumption – alcohol and tobacco use are not directly related to the project, but rather indicators of the state of health of a population.

Source: Huizhou Statistic Yearbook.

- viii. Average household food expenditure (annual) – improved economic circumstances of residents may provide them with a better diet. However, due to the absence of BMI data, the annual household expenditure on food will be considered as a long-term measure to reflect improved nutrition.

Source: Huizhou Statistic Yearbook.

- j) Demographic and economic context (annual).
 - ix. Total population – population of the region remained stable between 2005 and 2006.
 - x. Gross Domestic Product – the GDP of the Huizhou region increased by 18.9% between 2005 and 2006.

Source: Huizhou Statistic Yearbook.

3.12 Impact: Emergency – monitoring and reporting will only occur following an accident or emergency and will include the following:

- a) Fire / explosion.
- b) Surface water contamination – hazardous material handling, storage or transport could result in surface fresh water contamination and associated adverse effect on habitat quality.
- c) Seawater contamination – hazardous material handling, storage or transport could result in seawater contamination and associated adverse effect on marine habitat quality.
- d) Soil contamination – hazardous material handling, storage or transport could result in soil contamination.
- e) Groundwater contamination - hazardous material handling, storage or transport could result in groundwater contamination.
- f) Injuries related to work – this will be given as a profile and will detail the incidence, type and severity.

The accident and emergency reporting against all the above indicators will be carried out annually and included in this report.

Section 4 CSPC Environmental Monitoring Results: Operational period 2006

4.1 Scope

This document details the environmental monitoring plans and results for the CNOOC and Shell Petrochemicals Company for the year 2006.

4.2 Purpose

This document identifies the standards used to define and implement the monitoring requirements of the CSPC Complex. This includes the release points and the substances monitored for emissions to air, water and land. It also defines the community monitoring requirements. Furthermore, this document serves the purpose of reporting actual performance for the operating period defined in the report.

4.3 Acronyms / Definitions

BOD5	Biological Oxygen Demand
COD	Chemical Oxygen Demand
Complex	CSPC Petrochemicals Complex
CPDP	Chinese Preliminary Design Package
CNOOC	China National Offshore Oil Company
CSPC	CNOOC and Shell Petrochemicals Company Limited
DO	Dissolved Oxygen
EISA	Environmental Impact Statement (2002) Amendment
ESIA	Environmental and Social Impact Assessment (2002)
ETP	Effluent Treatment Plant
HSE	Health, Safety and Environment
PRC	Peoples Republic of China
GEPA	Guangdong Environmental Protection Agency
NEPA	National Environmental Protection Agency
TSP	Total Solids Particulates
TSS	Total Suspended Solids
TOD	Total Oxygen Demand

4.4 Legislation

The monitoring plans are based on the following requirements as a minimum:

- PRC National Regulations and Guangdong Provincial Regulations;

- World Bank Guidelines as stipulated by the World Bank Pollution Prevention Handbook (1998);
- CSPC requirements;
- Agreements between CSPC and PRC Authorities;
- Proposals in the EIS (1997 amendment) and the recommendations by NEPA and GEPA on the approval of the EIS (1997 Amendment);
- Recommendations of the ESIA (2002) and Marine EIA (2002);
- CPDP (2002); and
- Requirements for correct operation of the Effluent Treatment Plant (ETP), Evaporative Concentration Unit (ECU), Liquid Concentrate Incinerator (LCI), Wet Air Oxidation Unit (WAO) and Sludge and Waste Disposal Incinerators.

PRC Standards include:

- Ambient Air Quality Standard (GB3095-1996);
- Environmental Quality Standards for Surface Water (GHZB1-1999);
- Water Quality Standards for Fisheries (GB11607-89);
- Seawater Quality Standard (GB11607-89);
- Environmental Quality Standard for Soils (GB15618-1995);
- Standard of Environmental Noise for Urban Area (GB3096-1993);
- Emission Standard for Odour Pollutants (GB14554-1993);
- Integrated Wastewater Discharge Standard (GB8978-1996);
- Emission Standard of Air Pollutants for Industrial Kiln and Furnace (GB9078-1996);
- Emission Standard of Air Pollutants for Thermal Power Plants (GB13223-1996);
- PRC Identification Standard for Hazardous Wastes – Identification for Corrosivity (GB5085.1-1996);
- PRC Identification Standard for Hazardous Wastes – Screening Test for Acute Toxicity (GB5085.2-1996);
- PRC Identification Standard for Hazardous Wastes – Identification for Extraction Procedure Toxicity (GB5085.3-1996); and
- PRC Classification of Hazardous Waste.

4.5 Monitoring Programmes

CSPC have designed and implemented monitoring plans for collecting data on ambient air and water quality and for the releases of concern from major point sources. In addition, CSPC monitor

emissions and their environmental impacts on the receiving environment and consider this as an important element of the environmental protection plan for the Complex.

CSPC Complex is now in the Operational phase and as such have implemented a number of Operational monitoring programmes that include:

Monitoring within the Complex:

- Point source monitoring of stacks and vents;
- Ambient air quality at the site boundary;
- Monitoring of effluent discharge via subsea pipeline;
- Monitoring of effluent discharge via shore pipeline;
- Solid and hazardous waste;
- Noise at site boundary and at the outside edge of 500m exclusion zone;

Monitoring outside the Complex (in conjunction with GEPA and Huizhou Municipality as requested and as part of the collaborative arrangements of operators on the Daya Bay Industrial Park):

- Ambient air quality in the community;
- Water quality in Daya Bay (adjacent to shore discharge, and at the outside edge of the subsea pipeline discharge mixing zone);
- Sediment quality in Daya Bay;
- Surface water quality;
- Groundwater quality;
- Noise at the nearest receptors in the community; and
- Flora / fauna surveys (both onshore and offshore).

4.6 Operational Air Emission Monitoring Results

CSPC have in place point source release monitoring that provide feedback to pollution and prevention control systems and guide any necessary corrective action. This data is collated and monitored internally and forms part of the “Aspects Register” for the site operations. The results of this monitoring are sent to Daya Bay Environmental Protection Bureau at an agreed frequency.

The parameters in the monitoring programme include:

- Flow rate;
- Temperature;

- Particulates;
- Sulphur Oxides;
- Nitrogen Oxides;
- VOC;
- Total Hydrocarbons;
- Carbon Monoxide;
- Halogens (only for Environmental acceptance and when requested by the Authorities);
- Fugitive emissions;
- Hydrogen Sulphide; and
- Other toxic materials (including metals).

CSPC monitoring programme has taken into account the recommendations made by PRC NEPA and include:

- In line monitoring systems at main waste water and gas discharge outlets; and
- Fuel oil has been chosen and purchased that enables CSPC to meet the emission limits set, particularly for SO_x and NO_x.

4.6.1 Waste Incineration Facilities

The waste incineration facilities on site have continuous monitoring of:

- NO_x;
- SO_x;
- CO
- Total dust;
- Organic carbon;
- Temperature of the combustion chamber, oxygen content, pressure and water vapour.

In addition emission sampling of the Incineration facilities is carried out at an agreed frequency, of as a minimum once per year, of the following pollutants:

- Particulates;
- Metals that include mercury, cadmium, thallium, antimony, arsenic, lead, chromium, copper, manganese, nickel and vanadium.

As a requirement of the Environmental emission performance acceptance testing of the site, the Incineration facilities have been tested for the following components to demonstrate negligible emissions:

HCl; and
Dioxins.

4.6.2 Air quality monitoring at site boundary and neighbourhood

The following substances are measured at the site boundary:

- Total non-methane hydrocarbons (as C);
- Oxides of Sulphur (SO_x);
- Oxides of Nitrogen (NO_x); and
- Particulate matter.

These substances are measured in accordance with the principles described in the PRC Standards.

4.6.3 Process Vents

In cases when process vents cannot be recovered, CSPC ensure complete combustion of the substance by routing the substance to flare before release to atmosphere.

In cases when process vents cannot be routed to flare CSPC have in place abatement equipment designed specifically to ensure the pollutant discharge complies with permitted requirements.

4.6.4 Fugitive Emissions

Fugitive emissions include releases from:

- Compressors, pumps, valves seals etc;
- Secondary emissions from open drains, sewers, oil/water separators, waste handling facilities, sewer systems, cooling water systems etc; and
- Losses from storage tanks.

In 2006 fugitive emissions have been calculated on mass balance loss. As part of a monitoring and improvement plan for environmental protection the use of a Leak Detection and Repair Programme

(LDAR) to reduce fugitive emissions of VOC will be introduced and implemented across site during 2007 and 2008.

4.6.5 Sampling and Analysis methods

PRC sampling and analysis methods are followed.

4.6.6 Releases of concern from major point sources

Air emission standards have been set and are the maximum amounts of a pollutant that may be emitted by the CSPC Complex. These pollutants have been expressed as concentrations and as a total mass release, which reflects more directly the overall objective of reducing the total load on the environment. The emission standards set for the CSPC Complex have been established in terms of what can be achieved with available technology and in terms of the impact of the emission on the ambient environment.

Table 4.6.6 represents the major air emission standards for compliance and results for 2006:

Table 4.6.6

Aspect Source	Pollutant	Standard Concentration	Standard Total mass	Result 2006 Concentration	Result 2006 Total Mass
Boilers, Combustion Furnaces, Incineration Facilities and Process Vents	SOx	500mg/Nm ³	5500 t/a	See comments below – Note 1.	See comments below – Note 1.
Boilers, Combustion Furnaces, Incineration Facilities and Process Vents	NOx	240mg/Nm ³	4407 t/a	See comments below – Note 1.	See comments below – Note 1.
Boilers (1), Combustion Furnaces (2), Incineration Facilities (3) and Process Vents (4).	Particulate Matter	(1) 30 TSP (2) 200 TSP liquid fuel furnace, 20 TSP gaseous fuel furnaces (3) 20 TSP (4) 20 TSP	1837 t/a	See comments below – Note 1.	See comments below – Note 1.

Note 1: CSPC Complex, at the time of this report, is formally being assessed for project environmental acceptance. Whilst reporting on performance of the major air emissions from site operations to the Daya Bay Environmental Protection Bureau during 2006 are

in compliance with the permitted standards, the actual results cannot be released until confirmed by independent verification as part of the formal acceptance process. Formal acceptance is expected during 2007 and actual results data will then be included in the next report scheduled for publication in August.

4.7 Operational Aqueous Effluent Monitoring

In compliance with the requirements of PRC National Integrated Wastewater Discharge Standard (GB8978-1996), CSPC have in place sampling equipment and a monitoring programme for each discharge outlet that gives priority to water quality management and knowledge that the discharge load from the Complex does not compromise the sustainability of the aquatic system and receiving environment.

There are two main aqueous effluent discharge points from the Complex. The main discharge to Daya Bay is from the Effluent Pumping Station via an undersea pipeline that has as its purpose to ensure minimal impact of the discharge on the receiving environment. The second discharge point from the site is concerned with non-contaminated water drain off. The quality of this discharge is also monitored and controlled to ensure requirements are met, and as a minimum is monitored to ensure that Total Petroleum Hydrocarbon content is <0.5 mg/l before drain off.

CSPC have in place point source release monitoring that provide feedback to pollution and prevention control systems and guide any necessary corrective action. This data is collated and monitored internally and forms part of the "Aspects Register" for the site operations. The results of this monitoring are sent to Daya Bay Environmental Protection Bureau at an agreed frequency.

The parameters in the monitoring programme for the Effluent Pumping Station include:

- Volumetric flow (continuous in line monitoring);
- Total Oxygen Demand (TOD) (continuous in line monitoring);
- PH (24 hour composite sample);
- COD (24 hour composite sample);
- BOD5 (24 hour composite sample);
- Suspended Solids (24 hour composite sample);
- Dissolved Oxygen (24 hour composite sample);
- Sulphide (24 hour composite sample);
- Phenol (24 hour composite sample);
- Nitrate (24 hour composite sample);
- Ammoniacal Nitrogen (24 hour composite sample);
- Phosphate (24 hour composite sample);
- Cyanide (24 hour composite sample);

- Oil and Grease (24 hour grab sample);
- Total Petroleum Hydrocarbon (24 hour grab sample);
- Mercury (monthly);
- Cadmium (monthly);
- Chromium (hexavalent) (monthly);
- Arsenic (monthly);
- Lead (monthly);
- Nickel (monthly);
- Total Coliforms (monthly);
- Pesticides;
- Surfactants;

For controlled discharge into Daya Bay for non-contaminated water drain off:

- PH;
- Oil and grease;
- COD;
- Total Suspended Solids;
- Total Petroleum Hydrocarbon.

4.7.1 Sampling and Analysis Techniques

The measurement techniques stipulated by the PRC Integrated Waste Water Discharge Standard are used. For analysis of streams that there is no PRC method available World Bank standards will be used.

4.7.2 Releases of concern from major point sources

Water emission standards have been set and are the maximum amounts of a pollutant that may be emitted by the CSPC Complex. The emission standards set for the CSPC Complex have been established in terms of what can be achieved with available technology and in terms of the impact of the emission on the receiving environment.

Table 7.2.1 represents the major water emission standards for compliance and results for 2006:

Table 7.2.1

Aspect Source	Pollutant	Standard	Result 2006
Effluent Pumping Station	COD	100 mg/l	See comments below – Note 1.
	pH	6-9	
	Total Suspended Solids (TSS)	70 mg/l	
	NH4-N	30 mg/l	
	Oil and Grease	15 mg/l	
	Total Petroleum Hydrocarbon	50 mg/l	
Non Contaminated Water Discharged to Shore	Oil and Grease	15 mg/l	See comments below – Note 1.
	pH	6-9	
	COD	100 mg/l	
	Total Petroleum Hydrocarbon	0.5 mg/l	
	Total Suspended Solids (TSS)	70 mg/l	

Note 1: CSPC Complex, at the time of this report, is formally being assessed for project environmental acceptance. Whilst reporting on performance of the major water emissions from site operations to the Daya Bay Environmental Protection Bureau during 2006 are in compliance with the permitted standards, the actual results cannot be released until confirmed by independent verification as part of the formal acceptance process. Formal acceptance is expected during 2007 and actual results data will then be included in the next report scheduled for publication in August.

4.8 Solid and Hazardous Waste Monitoring

CSPC monitor all solid waste resulting from site operations to determine the most acceptable treatment, storage, transport and disposal methods to be used. Any wastes that may leach toxic materials, such as heavy metals, are analysed for their leachability. Each shipment going for disposal is certified for composition and toxic properties to ensure safe transportation and disposal.

CSPC have implemented a philosophy on waste that, put simply is expressed:

“Waste should be managed and not merely disposed of”. To enable this philosophy the following strategies are part of the waste management at the CSPC Complex:

- Reduction – minimizing the amount of waste generated at source and/or minimizing the hazardous components of waste;
- Re-Use – putting used items back into use;
- Recovery – capturing used materials and reprocessing them in some way. This includes recycle of materials and recovering energy from materials, e.g. power generation;
- Disposal – although the least favoured option, this includes disposal to landfill or incineration using the site incinerators.

CSPC follows a code of practice in the management of solid and hazardous waste that is summarized in the following four steps:

- All waste is clearly identified by analysis and categorized with detail of any hazards it may present. This is described on the transfer note from the producer to the receiver.
- Waste is stored in a proper manner, so that it is not spilled, will not leak or be blown about. The waste stored on the Complex is done so with safety and security and different types of waste are handled and stored separately.
- A Registered Carrier who holds a current license to carry that waste does all collection of waste on site. As the waste producer, CSPC furthermore audit and inspect the registered waste carrier to ensure compliance with requirements.
- CSPC audit and inspect the final disposal place to ensure that disposal methods being used by the Landfill Site is following acceptable health, safety and environmental standards.

All waste arising from CSPC site is analysed and monitored whether transported and disposed of at the site incineration facilities or transported off-site for disposal.

The wastes are categorized accordingly:

4.8.1 Operational Hazardous Waste exported from Complex

Each shipment is categorized and monitored for Metals including:

- Mercury;
- Arsenic;
- Lead;
- Chromium;
- Cadmium;
- Vanadium;
- Nickel;
- Copper.

4.8.2 Operational Non-Hazardous Waste exported from Complex

Each shipment is categorized and monitored for Metals including:

- Mercury;

- Arsenic;
- Lead;
- Chromium;
- Cadmium;
- Vanadium;
- Nickel;
- Copper.

4.8.3 Operational Waste exported from Complex for Metal recovery / reuse

Each shipment is categorized and monitored for Metals including:

- Mercury;
- Arsenic;
- Lead;
- Chromium;
- Cadmium;
- Vanadium;
- Nickel;
- Copper.

4.8.4 Operational Waste sent to Complex Incineration Facilities

To be based on the nature of the waste and may include:

- Oil;
- Sulphur;
- Heavy metals (Cd, Cr, Hg, As).

4.8.5 Internal Key Performance Indicators and Targets

Waste management performance is monitored and reviewed. The total hazardous waste transported from the CSPC Complex for disposal as a percentage of the total waste generated from site operations is targeted at <10% or <1712 t/a.

4.9 Noise Monitoring Programme

The noise monitoring proposed in the EIS (1997 Amendment) has been carried out in 2006 and comply with the specified standards and conditions. The frequency of monitoring, minimum of 4 times per year / or every 3 months, and at distinctive times between day (06:00 – 22:00) and night (22:00 – 06:00) and during abnormal operating activities, such as start-up and shutdown have been incorporated.

Location	Location	Frequency	Standard	2006 Result
Site Boundary	North East West	Every 3 months / or 4 times per year	Day time <65dB(A) Night time < 55dB(A)	Day time <65dB(A) Night time <55dB(A)

4.10 Groundwater Quality Monitoring

CSPC have founded water-monitoring wells for ground water monitoring to ensure that the ambient quality of the groundwater is not impaired due to production. The wells have been sited upstream (x2) and downstream (x2) on the Complex to ensure that shallow groundwater is not contaminated. The wells provide CSPC complex with background data about quality, the flow regimes of both shallow and deep aquifers and whether any contamination has occurred due to spills on site. Table 10.0 below indicates the minimum substance testing.

Table 10.0

Location	Description	Substance	Results 2006
On-Site	Up gradient (x2) Down gradient (x2)	pH COD Oil (TPH) Benzene TSS Inorganic Nitrogen	All results on-grade

4.11 Marine EIA 2002

CSPC emission into the Marine environment has been monitored in 2006 and the Complex is currently in progress with Marine Environmental Acceptance with the PRC Authorities. The requirements of GB codes (GB17378.7-1998) and (GB12763.6-1991) form part of the assessment.

Petroleum hydrocarbon is the main pollutant concern with heavy metals such as Cr, Pb, and Hg. The monitoring of marine habitats is conducted once per year. The objective is to monitor toxin accumulation, such as total petroleum hydrocarbon, inside the body of the marine habitats. In addition the long-term variation of water quality and sediment at specific locations can be studied and analysed.

CSPC will continue to monitor the condition of offshore sensitive habitats and receptors and will undertake corrective action where necessary. The condition of sensitive habitats will be monitored throughout the operational phase. Where habitats are at risk from cumulative impacts caused by industrial activities within Daya Bay, CSPC will advocate collaborative monitoring and the implementation of corrective action where necessary.

4.12 Collaborative Regional Monitoring

CSPC will continue to monitor those natural resources over which the “near field” impacts of the Complex are likely to extend. In addition, potential “far field” impacts on mobile large fauna such as birds and turtles will also be monitored. CSPC will fulfill this obligation by active participation in collaborative programmes with PRC authorities and/or other bodies as operated or planned by organizations such as WWF.

4.13 Environmental Incidents

CSPC manage the impact of operation on the environment. Management controls, programmes, monitoring, collection of data, internal and external review and reporting of performance, are all part of the CSPC Environmental Management System.

Reporting of environmental incidents to PRC Authorities is a requirement of CSPC License to Operate. In addition CSPC have in place a developed process of internal incident and near miss

reporting to enable timely corrective action and prevention. Key performance indicators are set with targets that enable environmental performance meet, as a minimum, PRC regulatory limits.

During the operation of the Complex in 2006 there were no reportable incidents occurred requiring reporting to the PRC authorities.

There were no spills occurred in unsealed areas of the Complex or offsite facilities during 2006.

There were 4 spills (>100 litres / kilograms) on sealed areas of the site consisting of approximately 25 tonnes of material. All spills were contained within the designed receiving facilities of the site and the material was recovered and disposed of correctly in the site incineration facilities.

Section 5 Injuries or illnesses related to work

5.1 Classification of Injuries and illnesses

A number of definitions are used that distinguish the extent and severity of the injury and include:

- a. First Aid Case (FAC) – this is any single treatment and subsequent observation of minor scratches, cuts, burns, bruises, splinters etc. that do not normally require medical care by a physician.
- b. Medical Treatment Case (MTC) – Any work related injury that involves neither lost workdays or restricted workdays, but which requires treatment by a physician or other medical specialist and include; treatment of infection, application of antiseptics during second or subsequent visit to medical personnel, treatment of second or third degree burns, application of sutures, removal of foreign bodies from the eye, etc.
- c. Restricted Work Case (RWC) – Any work related injury, which renders the injured person temporarily unable to perform all, but some, of their normal work on any day after the day on which the injury occurred.
- d. Lost Time Injury (LTI) – Any work related injury that renders the injured person temporarily unable to perform their normal work or restricted work on any day after the day on which the injury occurred.
- e. Occupational Illness – Any work related abnormal condition or disorder, other than one resulting from an injury that is caused by or mainly caused by exposure at work (50% or more probability that the illness was caused by exposures at work).
- f. Permanent partial disability – injury or illness that affects work performance in the longer term, such as prolonged absence from work. Irreversible health damage without loss of life, e.g. noise induced hearing loss, chronic back injuries, sensitization, hand / arm vibration syndrome, repetitive strain injury, etc.
- g. Permanent total disability – from an injury or occupational illness. Includes irreversible health damage with serious disability, such as corrosive burns, heat stroke, cancer, etc.
- h. Fatality – a death resulting from a work related injury or occupational illness.

5.2 Injury or illness incidence

A number of definitions are used to indicate the incidence of injuries or illnesses and include:

- a Total Reportable Case Frequency (TRCF) – the sum of all reportable cases (MTC, RWC, LTI) per million exposure hours.
- b Total Reportable Occupational Illness Frequency (TROIF) – the sum of all reportable cases (TROI, LTOI) per million exposure hours.
- c Lost Time Injury Frequency (LTIF) – The number of lost time injuries per million exposure hours.
- d Lost Time Occupational Illness Frequency (LTOIF) – the sum of lost time occupational illnesses per million exposure hours.

- e Work related activities – those activities for which management controls are or should have been in place. Injuries or illnesses occurring in the course of work related activities are work related.

5.3 Injury and Illness Performance Summary for 2006

	Exposure Hours	LTI	RWC	MTC	FAC	Total Reportable Cases	TRCF	LTIF	TROIF	LTOIF
CSPC	2,983,320	3	0	7	56	10	3.35	1.01	0	0
Contractors	6,777,868	0	1	7	29	8	1.18	0	0.29	0.15
Combined Total	9,761,188	3	1	14	85	18	1.84	0.31	0.20	0.10

5.4 Summary:

A total of 18 reportable injuries occurred during site operation in 2006. Three injuries resulted in lost time; caused by a slight fracture to the skull, fracture to the leg and a back injury. There was one injury that resulted in restricted work caused by a contractor maintenance technician requiring sutures to a lacerated nose wound. There were 14 medical treatment cases as a result of cuts requiring sutures and for 2nd degree burns. There were a total of 85 first aid cases of very minor injury.

There were 2 cases of occupational illness as a result of exposure to work activities. One case resulted in time of work as a result of heat stress and a second case was reportable due to chronic back pain as a result of manual handling activities.