

“The natural environment supports all human activity. We continually look for new ways to reduce the environmental impact of our operations, products and services.”

PROTECTING THE ENVIRONMENT

GLOBAL WARMING POTENTIAL (GWP)

Global Warming Potential (GWP) measures the impact of greenhouse gas emission from fossil fuels, taking into account both the amount and type of gas emitted. Shell Malaysia Exploration & Production (SM-EP) provided relative measurement of the warming influence of greenhouse gases (GHG) emitted in its operations in 2005. The main contributing components to SM-EP's GWP are carbon dioxide (CO₂), Methane (CH₄) and Nitrous Oxide (N₂O) from combustion processes. SM-EP is actively managing greenhouse gas emissions in its operations with a target to achieve zero continuous flaring before 2008.

In 2005, SM-EP emitted 1,786 kilotonnes CO₂ equivalent of GHG compared to 2,269 kilotonnes CO₂ equivalent in 2004. The 2005 target was 2,659 kilotonnes CO₂ equivalent of GHG.

In 2005, Shell Refining Company (SRC) recorded a GWP of 1,093 kilotonnes of CO₂ equivalent. This was 7.2 % lower than 2004's performance of 1,178 kilotonnes. The reduction was mainly due to the scheduled major maintenance shutdown that the refinery underwent in the second quarter of the year.

SRC EMISSION MONITORING

SRC is serious about protecting the environment. As part of the company's commitment to the environment, and in compliance with Malaysia's Department of Environment's emissions monitoring requirement, SRC installed the Continuous Emission Monitoring System (CEMS) in June 2005.

CEMS is designed to monitor these parameters:

- Nitrogen oxides (NOX)
- Sulphur dioxide (SO₂)
- Carbon monoxide (CO)
- Carbon dioxide (CO₂)
- Oxygen (O₂)
- Hydrogen sulphide (H₂S)

The emission monitoring system has been installed at the Long Residue Catalytic Cracker Unit (LRCCU)'s sulphur recovery unit (SRU).

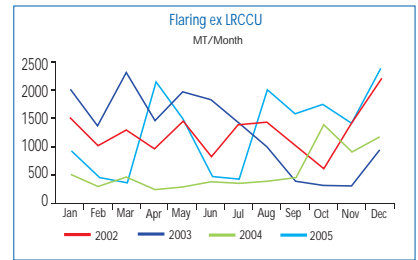
Sources of air emissions at the refinery could potentially arise from:

- Fuel burning or combustion in the operations
- Flaring and venting
- Evaporation from tanks and equipment during transportation and storage of oil products
- Fugitive releases which occur as a result of leak from process equipment

CASE STUDY

FLARING - Shell Refining Company

	2005	2004	2003	2002
Total Flared Gas in Metric Tonne (MT) (Complex 1 & 2, LRCC),	29,763 MT	17,247 MT	24,000 MT	20,000 MT



SRC EMISSION MONITORING

	2005	2004	2003	2002 ^(Note1)
CO ₂	19.9kT /100kT intake	20.2kT/ 100kT intake	21.8kT/ 100kT intake	22.2kT/ 100kT intake
SO ₂	0.11T/ 100T intake	0.11T/ 100T intake	0.12T/ 100T intake	0.06T/ 100T intake

Note 1: CO₂ emissions were understated in 2002; data has been corrected.

CASE STUDY

FLARING

In 2005, SRC registered increased flaring compared to previous years due mainly to processing of increasingly heavy crude oils through our Long Residue Catalytic Cracking Unit (LRCCU) as well as plant equipment reliability issues. Improvements to unit operations are scheduled to kick off beginning 2006.

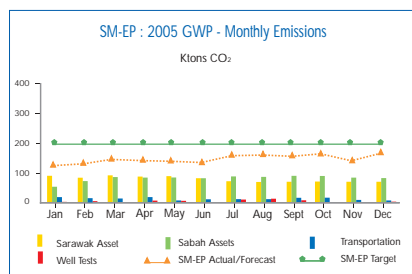
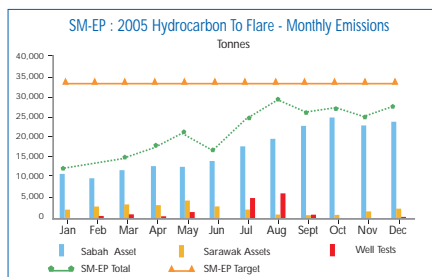
Meanwhile, Shell MDS (SMDS) continued to maintain zero flaring, a significant achievement thanks to a sustainable development initiative started in 2002 to completely eradicate continuous flaring of process off-gases during steady-state operations. Eliminating flaring resulted in natural gas savings.

TOTAL HYDROCARBONS TO FLARE

In 2005, SM-EP flared 256.8 kilotonnes of hydrocarbons compared to 427.0 kilotonnes of gas in 2004, a reduction of about 40%. The 2005 actual figure is also markedly lower than the 2005 target of 403.3 kilotonnes, mainly due to unplanned shutdown of the KN platform the whole of Q1 and Q2, which was included in the 2005 target. There was also lower flaring from production well test in 2005 compared to the forecast.

TOTAL HYDROCARBONS TO VENT

SM-EP vented 9.18 kilotonnes of hydrocarbons in 2005 compared to 7.47 kilotonnes in 2004. This was mainly due to shallow clastics wells in Central Luconia which was brought onstream. However, the figure is lower than the 2005 forecast of 14.8 kilotonnes.



HALON AND CFC LOSSES

There is no CFC or Halon in stock or equipment in SM-EP. All had been removed from use in 2001 and relinquished to the Malaysian Government approved Halon Bank in 2003.

SM-GP also reports no CFC losses.

SRC - our refinery has been free of Halon and CFC gasses since 2000.

HCFC AND HFC LOSSES

At the end of 2005 SM-EP had 4,438 kg of HCFC available in stock and equipment compared to 4,233 kg in 2004.

Approximately 1,884 kg of HCFC were lost to the atmosphere in 2005 compared to 2,235 kg in 2004.

As to HFC, the amount in stock and equipment at the end of 2005 was 1,715 kg compared to 650 kg in 2004. HFC loss in 2005 was 132 kg compared to 176 kg in 2004.

For SM-GP, a total of 0.102 tonnes were lost in 2005.

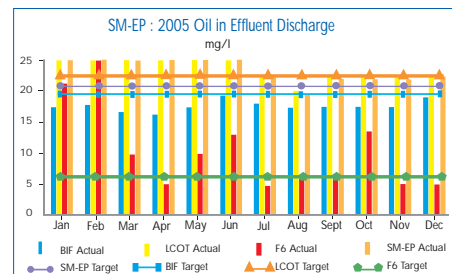
OIL IN PRODUCED WATER

In 2005, 3,882,559 m³ of produced water was discharged into the open sea at two onshore terminals, Labuan Crude Oil Terminal (LCOT) and Bintulu Intergrated Facility (BIF), and one offshore location at the Central Luconia gas facilities (F6), offshore Sarawak. That was slightly higher than produced water volume of 3,764,430 m³ discharged from the same facilities in 2004.

The average oil-in-water (OIW) content at BIF and LCOT was 17.1 mg/l and 24.8 mg/l respectively in 2005 compared to 2004's 17.4 mg/l at BIF and 24.2 mg/l at LCOT. At F6, the average OIW content was 15.3 mg/l compared to 8.2 mg/l in 2004. All SM-EP OIW analyses were conducted using the DOE approved APHA 5220B method.

A operational maintenance activities and discharges (eg backflushing liquids from Saint Joseph (SJ) crude oil field and Erb West (EW) field, Emulsion Wax Treatment Plant (EWTP) cleaning activities) which affected influent characteristics had led a deterioration in the quality of discharged effluent at LCOT in 2005. Similarly, the de-oiling quality has been affected since the South Sabah pipeline shutdown.

At SM-EP, the overall average OIW content of produced water discharged into the open sea was 23.2 mg/l in 2005 compared to the 21.2 mg/l target mainly due to above reasons. However, the oil-in-water content remains well within the Malaysian legislative limit for non "inland water" of 100 ppm.



OIL SPILLS

A total of four hydrocarbon spill incidences exceeding 100 kg occurred in 2005. The total hydrocarbon spillage in 2005 was 29.1 tonnes against 15.8 tonnes in 2004.

There were two major spillage of synthetic based mud containing paraffin saraline in 2005. One occurred during drilling works at F6-DP which led to a release of 4.4 tonnes of paraffin saraline and the other during appraisal drilling of Pisagan which resulted in the release of 16.0 tonnes of paraffin saraline.

At LCOT, a leak at the first-of-buoy at the single buoy mooring crude export line led to a release of 8.0 tonnes of crude oil into the environment.

In another incident, 0.47 tonnes of kerosene were spilled during a seismic survey carried out in Block E Offshore Sarawak when the electromagnetic source (streamer) was damaged when it entangled with fishing gear.

SM-GP recorded no oil spills in 2005.

In 2005, SRC recorded three spill incidents. In all three cases, the relevant authorities were duly informed and the spilled product fully recovered, thus rendering a zero net spill. The causes of these incidents were evaluated and key learnings are being used to improve our working practices.

DRILLING MUDS AND CUTTINGS

In 2005, no oil-based drilling mud was used in SM-EP, which continued to use synthetic-based muds (internal olefin and saraline muds).

It was estimated that there was a total of 1,119 m³ of synthetic oil in synthetic-based mud surface losses and 470 m³ of synthetic oil on drilling cuttings discharged into the sea. That compared to the 2004 figures of 238 m³ and 51 m³ respectively. The increase in 2005 was mainly due to increased drilling exploration activities, including in deepwaters.

WASTES

Shell's waste management philosophy, practices and procedures emphasise the prevention of waste generation, followed by re-use, recycle and recovery. The main sources of solid wastes from the group's upstream and gas operations are domestic wastes, non-hazardous wastes, and hazardous wastes from oil production and storage.

In 2005, our EP operations generated 25.1 kilotonnes of non-hazardous wastes and 43.7 kilotonnes of hazardous wastes. That compared to 16.1 kilotonnes of non-hazardous wastes and 17.0 kilotonnes of hazardous wastes in 2004. 1,250 MT of oil sludge from BIF were sent to the Kualiti Alam Scheduled Waste Management Centre for final disposal.

For our GP operations, scheduled waste disposal was 632 wet tonnes and non-hazardous wastes 1004 wet tonnes.

Sludge Management - Shell Refining Company

Quantity (MT)	2005	2004	2003	2002
Sludge	1,592	2,850	2,120	4,600
Spent Catalysts	1,655	2,568	2,430	2,740
Recovered Wastes Oil	56.7	1,933	1,900	2,700

**WASTES MANAGEMENT**

The main sources of solid wastes arising from refinery operations are non-hazardous wastes, spent catalysts and sludge from oil storage and refining.

SRC continuously produces sludge from its operations. We apply a proven sludge reduction technology to reduce the volume of sludge disposed and recover as much remaining hydrocarbon as possible.

After a successful trial of this technology, SRC received the Department of Environment's approval to operate the unit continuously for two years. DOE renewed the approval in 2004.

The quality of the treated materials meet the landfill criteria with moisture at less than 0.1% and Total Organic Carbon (TOC) at 0.25% weight. The technology enables a significant reduction in the volume of sludge that needs to be incinerated.

SRC continues to successfully recycle a large portion of the wastes that originate from its refinery operations. A total of 1,655 MT of spent Fluid Catalytic Cracking (FCC) catalysts was reused as raw feedstock at cement plants in Perlis and Negeri Sembilan while another 56.7 MT of recovered waste oil were sent for offsite recycling by a DOE-licensed recycler. In 2005, recovered waste oil was reduced due to sludge treatment facility downtime for major upgrade and maintenance.

Meanwhile, Shell MDS concluded the study on the use of bio-sludge as soil improver in close cooperation with Universiti Malaysia Sarawak (UNIMAS) in 2005. Shell MDS is pursuing the reduction of scheduled wastes storage on site. The key enabler for this will be compliance with the revised Scheduled Wastes Regulations which require a maximum of 20 tons of wastes stored on site or six months.

CASE STUDY**ENVIRONMENTAL ASSESSMENTS**

Two Environmental Impact Assessments (EIAs) were carried out in 2005 for submission to the Department of Environment. They were for the South Furious Central South Field Development Project and Rangak Exploratory Well in North Sabah. Two post-monitoring studies were also carried out for Serai Field and B11 Field. In addition, various environmental assessments were carried out for seismic activities, exploration and appraisal drilling activities throughout 2005 in line with SM-EP's internal requirements.