

Shell Geelong Refinery

2007-2009 Environment Improvement Plan Progress Report

December 2008



our home, our environment



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Unless otherwise explicitly stated, the word 'Shell' used throughout this document refers to Shell Geelong Refinery.

Foreword



In line with our commitment to sustainable environmental improvements, Shell Geelong Refinery has made considerable progress against the 2007-2009 Environment Improvement Plan (EIP).

We are proud of our progress and our continuing drive for further environmental performance success. Shell Geelong Refinery is pleased to present this progress report, which was only possible with the

input from the EPA, our independent auditor, Shell staff and the ongoing support from the refinery's Community Advisory Panel (CAP).

The CAP plays a formal monitoring function and we thank them for their attention to detail and constructive input. To further monitor our performance against EIP goals, the refinery engaged an independent auditor who provided feedback to both Shell and the CAP. A summary of our overall progress (as of December 2008) has been compiled based on the auditor's feedback and can be found on our website.

The auditor has concluded that, "In general, at the time of the audit, it is considered that Shell have made sufficient progress towards implementation of the EIP strategies that it is considered likely that satisfactory progress and where relevant, close-out of the EIP action items is achievable during its period of currency."

Within this report, practical improvements in key areas of environmental performance have been highlighted. These improvements are aligned with the goals of the EIP.

We invite you to view the 2007-2009 EIP and provide comments and feedback via our website: www.shell.com.au/geelong

A handwritten signature in black ink, appearing to read 'Huck Poh'.

Huck Poh
Refinery General Manager
Shell Geelong Refinery



WATER MANAGEMENT

Aspirational Goal

Maximise efficient use of water resources and further improve quality of effluent streams

Strategy in action

Northern Water Plant

In December 2008, Barwon Water and Shell signed off the Northern Water Plant (NWP) agreement. Shell Geelong Refinery General Manager, Huck Poh, Barwon Water Chairman, Roger Lowrey, and Managing Director, Michael Malouf, made the official announcement at the site of the NWP. Richard Marles, Federal Member for Corio, and Michael Crutchfield, State Member for South Barwon and Parliamentary Secretary for Water, represented both tiers of government in recognition of their funding for the project.

The plant is expected to be operational by 2012 and will meet the Barwon Water need to manage increased sewage flows from northern Geelong, while also producing recycled water to replace the drinking water now used by Shell for process purposes.

The plant will deliver a range of benefits including:

- A 2,000 million litre a year (5%) reduction in Geelong drinking water use (equivalent to the water used by 10,000 homes);
- A 10% reduction in ocean discharge at the Black Rock Water Reclamation Plant;
- Avoiding the public disruption and cost of a sewerage system upgrade; and
- Supply of water for community facilities such as sporting grounds in northern Geelong.



We recognise the growing need for water management systems that focus on recycling and conservation.

The NWP development during 2008 has focused on producing a robust design to deliver the performance necessary for reliable operations over 30 years. Some of the improvements made include refining the selected sources of wastewater for processing by the NWP to eliminate saline streams.

The key activities in 2009 are selecting the main contractor for construction and substantially completing the plant's detailed design.

ENERGY AND GREENHOUSE GAS EMISSIONS

Aspirational Goal

Continue to drive efficient energy use and reduction of Greenhouse Gas (GHG) emissions from refinery operations

Strategy in action

Optimising combustion efficiency to reduce energy consumption and CO₂ emissions

Global energy demand has grown 10-fold during the past 100 years and is expected to more than double again by 2050. Using more energy means more CO₂ emitted. In Australia, a country familiar with weather extremes – including drought – we are painfully aware of the threat posed by climate change.

In response, the Geelong Refinery is working to vigorously enhance the site's greenhouse gas and energy management systems and is developing focused greenhouse gas and energy management plans.

One clear example where the refinery is making a difference is the improved efficiency of the combustion process in the refinery's furnaces.

An initiative was developed between two refinery specialists, Marcus Curytko (Process Engineer – Operations) and Andrew Eichler (Senior Technologist – Process Control and Optimisation), which has led to improved energy efficiency. Marcus and Andrew believed that existing Advanced Process Control (APC) technology could be extended to deliver improvements in energy efficiency for the refinery.



By extending the use of the APC technology, Marcus Curytko and Andrew Eichler were able to deliver improved energy efficiency results for the refinery.

The APC continuously adjusts the furnace combustion control systems to minimise the oxygen level in furnace flue gases, requiring less fuel and resulting in greater combustion efficiency within the furnaces. As less fuel is consumed in the combustion process, fewer greenhouse gases are emitted. The new APC works by continuous automated optimisation of airflow rather than intermittent control of the fan operation.

To date, nine furnaces have had the oxygen minimisation function applied. The refinery is progressively installing this system into all suitable furnaces.

WASTE MANAGEMENT

Aspirational Goal

Drive continuous improvement in environmental waste management, reduction and resource recovery

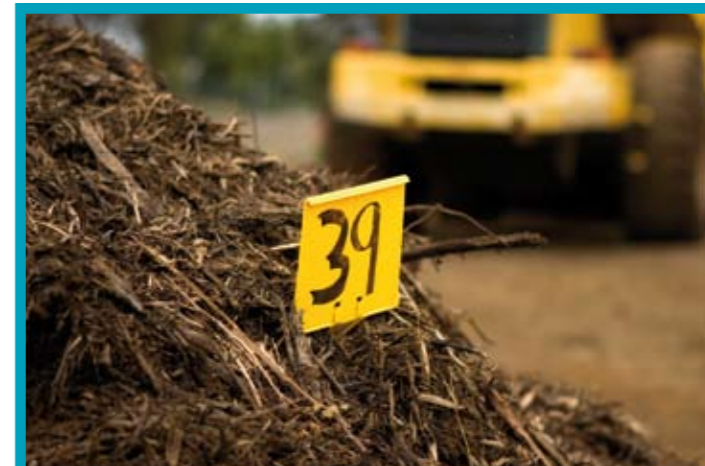
Strategy in action

Implementing the refinery's Waste Reduction Action Plan

Breaking down our waste streams, dividing them into their most basic form and then treating them as effectively as possible to avoid filling up landfill, has been a goal of the refinery for some time. Driven by this need, the Waste Reduction Action Plan (WRAP) focuses on waste reduction through avoidance, reduce, re-use or recycle. The WRAP actions align with the EPA's Environment and Resource Efficiency Plan (EREP), which requires large commercial users of energy, water and waste to identify areas of improvement and implement actions that reduce or minimise their environmental impact. Shell's EREP is due for submission by end 2008.

Recycling has been a priority for some time and in 2008 the refinery recorded an impressive rise in total domestic waste material collected for recycling. In 2006, about 700 tonnes of domestic waste material was collected for recycling. In 2008 this figure rose to more than 1,500 tonnes. This can be attributed to the substantial increase in the number of recycling bins on-site and the ability to recycle drums and intermediate bulk containers.

One of our measures to re-use waste, the Geotube® de-watering technology which turns waste sludge into compost, was recognised in 2008 in the Researcher of the Year awards. Shell Geelong Refinery was a finalist in the awards, which are run by Smart Geelong.



From waste to compost to new life.

The award submission centred on the refinery's modification of the existing bio-remediation technology, which saves the refinery the equivalent of about 20 olympic-sized swimming pools of waste from entering landfill each year.

Industrial waste from the refinery is pumped into specially designed large fabric containers (Geotubes®), which are placed in concrete bays to dry out. Once dried, locally sourced green and wood waste is added to the bagged waste and micro-organisms begin breaking down the hydrocarbons. After about 15 weeks, the waste is converted into compost and then spread around the 60,000+ trees surrounding the refinery.

AIR QUALITY

Aspirational Goal

Improve ambient air quality by continuing to reduce air emissions from the refinery

Strategy in action

Volatile Organic Compound (VOC) project – driving down tank emissions

Internal Floating Covers, or IFCs, are one of the largest (in scale) environment improvements made at the refinery in recent years. IFCs are designed to reduce emissions from storage tanks – the largest source of Volatile Organic Compounds (VOCs) at the refinery.

VOCs are emissions generated from the use, storage and handling of lighter refinery hydrocarbons and are found in many products refined on-site including crude oil, petrol and aviation fuel.

IFCs create a floating barrier within the tank to reduce the amount of space that vapours can form in, which reduces the creation of VOC emissions at the source.

In 2007 Shell completed the installation of three IFCs as required by the refinery's EPA Licence. Shell also completed the installation of a fourth IFC two years ahead of schedule.

In 2008 Shell successfully installed four more IFCs (again one a year ahead of schedule). The installation of the IFCs ahead of schedule affirms the strong commitment to the delivery of this programme. The completion of eight IFCs in 2007-2008 has run in parallel with regular maintenance works and will significantly contribute to the reduction in VOC emissions.

The full project will deliver a total of 13 installed IFCs and is expected to be complete by 2011.



Internal Floating Covers are the largest (in scale) environment improvements delivered at the refinery.

Shell Geelong Refinery is also pleased to regularly report on air quality surrounding the refinery. Independent NATA-accredited consultants continuously monitor ambient air at Bunnings in Corio, the Geelong Grammar School and the Shell Club in Purnell Road. In the EPA's Air Monitoring in Corio 2003-07 Report released in June 2007, the EPA said its report findings supported "those of EPA's previous studies: air quality in Corio is generally good and is similar to air quality in Melbourne and Geelong". The report is available on the EPA's website (www.epa.vic.gov.au).

The data is available on the Shell Geelong Refinery website (www.shell.com.au/geelong) and is updated twice a year.

SOIL AND GROUNDWATER

Aspirational Goal

Ensure historical soil and groundwater impact is managed effectively in a risk-based framework and that the potential for future impact is minimised

Strategy in action

Continuing investigations – through innovative drilling techniques

In line with the requirements of an EPA Clean Up Notice and our commitment to minimising our impact on the environment, Shell Geelong Refinery has undertaken extensive assessments to determine the nature and extent of historical soil and groundwater impact. The majority of our assessments have been done during the past 10 years, with a concerted focus for the past four years.

For the first time in Australia, innovative investigation techniques are in place, which will better enable Shell Geelong Refinery to assess our soil and groundwater impact. The techniques include using laser-induced fluorescence and permeability profiling tools mounted to conventional drilling equipment, to enable in-situ characterisation of soil and groundwater beneath the refinery.

The over-arching objective for employing these innovative investigation techniques is to drive focused, risk-based management of soil and groundwater while maintaining operational activities and compliance within the EPA Clean Up Notice. The new techniques have also been employed to complement historical soil and groundwater assessments to ensure consistency in the interpretation of site impact.



In an Australian first, innovative drilling tools and techniques are being used at the refinery.

By using these techniques and by drawing on global expertise and consultancy support, Shell Geelong Refinery is leading the way in soil and groundwater investigations. These investigations are supporting the preparation of an updated soil and groundwater management plan for the site.

COMMUNITY AMENITY

Aspirational Goal

Ensure refinery activities do not detract from the amenity of the surrounding community

Strategy in action

Reducing identified odour sources where practicable

Environmental improvements often go hand-in-hand with changes to operations and nowhere is this more evident than with the changeover to block valves at the Shell Geelong Refinery.

Through the refinery's continuous preventative maintenance program, an opportunity was identified to install block valves either side of a relief valve on the fuel gas knock-out vessel for the utilities boilers. This means in the future, no flare gas will be released to the environment when the relief valve is removed for maintenance.

The block valves have also been incorporated in a new section of the line to the flare, which will reduce the number of flare gas releases during certain maintenance activities.

Maintenance work including inspections, relief valve overhauls or replacement of piping can sometimes lead to process gas escaping during the work. These gases may release an odour. By installing the block valves, the operators are able to shut off the process flow upstream and downstream by closing the valves, enabling maintenance staff to work on the relevant equipment.

This will eliminate the potential for process gases creating an odour, which may travel off-site.

Where applicable, these block valves will be installed throughout the refinery.

While the block valves help to eliminate odours, our Odour Panel continues to monitor known odour sources.

The refinery's Odour Panel provides valuable data about the types, frequency and dilution of odours.

In quarterly odour audits, calibrated noses walk around the refinery to identify possible sources of odour as well as any potential for off-site discharge.

This enables the refinery to intervene before an on-site odour source becomes an off-site issue.



Every member of the refinery's Odour Panel, including community volunteers like Cheryl Irwin (pictured), undertakes a 'calibration' of their sense of smell, to gauge sensitivity to particular smells.

PROACTIVE ENVIRONMENTAL MANAGEMENT

Aspirational Goal

Continue to implement effective environmental management systems to continuously improve environmental performance, prevent the occurrence of incidents and facilitate rapid emergency response

Strategy in action

Effective emergency response procedures

In late 2008, Shell Geelong Refinery emergency response crews joined Shell Clyde Refinery (Sydney) colleagues at workshops coordinated by NSW Fire Brigade personnel. The workshops aimed to share and improve knowledge of how to effectively respond to storage tank fire fighting.

Responding quickly and effectively to incidents such as these is the best way to avoid impact to the environment in an emergency situation.

The workshop combined theoretical activities such as 'fire science', systems engineering and major incident management, and practical demonstrations using real-time simulators. Scenarios included Liquefied Natural Gas (LNG) tank fires, 'boilovers' of different fuel products, and rim seal blazes.

TELL SHELL

We welcome your comments and feedback.

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