



**Safety, Health & Environment
Performance Report 1999**

Orica is an Australian company with operations around the globe. We manufacture and supply commercial explosives and mining chemicals; agricultural chemicals and crop protection products; industrial, specialty chemicals and products for water care; paints and paint preparation products.

Until 1997, the company was part of the ICI Group.

Safety, Health & Environment (SH&E) Policy

At Orica we believe that all work related injuries, illnesses and environmental incidents are preventable.

We will manage all our activities with concern for people and the environment and will conduct our business for the benefit of society and without compromising the quality of life of future generations.

In particular we will:

- strive to ensure our facilities operate to the highest standards to protect our employees, contractors, neighbours and the environment
- continue to seek ways to efficiently use materials and energy
- sell only those products that can be produced, transported, stored, used and disposed of safely
- provide appropriate information and/or training on the safe use and disposal of our products to our customers and consumers

- seek to develop new or improved products and processes to improve the contribution we make to the quality of people's lives and to minimise the impact on the environment
- require every employee and contractor working for us to comply with relevant legislation and with this policy and we will provide them with the necessary training
- encourage employee initiatives that contribute to a safer and improved environment at work, at home and in the community
- set challenging targets and measure progress to ensure we continuously improve our safety, health and environmental performance
- communicate openly about our activities and report progress on our safety, health and environmental performance.

We make this commitment to our employees, contractors, customers, shareholders and the community as we work towards our vision of 'No Injuries to Anyone, Ever'.

SH&E Leadership in Orica

The Orica SH&E Council is the leadership group for the governance and performance improvement of SH&E throughout Orica. The Council consists of all members of the Executive Team plus the Corporate SH&E Manager and is chaired by Graeme Liebelt, the Executive Director with special responsibilities for SH&E.

The Council is supported by the Orica SH&E Managers Team (OSHEMT) chaired by the Corporate SH&E Manager, Patrick Hanrahan. OSHEMT consists of Corporate SH&E personnel and SH&E managers from the major business groups. It advises the Council on policy and strategy development and coordinates and streamlines activities and programs across Orica. Specialist support is provided by Orica's consultancy company SHE Pacific.

The relationship between the Council and OSHEMT typifies the way that throughout Orica specialists advise and support line managers who are directly responsible for implementation of Orica SH&E Policy, Standards and Procedures and are accountable for SH&E performance. Audits are conducted regularly and each operation or business provides written assurance to the managing director of the level of compliance with company standards.

Managing Director's Message



Philip Weickhardt
Managing Director

Welcome to our fifth annual safety, health and environment (SH&E) performance report, the second report under the Orica name. This year we have changed the presentation of the report to reflect the importance of businesses managing their own safety, health and environment programs. Each of our major businesses – Mining Services, Agricultural Chemicals, Consumer Products and Chemicals – describe their main SH&E issues and special activities in this report. This highlights the way we manage SH&E in Orica, with businesses and the line managers directly responsible and accountable for their SH&E performance.

Orica's goal to be among the best performers internationally in SH&E is consistent with our Vision of 'Winning Against the World's Best'. Top of the list of the Values supporting this Vision is a commitment to 'operate to the highest standards of safety, health and care for the environment'.

Those of you who know Orica will be aware of the high priority we give safety and health both with respect to the integrity of our production plants and the prevention of injuries and illnesses to those who work at Orica. This year we changed our injury and illness classification and recording system to one based on the US OSHA (Occupational Safety and Health Administration) system, a more comprehensive and rigorous system which allows us to compare our performance with the best companies

in the world. Whilst we were aware that our injury rate was about a quarter of the Australian chemical industry rate and significantly better than the Australian manufacturing industry average, the new benchmark with overseas companies illustrates that we are equal to the average Canadian or US chemical company, but still some distance from the world's best companies. The challenge is still in front of us.

Our environmental management, I am pleased to note, has exceeded our Challenge 2000 target of halving the environmental impact of our operations with respect to 'toxics to air' and 'smog precursors to air'. These were the major gains from our operations, and they were achieved by improving some of our processes and, in some cases, by closing down older plants.

This year in Australia, the environment protection authorities have introduced the National Pollutant Inventory. Orica has been reporting releases of chemicals on this list for some years both in this report and our site community reports.

The environmental impact from chemical plants is relatively small compared to those of many other industries, but in recent years we have become increasingly attentive to the potential impacts of our products. For this reason product stewardship has come to the fore in Orica. Product stewardship is all about taking responsibility, as far as we can, from cradle to grave, making sure that appropriate information is provided and that our products can be handled and disposed of safely. Product stewardship is featured in a number of the business pages in this report, reflecting the high level of activity throughout Orica in this area.

I hope you enjoy reading this report and you find it informative about how we manage SH&E and how we are performing. We would like to improve the report and rely on your feedback to shape it in the future.



Philip Weickhardt
Managing Director

Company Performance

Safety and Health

Injuries and illnesses

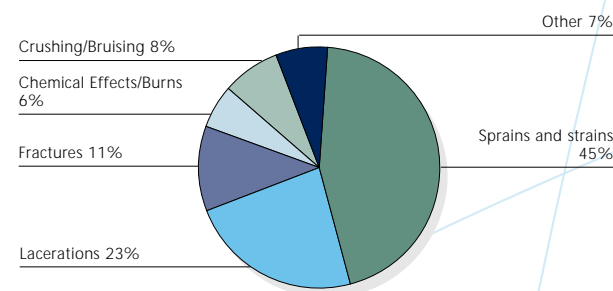
Orica regards the safety and health of its employees and contractors as its highest priority, believing that there is nothing so urgent or so important that the time cannot be taken to do it safely.

Because we have such a strong safety and health commitment we are disappointed to report that this year 193 employees and 48 contractors were injured or developed illnesses at work to such an extent that they required medical treatment, were put on restricted duties or lost time away from work. Sadly, there was also one fatality this year involving a contract truck driver who was killed in a single vehicle incident in Georgia, USA.

This gave the company an employee lost workday case rate of 0.42 and a recordable case rate of 1.86 cases per 200,000 hours worked.

Orica's contractor injury and illness rates are estimated to be about two and a half times the employee rates. The area of contractor safety is currently receiving particular attention.

Types of injuries and illnesses



Sprains and strains and lacerations were the major types of injuries (see pie chart). Over two thirds of the sprains and strains were a result of manual handling with a high proportion of these injuries occurring in the Consumer Products' Paints business (see page 12). Cuts to hands and fingers accounted for half of the laceration injuries.

Of the recordable cases 23 were termed illnesses as opposed to injuries, because they involved the gradual onset of symptoms rather than being related to a specific incident. Of the recorded illnesses almost 80 per cent were termed upper limb disorders which comprise muscular or tendon sprains usually arising from repetitive manual handling tasks.

Preventative programs

In this year the company conducted well over 6,000 health assessments on employees. Some of these are mandated by regulatory authorities and others required under company programs. In addition about 5,000 occupational hygiene measurements were taken to monitor the workplace environment for noise, radiation and chemical exposure.

A high proportion of the injuries and illnesses are a result of inappropriate behaviours. Orica's Unsafe Acts Prevention program has been supplemented in a number of parts of the company by the Behaviour Accident Prevention Process (BAPP) offered by BST Inc. This process involves identification of behaviours leading to injuries, recognition of good and bad behaviours and then observing those behaviours in the workplace to provide feedback (see page 12).

Orica's businesses, by their very nature, involve risks to employees of fire and explosion that could lead to serious injuries and fatalities if not properly managed. It is only knowledge of the safe handling of materials and operation of processes that prevents incidents. Basis Of Safety, a knowledge management and application process developed by Orica's Explosives business (page 9), is being applied to all relatively high hazard parts of the company's operations. This is supported by company Significant Risks audits undertaken by corporate auditors.

Injury and illness reporting and management

As signalled in the 1998 report, from 1 October 1998 Orica adopted a new injury and illness classification and recording system based on the US Occupational Safety Health Administration (OSHA) system. The two main differences compared with the system previously used by the company are:

- illnesses are included within the scope of the system
- injuries resulting in restricted work activities but involving no medical treatment or days away from work are included.

The performance measures used are the lost workday case rate and the recordable case rate per 200,000 hours worked.

Lost workday cases are occupational injuries or illnesses involving days away from work. Recordable cases are occupational injuries involving days away from work, restricted work activity or medical treatment and all occupational illnesses.

Orica has developed a new reporting, management and information system named SHERMIS. This computer based system allows employees at all levels

to enter incident information into a database, to record the incident investigation and corrective actions and to assign and manage those actions. The database is widely accessible in the company and is used to share learnings from incidents.

Safety and health benchmarking

In order to compare the company's performance with that of previous years, it is necessary to use our old measures of medical treatment injury frequency (MTIF) and lost time injury frequency (LTIF). The company's employee MTIF in this year rose to 5.5 compared to 4.8 per million hours worked in the previous year. This is of concern but is, at least in part, due to greater rigour in reporting under the new system. The employee LTIF was 1.8 which was the same as in the previous year and a record low for the company.

In the same period the significant occupational illness frequency fell from 2.5 to 1.1 per million hours worked. Thus there was a small net reduction in the overall injury and illness rate compared to the previous year.

Orica's injury rate is about one quarter of the Australian chemical industry average based on the Plastics and Chemicals Industries Association annual survey. In turn the chemical industry is recognised as one of the safest manufacturing industries.

One of the reasons for introducing the new injury and illness recording system was to facilitate benchmarking with North American chemical companies who are arguably the safest chemical companies in the world. Orica's lost workday case rate of 0.42 and recordable case rate of 1.86 per 200,000 hours worked compares to the 1998 average of the US Chemical Manufacturers' Association members of 0.36 and 1.86 and the Canadian Chemical Producers' Association of 0.51 and 1.98. This highlights that, although the company's performance is good in the Australian industry context, there is still some way to go to be among the world's best companies.

Prosecutions

Two prosecutions were incurred during the year under the NSW Occupational Health & Safety Act. The first involved a fine of \$15,000 and related to an incident in May 1996 when a contractor was injured as a result of the removal of a gear box cover at Botany (New South Wales, Australia). In the second, Incitec was fined \$2,500 over an incident in April 1997 at Kooragang Island (New South Wales, Australia) where an operator's arm was broken when it was caught in a conveyor system. These injuries were investigated thoroughly at the time and corrective

actions identified and put in place.

In addition the company's explosives business received minor citations from US state and federal authorities including those relating to a blasting operation conducted at Big Creek Mines near Phelps, Kentucky, USA.

Environment

Environmental burden

In 1995 Orica's former parent company, ICI PLC, as part of its Challenge 2000 program set world wide targets for halving the environmental impacts of its operations. It split the types of impacts into various categories, two of which were particularly relevant to our operations – 'toxic materials to air' and 'potential ozone generators' (smog precursors). ICI PLC also developed, with the help of external advisers, a technique for assessing the relative impact of different chemicals called 'environmental burden'. Orica has continued to use this technique in assessing its progress at reducing the environmental impacts of its operations.

In both categories Orica has achieved its target which was to halve the impact by 2000. Using 1995 as the baseline, 'toxic materials to air' have been reduced by 89 per cent and 'potential ozone generators' by 74 per cent. Notable activities in this past year to achieve these targets have been the reduction of ethylene oxide emissions following the Botany Surfactants plant upgrade in 1998, and the reduction of ethylene emissions as a result of closing down the EDC plant also at Botany.

National Pollutant Inventory

In Australia, requirements for reporting releases of certain chemicals from Orica's operating sites have been introduced under the National Pollutant Inventory. These are reported to the local environment protection authorities. The USA, Canada and other countries have similar inventories.

As in the past two reports, we have included collated data of emissions of the chemicals listed on the National Pollutant Inventory (see page 7). The list includes both releases of the chemicals directly into the environment as well as transfers to waste treatment, eg the sewer or landfill.

Significant emissions are also reported in Orica site environmental reports provided directly to communities surrounding our major sites. These are available from the sites and will be included on the Orica web site (see back cover).

Company Performance continued

Energy consumption/greenhouse gas emissions

Orica's total release of carbon dioxide, including that arising from electrical energy consumption, was about 2.7 million tonnes. This was a 5 per cent increase on emissions in the previous year. Total energy consumption went up a similar amount. The rise in energy consumption and carbon dioxide emissions was a consequence of increases in ethylene production at the Botany site and in ammonia production at Kooragang Island. These are both energy intensive processes.

There is a constant effort to improve efficiency in our operations. A good case in point has been Orica's subsidiary company, Australian Vinyls Corporation, which achieved a 10 per cent reduction in energy used and carbon dioxide emitted per tonne of production. This was achieved through a concerted resource conservation program with high involvement of all employees.

Orica was one of the first companies to sign a Greenhouse Challenge Cooperative Agreement with the Australian Government in 1996. This agreement did not include the Incitec operations within its scope. Incitec has recently signed a separate Greenhouse Challenge Cooperative Agreement.

Environmental compliance

	1996	1997	1998	1999
Number of Tests	37,283	44,238	49,626	26,587
% Compliance	98.4%	99.2%	99.5%	99.5%

Orica sites had a compliance rate of 99.5 per cent for environmental licence tests which is the same as in the previous year. The number of tests required was down considerably from previous years as a result of divestment of licensed facilities, changes in licence requirements and changes in protocols for on-line analysis tests.

Prosecutions

The Orica Group received three environmental prosecutions in the reporting period:

- In November 1998 the Incitec operation at Chester Hill (New South Wales, Australia) was fined \$500 for the late filing of an odour management plan.
- In February 1999 the Incitec operation at Cockle Creek (New South Wales, Australia) was fined \$500 for the release of waste liquor into the stormwater system.
- In February 1999 the Australian Vinyls plant at Altona (Victoria, Australia) was fined \$800 for release of PVC resin outside the site boundaries.

Legacy issues

Orica has major programs addressing identified legacy issues at Botany, Cabarita and Rhodes (all in New South Wales, Australia) and Cheltenham (Victoria, Australia), which were manufacturing sites for many years.

Botany – Groundwater

The remediation of contaminated groundwater at the Botany site is proceeding according to an agreed voluntary remediation plan, and in close consultation with all relevant statutory authorities and the community. The remediation plan has drawn on the best available international technologies and experience. For the first time in Australia a pilot subsurface reactive iron barrier has been installed to treat shallow groundwater. Initial results from this innovative technology are encouraging.

Botany – HCB disposal

The project for the safe and environmentally responsible destruction of hexachlorobenzene (HCB) waste stored at Botany continues in line with the management plan regulated by the New South Wales Environment Protection Authority (NSW EPA). Two technologies have now been trialled and preliminary design for a tailored full scale installation has commenced. The project team liaises closely with the local community through quarterly meetings and newsletters.

Cabarita

Remedial works at the redundant Cabarita paint site are complete, and final validation is expected by December 1999. During 1999, a voluntary off-site investigation was completed as an extension of the Cabarita main site remedial works. Its purpose was to determine potential lead dust deposition on neighbouring properties associated with a long history of manufacturing. The subsequent off-site remediation program was endorsed by the NSW EPA as best practice.

Rhodes

A remedial action plan for the Rhodes site has been approved and commenced in November 1999. A program for the assessment of sediment in Homebush Bay has been developed and reviewed by an independent expert. Final agreement to commence the program is now being sought from the NSW EPA.

Cheltenham

A contract has been let to clean up contaminated soil at the former Kemrez site at Cheltenham and remediation is proceeding and scheduled to be completed by the end of 1999.

Specific chemical releases from Orica's operations

Chemical	Releases and Transfers (tonnes)					Sites
	1998 Total	1999 Total	Air	Water	Other	
Acetone	73	84	66	18	0	Deer Park (Vic), Lorena (Brazil), Padstow (NSW), Rocklea (Qld), Gracefield (NZ)
Ammonia	3200	3000	2200	780	0	Gibson Island (Qld), Kooragang Island (NSW), Monclova (Mexico), Carseland (Canada), Botany (NSW), Yarwun (Qld), Deer Park
Benzene	3.4	3.8	3.8	0	0	Botany
Butanol	14	1	0	1	0	Botany
Butoxyethanol	3.5	1	0	1	0	Botany
Carbon monoxide	490	320	320	0	0	Gibson Island, Botany, Deer Park, Laverton (Vic), Altona (Vic)
Chlorine	0.6	0.6	0.6	0	0	Yarraville (Vic), Botany, Yarwun
Chloroethane	0.3	0.3	0.3	0	0	Botany
Chloroform	0.3	0.3	0.3	0	0	Botany
Cobalt & compounds	0.2	0.2	0.1	0.1	0	Botany, Gracefield
Copper & compounds	0.2	0.1	0	0.1	0	Botany
Cyanides	1	0.9	0.9	0	0	Yarwun
Dichloroethane (1,2)	31.1	31.5	30.9	0.6	0	Botany
Dichloromethane	3	1.1	1.1	0	0	Padstow, Deer Park
Ethanol	4.1	0.7	0.7	0	0	Rocklea, Botany
Ethylene	610	470	470	0	0	Botany
Ethylene glycol	2.7	2.9	0.5	2.4	0	Brownsburg (Canada), Botany, Padstow, Deer Park
Ethylene oxide	22	2.4	0.5	1.9	0	Botany
Fluoride compounds	0.4	0.5	0	0.5	0	Cockle Creek (NSW)
Formaldehyde	4.3	7.4	7.2	0.2	0	Mt Maunganui (NZ), Hornby (NZ), Deer Park
Glycol ethers	25	5.1	0	5	0.1	Botany, Scoresby (Vic)
Hydrochloric acid	4.7	4.7	0	1	3.7	Yarraville, Mt Maunganui
Lead & compounds	29	25	0	0.2	25	Brownsburg, Deer Park
Mercury & compounds	1.3	2.5	0.2	0	2.3	Botany, Yarraville
Methanol	15	25	23.3	1	0.2	Mt Maunganui, Deer Park, Brendale (Qld), Botany
Methyl ethyl ketone	9.3	1.4	0	0	1.4	Gracefield, Padstow, Rocklea
Methyl isobutyl ketone	3.7	0.7	0	0	0.7	Rocklea, Gracefield
Methyl methacrylate	6.9	1.5	0.5	0	1	Laverton (Dulux), Padstow
Nickel & compounds	0.1	0.1	0	0.1	0	Yarraville
Nitrates	850	890	0	890	0	Kooragang Island
Nitric acid	2	1.4	0.1	0.3	1	Carseland, Mt Maunganui
Nitrogen oxides	3200	4100	4100	0	0	Gibson Island, Botany, Monclova, Kooragang Island, Yarwun, Carseland, Laverton, Altona, Deer Park, Port Kembla (NSW)
Particulate matter	280	480	480	0	0	Gibson Island, Carseland, Botany, Laverton, Altona, Yarwun
Phosphates	3.3	5	0	5	0	Gibson Island
Phosphoric acid	4	3.4	0	3.4	0	Mt Maunganui
Propylene	72	1.2	0	0	1.2	Botany
Propylene oxide	12.3	2.8	2.2	0.69	0	Botany
Styrene	18	14	13.8	0	0.2	Rocklea, Padstow, Laverton
Sulphur dioxide	1080	1030	1030	0	0	Botany, Port Kembla, Gibson Island, Lorena
Sulphuric acid	0.9	0.5	0	0	0.5	Yarraville
Tetrachloroethylene	10.6	9.8	0	0	9.8	Brownsburg
Toluene	45	7	7	0	0	Rocklea, Padstow, Gracefield
Trichloroethane	3.1	3.2	3.2	0	0	Botany
Vinyl chloride	1.5	6.6	6.6	0	0	Laverton, Altona, Botany
Xylenes	41	4.5	4.5	0	0	Rocklea, Gracefield
Zinc & compounds	1.1	0.9	0	0.9	0	Botany, Yarwun, Gibson Island

- The list of chemicals is based on the Table 2 of the Australian National Pollutant Inventory. However trace combustion products have not been included. Chlorine used in treatment of cooling tower water, etc is also not included. Other chemicals released in significant amounts have been included on the list eg ethylene. No report is given for releases less than 0.05 tonnes.
- Efficiency improvements at Gibson Island have led to a reduction in carbon monoxide releases.
- Reduced emissions of ethylene are primarily as a result of the closure of the EDC plant at Botany. Reduced emissions of propylene due to closure of Polypropylene plant at Botany.
- Reduced releases of ethylene oxide, glycol ethers, etc are due to process improvements on Botany Surfactants plant and to divestment.
- Increases in formaldehyde and methanol releases are due to increased production activity.
- Increase in vinyl chloride emissions is due to significant losses of containment at Laverton.
- Other major changes from 1998 to 1999 are due to divestments and acquisitions.
- Data for the Polythene operations at Botany are included for the full year, but are now part of joint venture Qenos.

Mining Services

Orica is the world's leading supplier of commercial explosives, initiating systems and fully integrated blasting technology to the mining, quarrying and construction industries.

Safe pumping of explosives

Most commercial explosives are pumped into pre-drilled blast holes prior to detonation. Mishaps with these pumping systems have resulted in major incidents around the world. To prevent such incidents, Orica pumps are fitted with several protective devices and our operators and maintenance personnel are highly trained and certified before working with them. Each pump is registered, has its own log book and also has its protective devices registered. These devices were developed over a number of years and include microprocessor systems, thermofuses, bursting discs and other protective systems.

In Australia, critical pumps are fitted with microprocessor systems which use specially developed sensors to monitor pump pressures and temperatures. The system detects any abnormal operating conditions, and initially alerts the operator before shutting down the pump. The same system logs operating data and, in this way, provides an understanding of advanced pumping applications such as for very deep blastholes in open cast mines.

Safety milestone

Like the mining companies it serves, Orica Explosives operates in some of the harshest working environments in the world. Arguably there are no harsher workplaces than those faced by Orica's United Pacific Drilling (UPD) which principally operates in remote parts of Papua New Guinea. The drill sites are often cut into the sides of mountains, and can only be accessed by helicopter or by tortuous walking tracks. Landslides are a constant threat, and the drilling workers face heat, cold, mist and torrential rain as they carry out their difficult tasks.

UPD historically had a reasonable safety record but still suffered injuries such as crushed fingers and wounds from bush knives. A special safety awareness campaign with a heavy emphasis on training of all personnel and on the safety accountability on drilling supervisors, led to a major change in the safety performance. On Friday 12 February 1999 UPD achieved 1 million hours worked without a medical treatment or lost workday case.

In a developing country where many people have limited opportunities, and indeed many of UPD's employees live in traditional villages when not at the drill sites, 'Safety' is something which has a low priority. However, at UPD, the rule is that 'Sefti mas kam pastaim' or 'Safety must come first'.

SH&E Charter around the world

Orica employees have signed on to Orica's SH&E Charter each year since mid 1995. The Charter clearly describes what is expected of each employee and, in turn, what they should expect from their supervisor to ensure a safe and healthy workplace. This was a new concept for the acquired explosives business in the Americas and Europe but one that has been embraced with enthusiasm.

The first step in introducing the Charter was to translate it from English to the languages of the various countries in which Orica now operates – French, Portuguese, Spanish, Turkish, as well as Thai, Bahasa Indonesia, Pidgin (PNG) and Vietnamese to name a few. This was followed by a major campaign across all the sites, big and small, to ensure one on one discussions took place until all employees understood and signed on to the SH&E Charter with their supervisors.

Whether it be 'Zéro Accident, Zéro Blessure' or 'Ningun Lesionado, Nunca' or 'Tidak Ada Kecelakaan Terhadap Siapapun, Selamanya' the message is the same across Orica 'No Injuries to Anyone, Ever'.

Our Quarry Services business has developed new blasting methods to assist with the costly exercise of converting spent quarries into safe and usable land. In one example, by blasting a wedge out of the final pit wall, the quarry owner needed to excavate one third of the backfill required for traditional methods and the rehabilitation took only one third of the time. The before and after pictures demonstrate a successful outcome.



Safety is paramount in the mining industry and our mining customers give it a high priority. However, the risks can be high and too often there are serious injuries. As the world's leading manufacturer and supplier of commercial

explosives we have safety leadership responsibilities, and I was particularly pleased that the Underground Mining business in Australia won the Orica Excellence Award last year for their work on safety with customers. Also a number of our businesses around the world such as those in Papua New Guinea, Philippines, Europe and New Zealand achieved long periods without injury.

Explosives present some unique hazards both in their manufacture and in their use. The industry has a

history of serious incidents around the world and, as a manufacturer and supplier of explosives, we etch the learnings from these incidents in our corporate memory, and put in place procedures to prevent them from happening in our business. This is formalised in our Basis Of Safety (BOS) program which has been developed within our business. BOS systematically captures the essential safety elements of a process and documents them. It incorporates these elements in training programs and in supporting systems and monitors the effectiveness by regular auditing.

It is with excellent programs such as BOS, which we intend to maintain and improve our safety record.

Peter Clinch
Executive Director, responsible for International Explosives

Agricultural Chemicals

Through its agricultural chemical interests, Incitec and Crop Care Australasia, Orica supplies fertilizer and crop protection products to farmers.

Urea plant upgrade

The urea prill tower at the Gibson Island plant has been a landmark on the Brisbane, Australia skyline for 30 years. It hasn't always met the standards we now set ourselves, as dust emanating from the tower, although relatively harmless, is unsightly and the source of some complaints from the neighbouring industry.

A \$45 million project is currently underway to install new evaporation, granulation and scrubbing facilities to reduce urea dust from the plant by 95 per cent. At the same time a similar reduction in emissions of ammonia from the plant will be achieved.

The upgraded plant, the only urea plant in Australia, is due for commissioning before the end of 1999. The prill tower will remain as a landmark but will no longer be used.

As well as providing significant environmental benefits, the urea granules produced by the new plant will be larger and harder than urea prills produced currently and are strongly preferred by customers.

Environmental management system

Incitec Fertilizers business has close to 100 distribution sites around Australia, some of which are owned by Incitec and others are owned by private dealers. Apart from offering a range of fertilizer and crop protection products and services, these sites have workshops and industrial 'wash down' and fuel facilities.

A comprehensive environmental management system (EMS) has been developed to facilitate identification of environmental risks and impacts of these facilities and actions to improve environmental performance. A communication program has been created with the slogan of:

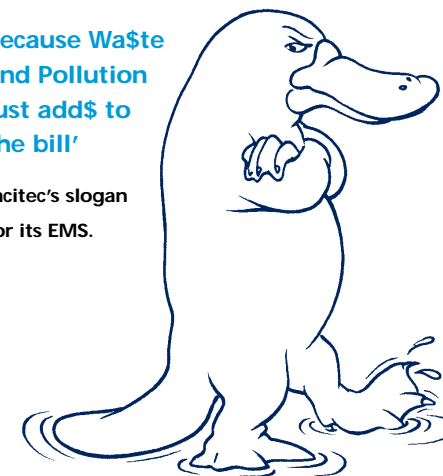
- Focus (on an environmental issue)
- Find It (improvement opportunities)
- Fix It (prevent environmental impacts)

The program is the basis of awareness training being undertaken by all site staff and the dealer customer network.

Some sites have made excellent progress. A notable example is the Dalby (Queensland, Australia) site where staff test the surrounding soil to ensure there is no fertilizer contamination and have planted eucalyptus trees, which a family of koalas already call home.

'Because Waste and Pollution just add\$ to the bill'

Incitec's slogan for its EMS.



Crop Care product stewardship

Although the agricultural chemicals industry is tightly regulated, Crop Care believes that regulatory compliance alone is not sufficient. Hence as part of its product stewardship program all products supplied by Crop Care need to undergo a life cycle assessment of their possible impact on the environment, health and sustainable production. If deficiencies are identified, corrective actions are put in place and, in some cases, this could involve withdrawal of a product from the market.

Other aspects of product stewardship are also being addressed. Packaging waste and unwanted chemicals have been a problem for many years. Farmer groups, governments and local councils are working together with agricultural chemical suppliers to set up programs such as drumMuster, ChemCollect and Chemclear to manage these issues. Crop Care through the industry association, Avcare, has been very active in this area.

Particular initiatives on reducing packaging wastes include:

- increasing the quantity of products being sent via bulk tankers to storage facilities in the field, thereby eliminating the multitude of individual packs previously supplied.
- increasing the number and quantity of products being packed into refillable 110 litre and 1000 litre containers.

Product stewardship is our way of sustaining our business, and goes hand in hand with the sustainability of the land.

EMS Project manager, Jamie McMaster discussing environmental issues with Croptec managing director, Wayne Skinner, at Croptec's fertilizer and crop protection depot at Mooroopna in Central Victoria.



I'd like to recognise the way that those who work for the Agricultural Chemicals business have gone about their tasks safely in this past year. A number of our sites, notably Gibson Island and Brendale both in Queensland, Australia have achieved long periods injury and illness free. However, we are very aware of the need for further improvement in this coming year and we will be putting special emphasis on behavioural safety training and on checking our operating procedures and work instructions with job cycle checks.

It is also good to see progress with our environmental performance, particularly with the introduction of the environmental management system developed by our fertilizer business for their many distribution sites. I look forward to the

outcome of the Gibson Island urea plant upgrade and other improvement projects being undertaken elsewhere in the business. We hope that these steps will reinforce our commitment to being good neighbours to our surrounding communities.

Finally, there are two areas vital to the sustainability of our business. Firstly, product stewardship is of increasing importance as we live up to our responsibilities both to our customers and the land we all rely on. Secondly, we are addressing the issues of energy consumption and greenhouse gases in relation to our ammonia business and we have just signed a Greenhouse Challenge Cooperative Agreement with the Australian Government.

**Greg Witcombe
Managing Director Incitec Ltd**

Consumer Products

Orica is Australasia's leading manufacturer and supplier of architectural and decorative surface coatings marketed under such well known brand names as Dulux, Berger, Levene, Cabot's, Feast Watson, Intergrain, Acratex, British Paints and Walpamur. Other products sold directly to the consumer are marketed under the Selleys, Poly and Rota Cota brands.

Handling safe behaviours

The Dulux Decorative Division in Australia has begun a behavioural safety process to identify and eliminate factors leading to injury in the workplace. The process involves peer to peer observation of activities that occur every day in the workplace, and verbal feedback with particular emphasis on behaviours that have led to injury in the past. When an employee observes a workmate carrying out an 'at-risk' behaviour, the issue is discussed with that person as to how the task could be done more safely.

Employees at Dulux Trade Centres have been focusing on behavioural causes of manual handling injuries and on removing the barriers to safe lifting,

such as lowering, bending and twisting behaviours. Over the last few months, employees at the Clayton Trade Centre in (Melbourne, Australia) have been testing and developing novel materials handling equipment to do just that.

Starting with the idea 'that all activities involving craning or bending of the back to lift a load should be eliminated', they began to look for a more ideal height to store stock and move it around the store. A 'reference height' of 500 mm was chosen and a 'stock table' and a 'raised flat bed trolley' were constructed to accommodate the 10 and 15 litre cans.

A different approach was taken with 20 litre cans, which are stored in stacks of three and are too tall to place on a 'stock table'. A special trolley, with 'plastic fingers' that could lift the cans by the rim, was developed with outstanding success.

The behavioural safety process has given employees a way of getting directly involved in managing their safety. The results have been very positive, with improved working conditions and a reduction in injuries.

Safer and better products

There is a constant search for improved surface coatings products, not only in terms of better performance but also in regard to greater safety in manufacture, application, use and disposal.

One area of concern has been the use of crystalline silica pigments in tank linings. These pigments have very desirable properties such as inertness, durability and hardness, but crystalline silica has come under

increasing scrutiny because the inhalation of the silica dust over long periods of time is linked to silicosis and lung cancer. The Dulux Protective Coatings research and development team spent several years developing and testing suitable crystalline silica free coatings for use as tank linings and, in September 1999, a new product called Durebuild STL was launched. Durebuild STL is not only free of crystalline silica, but also 100 per cent solvent free and has excellent surface coating properties.

The Dulux Protective Coatings business has a number of other better and safer products in the testing stage, and it is also looking at packaging that applicators find easier to lift and use.

Production up – waste down

Since 1995 the Dulux Rocklea paint manufacturing and distribution site in Queensland, Australia has increased production by over 30 per cent whilst also reducing energy consumption by 5 per cent. This has been achieved by a combination of efficiency gains from increases in average batch sizes, and by process improvements. Batch sizes have been increased partly as a result of increasing volumes produced and partly by better scheduling of production.

The major area of process improvement has been in the dispersion stage, which is the most energy intensive stage of paint production. Reformulation of some paint batches to allow high speed dispersion in place of ball mill dispersion has led to significant reductions in energy usage.

At the same time there has been a 30 per cent reduction in solvent waste through a variety of initiatives.

Attention is now being focused on minimising and treating water washings contaminated with paint solids. These wastes represent almost 70 per cent of the total waste generated from the site's operations.



The Coatings Care Program has four codes of management practice for:

- Manufacturing
- Transportation & Distribution
- Product Stewardship
- Community Responsibility

'Worth Doing...Worth Doing Safely'

Mark Gowers, store manager at the Dulux Trade Centre in Clayton, Melbourne, demonstrating the 20 litre 'stack mover'.



The Consumer Products business, when compared to other Orica businesses, had a higher injury rate this year. However, in many ways, this was our best year yet as we progressed many of the safety issues in our workplace, particularly relating to manual handling activities. In any one year Consumer Products manually handle some one million packages weighing over 25 kg. Each of these heavy packages is handled on average four times. Our safety program, looking at the equipment we use and the behavioural way in which we go about our tasks, is delivering a much safer and healthier workplace. Tremendous credit goes here to all the employees who have participated.

We are aware of our responsibility to our customers to be always looking for not just better, but safer

products. In past years, we have made significant improvements in replacing solvents and introducing novel technology such as the Asthma Foundation endorsed Berger BreatheEasy interior range of products, and this will continue in the future.

Finally, as the President of the Australian Paint Manufacturers Federation I am especially pleased to introduce the paint industry's Coatings Care program, which is committed to protecting worker and community safety and health as well as the environment. We are already doing well with many aspects of the program, but we will be putting in additional effort to fulfil all our commitments and to assist the industry to raise its standards to achieve the Coatings Care objectives.

Russell King
General Manager, Orica Consumer Products Group

Chemicals

Orica is a leading supplier of chemical products and services in Australia and New Zealand and has a growing presence in the Asia Pacific region.

New chlorine plants

Orica's ChlorAlkali business is constructing two new chlorine and caustic soda plants in Australia. The new plants, to cost about \$145 million, will be located at Laverton (Victoria, Australia) and at Botany (New South Wales, Australia). They will replace the existing mercury cell plants at Yarraville (Victoria, Australia) and Botany with modern membrane cell technology and will be ready for operation from October 2000 (Laverton) and March 2001 (Botany).

The step has been taken because of the advanced age, low efficiency, high maintenance costs and environmental performance of the existing mercury cell plants which have been in operation for up to 50 years.

The new plants will eliminate the hazards and potential environmental impact of mercury. In addition, the use of modern membrane cell technology will reduce the total energy required to produce one tonne of chlorine by 12 per cent, and will reduce carbon dioxide emissions by 20 per cent, when compared with the mercury cell process.

Extensive safety engineering has gone into the design of the plants to reduce their impact on the surrounding communities and possible emissions to the environment. The chlorine will be liquefied and packed into containers at the new Laverton plant, in what will be one of the most advanced and safest storage facilities in the world.

Comfortable protective clothing

Operators handling chemicals have to wear personal protective clothing which generally leaves them feeling hot and uncomfortable. This was particularly the case for Chemnet's transport drivers and other operators in New Zealand who were required to wear PVC coats, PVC over-trousers and polycotton overalls to handle the loading of acids and alkalis.

Recognising that this was not conducive to safe working, a team from Orica operations at Mount Maunganui (North Island) set about the task of reviewing modern fabrics that provided the protection and the comfort they wanted. Their investigation led them to W. L. Gore & Associates, the US company famous for its high quality outdoor clothing made from GORE-TEX fabric.

After laboratory tests to confirm the protective qualities of the fabric, pairs of one piece overalls were made for field testing. The prototype overalls were a major success and, in March 1999, all Chemnet's operational and transport staff were issued with the new garments. Now the overalls are being considered for use in other parts of Orica.

AMMSAFE

Orica's AMMSAFE product stewardship program is aimed at the safe use of ammonia by our customers. Ammonia is used as a refrigerant in large industrial and commercial installations where its low corrosivity, high latent heat and chemical stability are advantageous. It is, however, potentially harmful to human health and, under some circumstances, is also flammable. In the past, some market share was lost to the relatively inert CFCs but, with the concerns regarding ozone depletion, there has been a trend back to ammonia.

While ammonia is safe to use when handled appropriately, there has been a long history of incidents involving ammonia refrigeration systems. As part of AMMSAFE, the quality and availability of technical and safety data were improved, and in particular, a new ammonia handbook was written and special posters prepared. Training on the properties and handling of ammonia was offered to all customers, and assistance given in auditing and preparing emergency plans. In addition, a safe process was developed for the return of waste ammonia from

customers to a best practice packing and distribution facility at Newcastle (New South Wales, Australia).

The result has been a reduction of incidents involving ammonia and a significant increase in market share for our Chemnet trading and distribution business, showing once more that good product stewardship is good business.



Orica is committed to the Chemical Industry's Responsible Care Program. In 1999 this ground-breaking program celebrated its tenth anniversary in Australia.

Mike Swallow, a team leader at Chemnet's operations in Mount Maunganui, wearing the protective clothing for transfer of acids.



Safety is always at the forefront of our Chemicals business, and I am particularly proud that our business has led the way in Orica in the introduction of behavioural safety programs such as Unsafe Acts Prevention and Critical Behaviours Inventories. The commitment of individuals to safety is exemplified by Chemnet employees in New Zealand, who took the initiative to search the world for the most effective protective clothing.

Occupational health of our employees is a top priority and Chemicals runs programs directed at the workplace and the home.

On the environment side, it is pleasing that we improved our environmental compliance in all businesses and, in this coming year, we will commence replacing our mercury based chlorine cells with modern membrane cell technology.

Finally, as the Executive Team champion for product stewardship, it is good to see the progress across the company in this area. Our Chemicals business has excellent programs such as AMMSAFE, Solvent Care and Chlorine Safeguard. Stewardship of our products from creation to disposal is our responsibility, and it is pleasing that when it is done well it also gives us a welcome competitive advantage.

Barbara Gibson
General Manager Chemicals Group



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**Produced by Orica's
Corporate SH&E Unit
and Corporate Affairs
November 1999**

ACN 004 145 868

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New Zealand

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These reports will in future be included on our web site. Printed copies can be obtained directly from the sites.