

# NOVA CHEMICALS

2003 Responsible Care® Annual Review



## PRESIDENT'S MESSAGE

At NOVA Chemicals, responsible corporate citizenship is the foundation of our business.

We work hard every day to earn our strong performance record in safety, health, security and environmental protection. Our achievements are the product of a Responsible Care culture within our industry that makes safe operations the cornerstone of our work. We remain committed to protecting workers, the environment and our communities as we make the plastics and chemical products that are an integral part of modern life.

We are proud of our achievements, but we are never satisfied with our performance. Membership in the Responsible Care program provides both a roadmap for continuous improvement and benchmarks to compare our performance against other leading companies. Launched in 1985, Responsible Care is a rigorous, structured framework for driving improvement in safety, security, health and environmental protection. The program also helps us aggressively confront emerging challenges as an industry, such as the need for even tighter security in an uncertain world.

We also want our stakeholders to know us better and continue the dialogue that expands public understanding of our industry. Together with our peers, we publicly report our performance in each core area of Responsible Care.

Open communication allows us to explain how we control risks associated with our business as well as respond to changing needs or societal expectations. Our transparency also encourages better understanding of the products we make and their significant value to society.

Although the chemical industry is already the safest manufacturing industry in North America, we reach for even higher standards every day. We believe it is the only responsible way to do business.



Jeffrey M. Lipton  
*President and Chief Executive  
Officer, NOVA Chemicals*

# RESPONSIBLE CARE® AT NOVA CHEMICALS

Responsible Care is the chemical industry's award-winning initiative that requires member chemical companies to go above and beyond regulatory requirements and voluntarily share relevant performance metrics with the public.



On April 15, 2004, members of the Alberta Ethylene Crop Research Project Team were presented with NOVA Chemicals' 2003 President's Award for Excellence in Responsible Care.

Responsible Care companies improve their performance by implementing world-class management practices; working with independent auditors; tracking performance through environmental, health, safety and security measures; and extending these best practices to business partners throughout the industry. From its beginnings in Canada in 1985, the initiative has now extended to nearly 50 countries worldwide.

NOVA Chemicals believes Responsible Care makes good business sense. The company strives to improve its Responsible Care management systems by listening to employees, the community and customers; by conducting research to understand the potential impacts of products on the health and well-being of the public before such products are introduced to the marketplace; and by implementing inherently safer technologies and processes when it is technologically and commercially feasible to do so. NOVA Chemicals is proud to be a founding member and an industry leader in Responsible Care.

NOVA Chemicals is a member of several industry organizations that support and promote Responsible Care in the countries in which we operate:

- The American Chemistry Council® (ACC): [www.americanchemistry.com](http://www.americanchemistry.com)
- The Canadian Chemical Producers Association: [www.ccpa.ca](http://www.ccpa.ca)
- The European Chemical Industry Council: [www.cefic.be](http://www.cefic.be)

In addition, we participate in plastic industry organizations that support the environmentally and socially responsible use of plastics resources:

- The American Plastics Council® (APC): [www.americanplasticscouncil.org](http://www.americanplasticscouncil.org)
- The Canadian Environment and Plastics Industry Council (EPIC): <http://www.plastics.ca/epic/>
- The Canadian Plastics Industry Association (CPIA): [www.plastics.ca](http://www.plastics.ca)
- PlasticsEurope (Association of Plastics Manufacturers): [www.apme.org](http://www.apme.org)
- The Polystyrene Packaging Council (PSPC): [www.polystyrene.org](http://www.polystyrene.org)

# RESPONSIBLE CARE® AT NOVA CHEMICALS [CONTINUED]

OUR RESPONSIBLE CARE VISION - We will be a leader in the chemical industry worldwide, in terms of our performance and commitment to Responsible Care. Our ultimate goal is to operate our businesses without harm to people, property and the environment.

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OUR RESPONSIBLE CARE POLICY - NOVA Chemicals is committed to being a leader in achieving and maintaining superior Responsible Care performance. The following principles reflect the ethic of Responsible Care and guide our conduct worldwide.

## We will:

- Manage our business on the premise that all incidents that could result in harm to people, property or the environment can be prevented.
- Operate in accordance with applicable laws and regulations and to the higher of NOVA Chemicals' or local health, safety and environmental standards.
- Ensure that employees and contractors understand their responsibilities and are provided with the training and support necessary to integrate Responsible Care principles into their work.
- Provide the human, material and financial resources required to integrate Responsible Care principles into all of our business operations.
- Understand the health, safety, environmental and resource impacts of all of our products at all stages of their lifecycles and take steps necessary to protect our stakeholders and the environment, and conserve resources.
- Seek and incorporate public input regarding our products and operations, and review our Responsible Care performance with our stakeholders to facilitate continuous improvement.
- Support health, safety and environmental education and research, and use best available science, technology and industry practices where economically and technically feasible.
- Participate proactively in Responsible Care-related public policy development processes, and the development of industry standards.
- Foster business relationships with companies that demonstrate a commitment to responsible health, safety and environmental management practices.

# MANAGING PRODUCTS THROUGH THEIR LIFECYCLES

At NOVA Chemicals, we are committed to managing the impact of our products across the full product lifecycle.

Our product stewardship program addresses product regulations and risk management issues in new product design, market development, raw material selection, product manufacturing, distribution and sales, product applications, recovery or reuse, and disposal.

Our commitment to product stewardship involves our employees, customers and distributors, their customers, our suppliers, carriers, regulatory authorities and other interested parties. Our work includes:

- product research
- maintaining accurate product information
- ensuring compliance with regulations
- advising customers on product selection and performance
- working with selected trade associations to manage major public issues confronting the chemical and plastics industries.

## SUPPORTING RESEARCH

NOVA Chemicals conducts strategic testing and science-based risk reviews of our products and the chemicals used to make them through industry association work groups.

- As a member of the American Chemistry Council's (ACC) Olefins Panel, NOVA Chemicals volunteers with other producers to review and release new testing results under the EPA's High Production Volume (HPV) Chemical Challenge Program. This long-term project will help to further characterize the human health and environmental effects of six olefin products made by NOVA Chemicals and other chemical manufacturers. For further information, please visit the EPA's official HPV Web site.

- NOVA Chemicals also sponsors research on ethylbenzene as part of the EPA's Voluntary Children's Chemical Evaluation Program (VCCEP) pilot. This research seeks to increase understanding of ethylbenzene, a key feedstock in the production of styrene, as it relates to children's health. The testing is underway and the results will be presented to an independent panel of scientists as they are completed. For additional information, please visit the ACC Web site [www.kidshealthinfo.com](http://www.kidshealthinfo.com). This Web site was created to serve as a gateway to authoritative sources of information on children's health.

- The company supports the ACC's Long Range Research Initiative (LRI), which sponsors independent, third-party research at the CIIT (Chemical Industry Institute of Toxicology) Centers for Health Research and at other prominent research centers and universities. Information is available on the LRI Web site.

The European Union continues its assessment of risks associated with a category of compounds called brominated flame retardants. Brominated flame retardants are used in electrical and electronic goods, furniture, plastic parts and other applications to help reduce the risks of human injury and deaths due to fires. Several of these compounds have also been associated with undesirable health and environmental effects. NOVA Chemicals uses several brominated flame retardants in flame retardant (FR) grades of styrenic polymers to meet industry standards and the specific needs of our customers. In conjunction with manufacturers of flame retardants and other polymer producers, NOVA Chemicals has been diligent in participating in the EU assessment process to help ensure that any data gaps are addressed and that FR grades of styrenic polymers contain the most effective, low risk additives.

# MANAGING PRODUCTS THROUGH THEIR LIFECYCLES [CONTINUED]

For further information on these and other topics of interest to the public, please see the "Where We Stand" section of our Web site.

In addition to industry-sponsored research efforts, NOVA Chemicals also conducts product risk reviews. For a summary of our process for characterizing and managing risk for the products we make, see "Managing Products Through Their Lifecycles."

## PROMOTING GOOD STEWARDSHIP

Through our "Partnerships\* in Commitment" (PIC) program, we engage our customers, carriers and distributors to work cooperatively to safely handle, use and dispose of our products. We also work with our suppliers and carriers to ensure they safely handle, package and transport the raw materials required to manufacture our products. The PIC program is used to encourage our business partners to adhere to Responsible Care programs and practices.

We also play an active role in the chemical industry's product stewardship efforts by sponsoring studies and by supporting plastics resource recovery and recycling programs that are both environmentally and economically sustainable.

- NOVA Chemicals is a primary funding member of the Environment and Plastics Industry Council (EPIC), which sponsors plastics recycling research and integrated waste reduction strategies for Canadian municipalities. For additional information, please visit the EPIC web site.
- As a member of the APC/Polystyrene Packaging Council (PSPC), we support lifecycle assessments of our polystyrene products and alternative products.
- Our customers have identified factual, accessible data on NOVA Chemicals' products as a priority need. In response, we have developed a series of product-based Web sites that provide technical and product application data, plus safe handling information. For more information and the most recent additions, please visit the products section of our Web site.

For additional information regarding our product safety performance in the U.S., please visit the managing product safety section of the American Chemistry Council's Responsible Care performance Web site.

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*\* The words 'partner' and 'partnerships' used in connection with NOVA Chemicals' "Partnerships in Commitment" program are not intended to imply a legal partnership, but rather a supplier-customer relationship in which each of the parties is committed to the Principles of Responsible Care®.*

# KEEPING EMPLOYEES & CONTRACTORS SAFE

NOVA Chemicals operates on the premise that all work-related illnesses and injuries can be prevented.

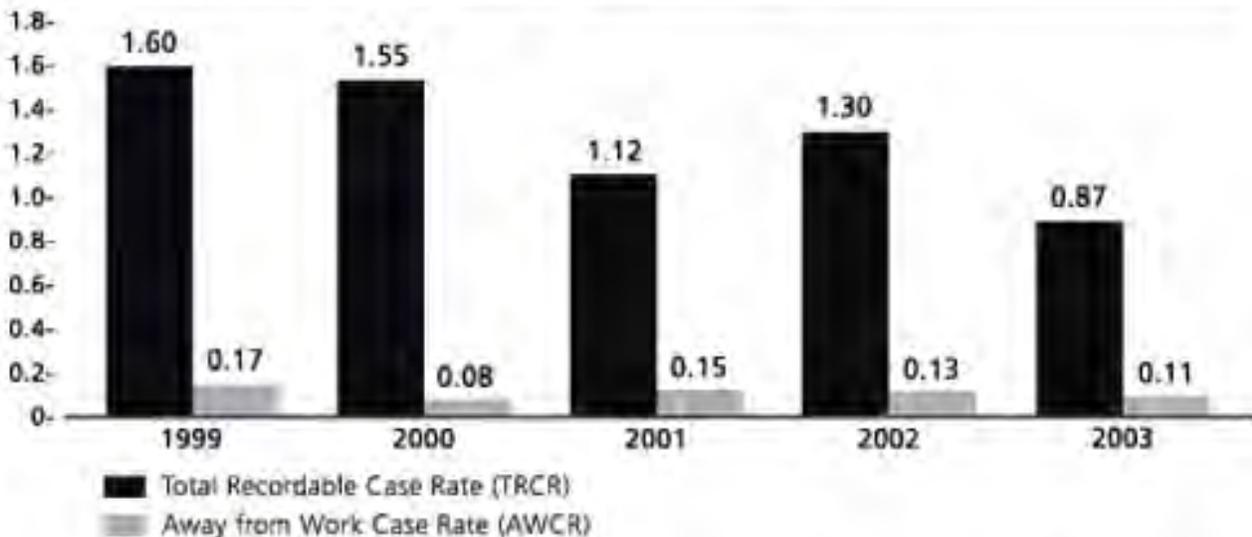
Our occupational safety and health programs are designed to protect employees and contractors from both immediate on-the-job and long-term health risks. As the foundation for these efforts, NOVA Chemicals strives to foster a culture in which all workers are responsible for maintaining the workplace health and safety of their fellow employees.

Occupational Safety Performance Company-Wide  
In 2003, NOVA Chemicals' employee away-from-work injury/illness case rate (AWCR) \* was 0.11, and the employee total recordable case rate

(TRCR)\*\* was 0.87, both improvements over last year. Our contractor AWCR was similar to 2002, with an AWCR rate of 0.06 and a TRCR of 2.56. We continue to work diligently to achieve better results in accordance with our belief that all accidents and injuries are preventable.

For additional information regarding our safety performance in the U.S., please visit the safety section of the American Chemistry Council's Responsible Care performance Web site.

## EMPLOYEE INJURY/ILLNESS

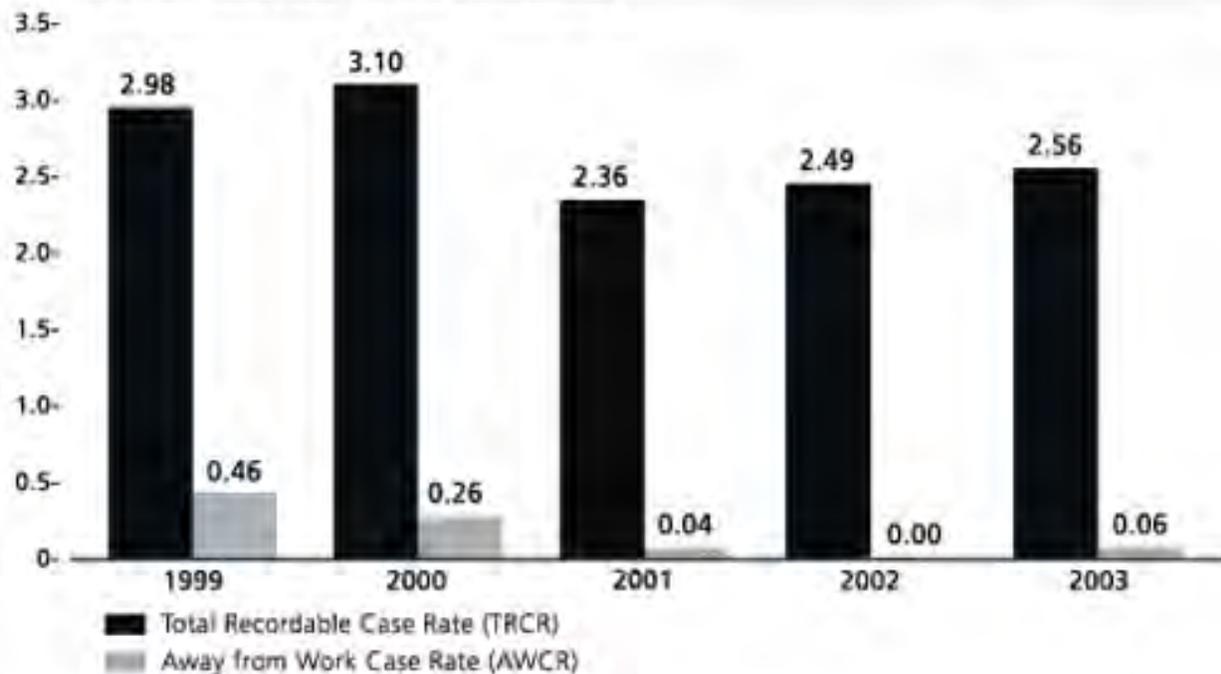


\* *Away-from-Work Case Rate (AWCR): The number of illnesses or injuries resulting in absences from work, as a rate per 200,000 hours worked.*

\*\* *Total Recordable Case Rate (TRCR): The number of away from work cases, medical treatment cases or restricted work cases (where the work routine is restricted due to the work-related injury or illness) at a rate per 200,000 hours worked.*

# KEEPING EMPLOYEES & CONTRACTORS SAFE [CONTINUED]

## CONTRACTOR INJURY/ILLNESS



\* *Away-from-Work Case Rate (AWCR): The number of illnesses or injuries resulting in absences from work, as a rate per 200,000 hours worked.*

\*\* *Total Recordable Case Rate (TRCR): The number of away from work cases, medical treatment cases or restricted work cases (where the work routine is restricted due to the work-related injury or illness) at a rate per 200,000 hours worked.*

# KEEPING EMPLOYEES & CONTRACTORS SAFE [CONTINUED]

## Safety success story: Condensate pots



The Sarnia, Ontario site's Winterization Team created safe, sustainable systems and processes to enhance their winterization program.



Condensation pot at the Sarnia, Ontario facility.

Steam plumes and ice build-up on pads and ground areas were a threat to worker safety during the winter months at the Sarnia, Ontario site, and these slippery surfaces had to be salted and sanded to prevent slips and falls. To stop the ice build-up and need for heavy salting/sanding, the team invented condensate pots. These are small, non-pressure vessels approximately 12" in diameter and 18" tall, and are used to capture the condensate discharge from steam traps. Installing the unobtrusive condensate pots eliminated the steam and ice build-up on the pad and ground areas, reducing the potential for slips and falls during the colder months. The condensate pots are currently being evaluated for implementation at other manufacturing sites.



To ensure they could maintain the equipment and prevent worker injury, the team also created a new tool. The design of their new wrench allows steam to vent through it when the drain on a steam trap is opened. This new wrench makes trap repairs much safer by eliminating the potential for steam burns. The design of the wrench also ensures a snug fit and is easy to use in confined spaces, making for a smooth, safe and trouble-free operation.

# OPERATING PLANTS SAFELY, RELIABLY AND EFFICIENTLY

Through effective process safety management, we reduce the risk of uncontrolled process events such as fires, explosions, and accidental chemical releases.

The company employs a comprehensive set of Responsible Care Process Safety Standards and Guidelines to help minimize these events. Our Standards outline specific requirements for assessing and managing process risk; organizational and manufacturing changes; ensuring equipment integrity; and controlling plant purchases of equipment and materials. All of NOVA Chemicals' facilities are operated in accordance with our internal Process Safety Standards, which meet or exceed the regulated process safety requirements of the U. S. Occupational Safety and Health Administration's (OSHA) Process Safety Management Regulation and the European Union's SEVESO II directive.

## PROCESS FIRES

Process fires are an area of particular focus at NOVA Chemicals, and we believe our approach to eliminating them is an industry best practice. Any uncontrolled fire that occurs at a chemical plant – no matter how small – could potentially cause harm to our employees and contractors, as well as serious damage to equipment, facilities, and the environment. We place such an emphasis on process fires that whenever an uncontrolled fire of any size occurs within a process

area, senior business leadership is notified immediately, and a thorough incident investigation is initiated to help prevent recurrence. NOVA Chemicals has developed a monitoring and reporting system called the Incident Learning Process (ILP), and we believe it is also an industry best practice that helps us reduce the frequency and severity of process-related incidents.

To provide leadership in addressing process fires, we have established a company-wide team that works to identify and review all process fires and Loss of Process Containment (LOPC) incidents. The team shares information and develops recommendations and actions to reduce the occurrence of electrical system faults, hydrocarbon leaks from flanges and pump seals, and polymer leaks at all stages in the manufacturing process. For example, after we identified bolted joints as a potential hazard, a program was developed to reduce the rate of failure through improved inspection and maintenance practices. Similarly, a risk-based upgrading project has been implemented to improve the reliability of mechanical seals in hydrocarbon service.

NCX REPORTABLE PROCESS SAFETY INCIDENT PERFORMANCE				
4	1	0	0	2
1999	2000	2001	2002	2003

**ACC Definition:** A process safety incident is considered reportable if it results in (1) a fire or explosion causing more than \$25,000 in property damage, (2) a release of a chemical greater than the CERCLA reportable quantity for extremely hazardous substances or a release of 5,000 pounds of a flammable or combustible material, or (3) a serious injury or fatality arising from a fire, explosion, chemical release, or a release of energy or material from a process. For additional information regarding our process safety performance in the U.S., please visit the [process safety](#) section of the American Chemistry Council's Responsible Care performance Web site.

# HEALTH & WELLNESS

In addition to operating our facilities safely each day, we are committed to ensuring the health and well-being of our employees both on and off the job.

## OUR OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE PROGRAMS:

- Assess employee fitness-to-work, to ensure workers are capable of doing their jobs without harm to themselves or to others
- Promote awareness about health risk factors, both on and off the job, through Wellness promotion programs and communications
- Provide training and information about office and industrial ergonomics, reproductive and developmental health, hearing conservation, and respiratory protection
- Ensure compliance with all relevant regulatory and industry codes and practices
- Protect workers and neighboring communities by assessing, evaluating and controlling any chemical, biological or physical health hazards in the workplace
- Measure our progress to ensure continual improvement in every dimension of employee health and wellness.

## WELLNESS FAIR 2003

Our ergonomics programs for both office and plant employees stress the importance of breaks at regular intervals and proper ergonomic techniques during repetitive tasks to lessen the chance of developing musculoskeletal disorders (MSDs).



2003 Wellness Fair displays at NOVA Chemicals' Monaca, PA facility.



An employee at NOVA Chemicals Monaca, PA facility experiences simulated alcohol impairment during the 2003 Wellness Fair.

# PROTECTING THE ENVIRONMENT

NOVA Chemicals strives to preserve the environment and eliminate waste by reducing emissions and environmental discharges and by continuously improving manufacturing processes.

## NOVA CHEMICALS' STRATEGY TO LIMIT ITS ENVIRONMENTAL IMPACT FOCUSES ON FIVE OBJECTIVES:

- 1) Minimize the potential environmental risks associated with products during their lifecycles
- 2) Conserve resources
- 3) Minimize emissions and waste
- 4) Proactively manage emerging environmental issues
- 5) Achieve a sustainable competitive advantage through the effective use of technology to address environmental issues

## GREENHOUSE GASES

NOVA Chemicals supports voluntary initiatives to improve energy efficiency and to reduce or avoid greenhouse gas emissions. As a company, we are taking voluntary and cost-effective actions to reduce emissions of greenhouse gases. Furthermore, we encourage governments to pursue policies that promote healthy economies and international competitiveness while pursuing a greater understanding of the science of climate change.

The potential implications of climate change are important to NOVA Chemicals. We set targets, implement energy efficiency programs and use new technologies to manufacture our products with less energy and lower greenhouse gas (GHG) emissions. For instance, all of NOVA Chemicals' Canadian manufacturing sites use cogeneration or hydroelectricity as the primary sources of electric-

ity. These are less greenhouse-gas-intensive sources of energy than the fossil fuel-based alternatives commonly available from regional power generators, and delivered a GHG emission offset of approximately 500 kilotonnes (kt) carbon dioxide equivalents (CO<sub>2</sub>E) in 2003.

A key issue for the company is the direct emissions from our large Canadian ethylene, refinery and manufacturing operations at our Joffre, Alberta; Corunna, Ontario; and Sarnia, Ontario facilities. Together, emissions from these operations account for about 85% of annual direct GHG emissions from our chemical facilities. As indicated by our GHG emissions performance chart, we have achieved a significant decrease in direct emissions intensity from these facilities, while increasing production volume by over 17% since 2000.

In 2002, we began reporting direct and indirect greenhouse gas emissions from every facility we operate. For our chemical facilities, direct greenhouse gas emissions on a company-wide basis in 2003 were 5388 kt CO<sub>2</sub>E; indirect emissions were 1104 kt CO<sub>2</sub>E; and the corresponding total (direct + indirect) emissions intensity was 0.44 tonne CO<sub>2</sub>E emitted per tonne of product, a reduction from the 2002 value of 0.47. With our approximately 500 kt CO<sub>2</sub>E emission offset applied to chemical facility emissions, the net (total - offset) emission intensity for 2003 was 0.40 tonne CO<sub>2</sub>E emitted per tonne of product, slightly lower than the 0.41 reported for 2002.

Further information regarding NOVA Chemicals' position on climate change is available in the "Where We Stand" section of our external Web site.

# PROTECTING THE ENVIRONMENT

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## ENVIRONMENTAL PROJECTS

All of our facilities develop and maintain environmental programs and projects that are driven by external requirements and specific business needs. The following are examples of successes at just a few of our facilities:

### Managing Fugitive Hydrocarbon Emissions: Leak Detection and Repair Programs (LDAR)

Fugitive Hydrocarbon Emissions (FHE) are a major source of hydrocarbon emissions to air from manufacturing facilities. The sources of these volatile organic compound (VOC) leaks include valve packing, flanges, threaded connections, pump seals, compressor seals, pressure relief devices, sampling systems and open-ended lines. In isolation, each of these leaks can be very small, but the total emissions from these minor leaks can be significant. NOVA Chemicals' Leak Detection and Repair Programs (LDAR) are working to reduce VOC emissions.

#### Joffre, Alberta LDAR

The Joffre, Alberta site began its LDAR program in 1991. The program is important because there are approximately 56,000 emission points on site, and fugitive emissions account for 60% of the site's air emissions of hydrocarbons. Through diligent preventative measures, leak detection and leak repair, the site has reduced its hydrocarbon leak rate by almost 86% since the early 1990's.

#### Sarnia, Ontario LDAR

Due to outstanding efforts over the past four years, the Sarnia, Ontario, styrene manufacturing facility has reduced its fugitive emissions by 95% from accessible sources. (Inaccessible sources are defined as those that are more than 2 m above a permanent support surface; unsafe to monitor due to temperature or pressure concerns; or covered or insulated equipment). These LDAR programs and similar emission reduction efforts reduce the potential occurrence of process fires and chemical exposures, thereby lowering the risk to our employees, neighbors and the environment.

### Styrene Vapor Balance Line: Breda, The Netherlands

When unloading barges of styrene at this facility, some styrene vapor in the storage tanks was escaping to the air due to displacement. The installation of a balancing line between the storage tanks and the barge has eliminated this problem by creating a closed system. During unloading, the vapors are now returned to the barge, and when the barge is reloaded the vapors are safely incinerated.

### Cleaning Soil: Corunna, Ontario

Landfarming, also known as land treatment or land application, is an above-ground remediation technology for soils that reduces concentrations of petroleum constituents through biodegradation. NOVA Chemicals is testing a program at our Corunna, Ontario landfarm that utilizes alfalfa to break down hydrocarbons in the soil through a process called phytoremediation.



Landfarm in Corunna, Ontario planted with alfalfa.

We hope to achieve even better results with alternate types of vegetation, and further testing will commence with the planting of reed canary grass in one section of the landfarm.

# PROTECTING THE ENVIRONMENT

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## PROPERLY DISMANTLING AND REMEDIATING OLD SITES

Over time, some of our smaller, older facilities have reached a point where they are no longer economically and technologically sustainable. When facilities have been closed, we employ a rigorous procedure to ensure that site buildings and infrastructure are safely dismantled, and equipment and vessels are recycled or salvaged whenever possible. We thoroughly investigate site environmental conditions, and then develop and implement clean-up plans in compliance with all relevant regulations to return the site to an environmental

condition suitable for continued industrial use.

In 1990, we created a team to manage these inactive properties and environmental liabilities, and a \$50 million accrual was established to address existing environmental issues at these sites. Since that time, we have been working closely with environmental authorities in several jurisdictions. To date, 12 sites have been fully dismantled and remediated, and work is progressing on several others. \$12 million is currently being held in a reserve to address remaining issues at inactive sites.

## ENVIRONMENTAL PROTECTION PERFORMANCE COMPANY-WIDE

Each year, NOVA Chemicals sets company-wide performance targets in three key areas: waste disposal, regulatory permit exceedances and hydrocarbon emissions (GHG & VOC).

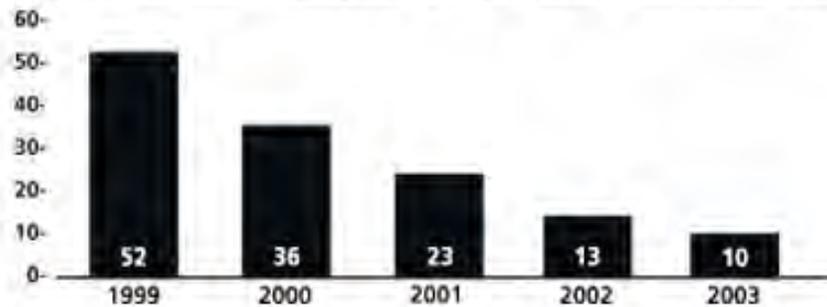


*Waste Disposal: Through reuse, recycling, and waste minimization efforts, NOVA Chemicals strives to limit the amount of waste that requires disposal.*

# PROTECTING THE ENVIRONMENT

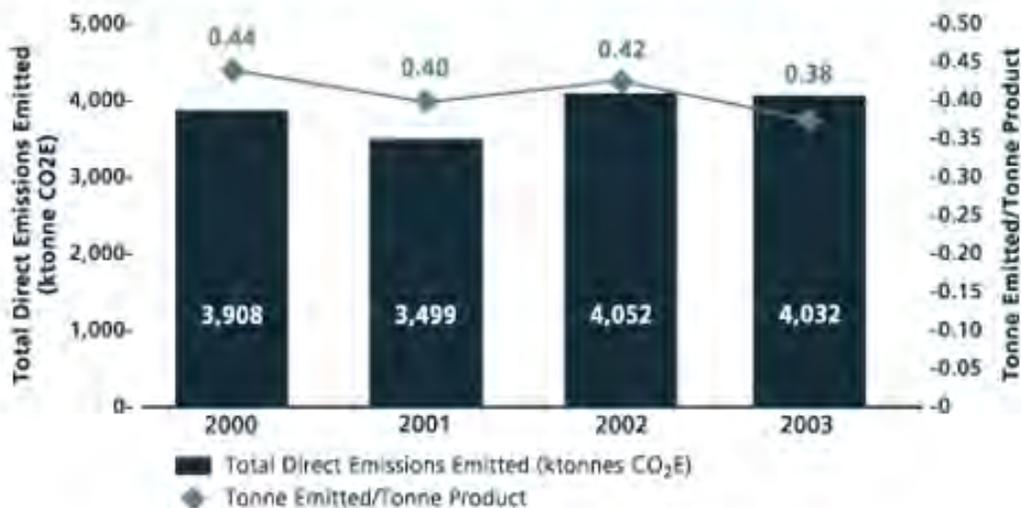
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## ENVIRONMENT: REGULATORY PERMIT EXCEEDENCES



*Regulatory Permit Exceedences: Unusual operating conditions and unexpected equipment failures can cause a facility to temporarily exceed the limits of its operating permit. In 2002, the company had 13 exceedences, but reduced this number to 10 in 2003. None of these exceedences were related to environmental emissions.*

## ENVIRONMENT: DIRECT GHG EMISSIONS CO<sub>2</sub>E (LARGE EMITTERS)



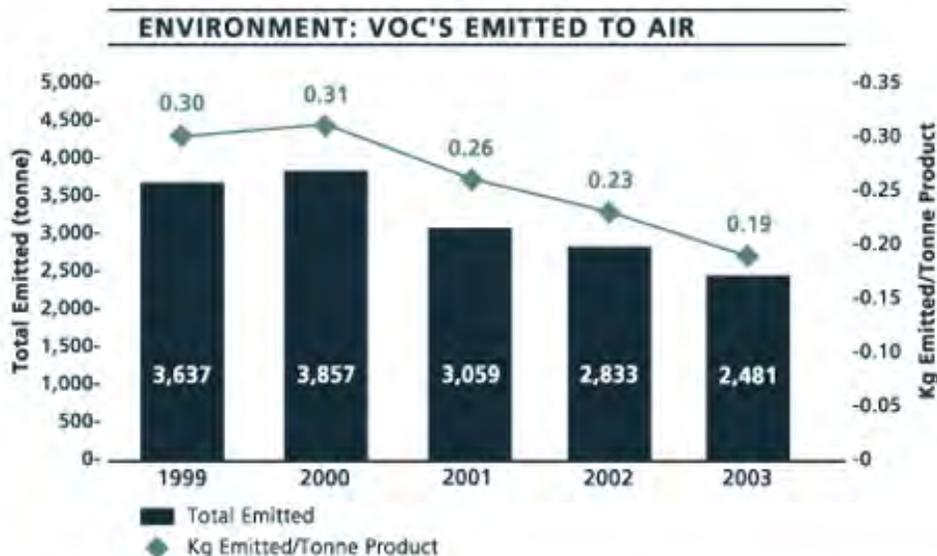
Joffre, Alberta; Corunna, Ontario; and Sarnia, Ontario sites

*Greenhouse Gas Emissions: Cleaner energy, greater energy efficiency and energy conservation are the foundations of NOVA Chemicals' efforts to lower greenhouse gas emissions.*

*NOVA Chemicals recognizes that goal setting is an important part of a greenhouse gas emissions management strategy. In alignment with other major Canadian and U.S. chemical industry producers, as well as large industrial emitters from other manufacturing sectors, we are currently targeting an 18% reduction in greenhouse gas emission intensity (defined as the equivalent mass of carbon dioxide emissions relative to mass of product) from our manufacturing facilities across Canada, the United States, the United Kingdom and Europe over the 1990 to 2012 time frame.*

# PROTECTING THE ENVIRONMENT

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*Volatile Organic Compound (VOC) Emissions: In support of efforts to improve overall air quality, NOVA Chemicals operates its facilities to maintain VOC emissions at levels that meet our regulatory requirements and follow good management practices.*

For additional information regarding our environmental performance in the US, please visit the [environment](#) section of the American Chemistry Council's Responsible Care performance Web site.



Alberta Premier Ralph Klein presenting the Premier's Award to Jim Dixon & Xiaomei Li for NOVA Chemicals' Alberta Ethylene Crop Research Project.

By collaborating with government, community and industry, the Joffre, Alberta environment team has helped internal and external stakeholders better understand the environmental impacts of ethylene production through the Alberta Ethylene Crop Research Project. This work led to a new, science-based Ambient Air Quality Guideline for ethylene in the province of Alberta that will reduce and potentially eliminate the number of reportable environmental incidents related to ethylene emissions at our Joffre, Alberta facility. The team was the recipient of our President's Award for Excellence in Responsible Care for 2003.

# PROTECTING THE ENVIRONMENT

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NOVA Chemicals produces hydrogen as a co-product of ethylene manufacturing at our facilities in Joffre, Alberta. We are preventing the creation of additional greenhouse gas emissions (associated with hydrogen production for industrial use) by making this co-product available commercially after processing at our Hydrogen Off-Gas Plant.

# TRANSPORTING PRODUCTS SAFELY

Safely and efficiently transporting NOVA Chemicals' products worldwide is a significant undertaking.

This process requires a concerted and focused effort from the company's logistics group and manufacturing sites in cooperation with operators of pipelines, railroads, barge companies and other carriers. To accomplish this task, the logistics team employs the transportation risk management process to assist in the following: choosing the best methods and routes of transport; performing rigorous carrier evaluations; and thoroughly documenting and investigating serious incidents using the company-wide Incident Learning Process (ILP).

## INDUSTRY ASSOCIATIONS



Transportation safety is a shared responsibility under Responsible Care and is accomplished through partnerships between chemical companies and carriers. We participate in Transportation Community Awareness and Emergency Response (TRANSCAER) in North America. \*

TRANSCAER's purpose is to:

- reduce chemical transportation incidents
- provide technical assistance and advice in the event of an in-transit product release

- encourage partnerships between citizens and industry to develop an awareness of transportation emergency preparedness
- help emergency planning groups identify the types of hazardous materials moving through the community
- assist local officials in developing and evaluating their community's emergency response plan
- assist with training and testing for emergency preparedness (e.g. police, ambulance & fire departments)

\*TRANSCAER® is a registered trademark of the American Chemistry Council®

As a participant in the Pennsylvania TRANSCAER Team, NOVA Chemicals was chosen as the winner of the 2003 Emergency Preparedness and Prevention Partnership Award by the U. S. Environmental Protection Agency. The PA TRANSCAER Team provides free training for first responders in hazardous materials response.



On April 15, 2003, NOVA Chemicals organized a TRANSCAER outreach program with participation from nearly 100 community members from Olds, Alberta and surrounding towns. Several other companies and government agencies were also involved in the event.

# TRANSPORTING PRODUCTS SAFELY

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## TRANSPORTATION SAFETY PERFORMANCE COMPANY-WIDE

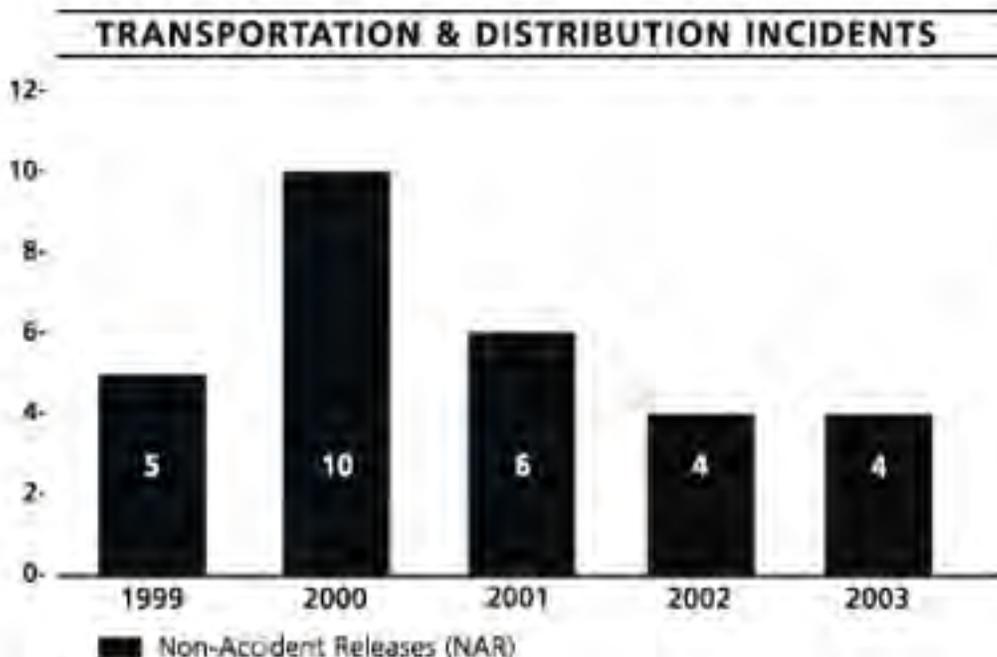
One of NOVA Chemicals' key measures of safe transportation is the number of Non-Accident Releases (NARs). These are instances when a release of hazardous material occurs from a railcar during transport that could have been prevented by maintenance or inspection. Releases usually involve small amounts of material, often as little as 250 milliliters (or approximately 1 cup).

For additional information regarding our transportation safety performance in the U.S., please visit the transportation safety section of the American Chemistry Council's Responsible Care performance Web site.

## RECOGNITION FROM THE RAILROADS

NOVA Chemicals was honored with Rail Safe Handling Awards in 2003 for the safe movement of hazardous materials by the following railroads:

- Canadian Pacific Railway
- Norfolk Southern Railway
- Burlington Northern Railway
- Kansas City Southern Railway
- Union Pacific Railway



# MAINTAINING AND ENHANCING FACILITY SAFETY AND SECURITY

Emergency preparedness and security are cornerstones of NOVA Chemicals' Responsible Care program.

Our emphasis is on prevention, but as a chemical manufacturer we recognize that each plant must be ready to respond to crisis situations in order to protect the safety of our workers, the community and the environment. The company's Emergency Preparedness and Security Council ensures that we have appropriate plans and procedures in place to manage security issues, emergencies or crises at all facilities.

## HEIGHTENED SECURITY

NOVA Chemicals continues to improve its physical security, emergency preparedness, and integrated global security standards. All of NOVA Chemicals' plants are regularly assessed against these enhanced standards through internal programs and audits.

Our company has shared these internal improvements in partnership with other chemical producers to develop best-in-class security practices for the chemical industry. Since the American Chemistry Council's formal approval of the Responsible Care Security Code for all member companies in June 2002, NOVA Chemicals has completed rigorous security vulnerability assessments. Our highest priority facilities have already implemented enhanced security measures. Lower-risk NOVA Chemicals facilities will implement additional security measures according to established schedules.

In an ongoing effort to improve security at our facilities, NOVA Chemicals:

- evaluates gaps in physical security and security procedures on a scheduled basis
- closes identified gaps with sound and prudent countermeasures
- verifies the effectiveness of countermeasures through the use of independent third parties.

Some concrete examples of measures that we are taking at our facilities to increase security include: identity verification; digital video recording in applicable areas; increased perimeter lighting; fence and fence line inspections; and employee patrols.

**In April 2004, U.S. Department of Homeland Security Secretary Tom Ridge called the Responsible Care Security Code a "model program."**

Visit the security section of the American Chemistry Council's official Web site and the security section of the American Chemistry Council's Responsible Care performance Web site for further information.

## INFORMATION PROTECTION AND CYBERSECURITY

Information protection and integrity are of growing importance in today's society. In 2003, NOVA Chemicals initiated a corporate-wide cyber-security review based on the International Standard ISO/IEC 17799:2000 Code of Practice for Information Security Management. We completed ISO security assessments for critical IT services and developed mitigation plans to address all identified assessment issues. Security improvements were implemented, and assessment work continues.

Late in the year we answered a call for support from the American Chemistry Council and the Chemical Industry Data Exchange (CIDX) to help develop new cybersecurity guidelines. NOVA Chemicals employees are participating in both ACC and CIDX cyber-security sub-committees.

# MAINTAINING AND ENHANCING FACILITY SAFETY AND SECURITY

[CONTINUED]

## EMERGENCY PREPAREDNESS

NOVA Chemicals' planning process for an emergency or crisis situation is comprehensive. It encompasses a given manufacturing, technology or office facility, surrounding areas, other industries in the vicinity, the community, transportation routes and ancillary facilities. Our strategic, three-tiered approach includes site planning and response, crisis management, and NOVA Chemicals' Logistics Emergency Response Team (NOVALERT).

### Site Planning & Response

All NOVA Chemicals manufacturing, technology and office facilities are required to have a documented Emergency Response Plan, and to provide training on this plan. Each facility's emergency response plan addresses the risks and hazards related to its operation and must comply with applicable regulations. These plans must clearly define the internal and external resources necessary to manage responses to emergency situations.

### Crisis Management

NOVA Chemicals' Crisis Management Team is activated when an event occurs that has potential business implications beyond the facility. The team provides strategic and technical support to on-site personnel and addresses immediate business concerns.

### NOVALERT

NOVALERT's world-class team responds to off-site transportation incidents involving an in-transit release of our products. All team members are company employees trained in accordance with regulatory requirements. The team is on-call 24-hours-a-day and is distributed on a regional basis so they can quickly respond to any situation.



The European NOVALERT program was launched in October 2001 and is now managed from our Manchester, U.K. facility. Through a contract with the U.K.'s National Chemical Emergency Centre (NCEC), the program provides a live emergency number and interpreter service for 37 destination countries and nine languages with year-round, 24-hour-a-day coverage. Future plans include the extension of language and territory coverage into Eastern Europe and improved communications with first-line responders to align local remedial and incident-resolution activities.

## TRANSPORTATION SECURITY

In 2003, NOVA Chemicals received approval for membership within the U.S. Customs Trade Partnership Against Terrorism (C-TPAT) program, a joint government-business initiative to build cooperative relationships that strengthen overall supply chain and border security. By participating in this new initiative, companies are working to ensure a more secure supply chain for their employees, suppliers and customers. We also

# MAINTAINING AND ENHANCING FACILITY SAFETY AND SECURITY

[CONTINUED]

participate in the Canadian equivalent program, Partnerships in Protection (PIP). Both fall under the Free and Secure Trade (FAST) initiative, a Canadian/US partnership that promotes greater security and increased integrity in supply chain management processes by offering expedited clearance processes to those carriers and importers who have enrolled and been accepted in either pro-

gram. This acceptance is based upon a demonstrated history of compliance with all relevant legislation and regulations, and acceptable records and audit trails.

For additional information regarding security performance in the U.S., please visit the security section of the American Chemistry Council's Responsible Care performance Web site.



Painesville, Ohio Township Fire Department applies foam suppression to a tank dike at the Painesville, Ohio site during a November 2003 emergency response drill.



Painesville, Ohio Site Shift Leader, Rick Arcaro and members of the Painesville Township Fire Department debrief after the application of foam to a tank dike during a November 2003 emergency response drill.

# PARTNERING WITH OUR COMMUNITIES



NOVA Chemicals sponsors the Annual Central Alberta Science Festival.

## OUR COMMITMENT

As a Responsible Care company, NOVA Chemicals recognizes the right of the public to know the risks associated with our operations and the transportation of our products. We are sensitive to any concerns that may arise among our diverse stakeholders, and we are committed to responding to those concerns.

Within the communities where our facilities are located, we have Responsible Care-based community initiatives that support our vision of being a "neighbor of choice." To us, this phrase embodies a commitment to demonstrate outstanding safety, health, security and environmental performance in the communities where we operate.

## OPEN COMMUNICATIONS

We openly share information about our operations, products and risk control processes including safe operating and transportation practices, incident investigation and emergency planning and response. We encourage two-way dialogue with our neighbors through site open houses and local advisory groups such as Community Advisory Panels (CAPs) to ensure that we are addressing the concerns the community regards as most pressing. In addition, we are committed to ongoing improvement of the exchange of information about our company and products.

# EVALUATING AND IMPROVING PERFORMANCE

NOVA Chemicals uses company-wide and site-specific tools and systems to evaluate performance and promote continuous improvement in our environment, health, safety and security programs at all of the company's facilities.

## RESPONSIBLE CARE® VERIFICATION

NOVA Chemicals obtains independent, third party opinions about our environment, health, safety, and security performance through voluntary membership in industry associations. As a member of both the Canadian Chemical Producers' Association (CCPA) and the American Chemistry Council (ACC), NOVA Chemicals engages in periodic, independent third party verification to demonstrate compliance with Responsible Care.

In 2002, the Canadian Chemical Producers' Association (CCPA) reassessed Responsible Care management systems at NOVA Chemicals' facilities in Canada, and concluded that they meet the requirements of the Responsible Care ethic.

External consultants also completed an evaluation of our Corporate Responsible Care Audit program in 2002. Their report concluded:

**"... NOVA Chemicals' Responsible Care® Audit Program is progressive, soundly designed, and effectively implemented. We believe it is one of the leading programs and is highly rated when compared to other programs with which we are familiar. It is definitely in the top quartile and probably in the top decile."**

## RESPONSIBLE CARE MANAGEMENT SYSTEMS® (RCMS®)

A fundamental aspect of NOVA Chemicals' culture, as reflected in our management systems, is our commitment to continuous improvement in areas such as health and safety, workplace diversity, employee empowerment and shared leadership, life-long learning, and active community outreach and involvement. Consistent with such values, the American Chemistry Council's (ACC) RCMS® program was launched in 2003 to strengthen management of Responsible Care requirements and establish third-party verification of Responsible Care management systems in member companies.

NOVA Chemicals agreed to implement the RCMS program in advance of requirements, which begin in 2005. A third party will verify NOVA Chemicals' corporate management systems in the fourth quarter of 2004. In accordance with the program's requirements, a representative sample (1/3 of our U.S. sites) will be audited by the end of 2007.

For additional information regarding the RCMS program in the U.S., please visit the accountability section of the American Chemistry Council's Responsible Care performance Web site.

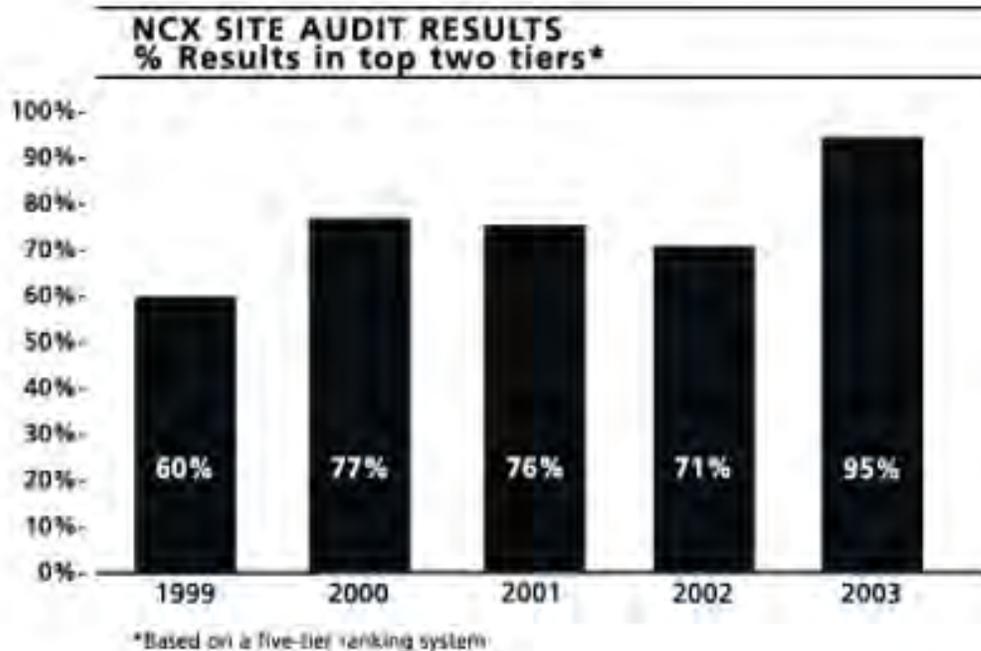
## INTERNAL AUDIT SYSTEMS

The Company has established a series of internal Responsible Care Standards that provide the framework for regulatory compliance, as well as compliance with the Responsible Care obligations shared with all member companies of the Canadian Chemical Producers' Association (CCPA) and the American Chemistry Council (ACC). These standards are in place across the Company and are the basis for regular internal audits to verify conformance.

# EVALUATING AND IMPROVING PERFORMANCE [CONTINUED]

## AUDIT PERFORMANCE COMPANY-WIDE

In 2003, NOVA Chemicals audit personnel conducted 18 audits of NOVA Chemicals' sites and Responsible Care programs to assess management system conformance with regulatory and internal environment, health, safety, and security requirements. These audits are rigorous, and are designed to drive our internal systems and processes towards continuous improvement in all areas.



*To assess our overall performance results as measured by our internal audits, the company employs a five-tier ranking system. In 2003, 95% of NOVA Chemicals' Responsible Care audits were ranked in the top two tiers of the five-tier ranking system.*

# KEY RC PERFORMANCE MEASURES SUMMARY

## NOVA CHEMICALS' RESPONSIBLE CARE PROGRAM Key Performance Measures Summary

MEASURES	1999 Actual	2000 Actual	2001 Actual	2002 Actual	2003 Actual
<b>Occupational Safety</b>					
Away from Work Case Rate (AWCR) Employees	0.17	0.08	0.15	0.13	0.11
Away from Work Case Rate (AWCR) Contractors	0.46	0.26	0.04	0.00	0.06
Total Recordable Case Rate (TRCR) Employees	1.60	1.55	1.12	1.30	0.87
Total Recordable Case Rate (TRCR) Contractors	2.98	3.10	2.36	2.49	2.56
<b>Environment</b>					
Number of Regulatory/Permit Exceedances	52	36	23	13	10
Hazardous Waste Disposed per Unit Quantity of Product Manufactured (kg/tonne)	0.96	0.74	0.69	0.44	0.40
Volatile Organic Compounds (VOC) Released per Unit Quantity of Product Manufactured (kg/tonne)	0.30	0.31	0.26	0.23	0.19
Direct Greenhouse Gases (CO <sub>2</sub> equivalents) Released per Unit Quantity of Product Manufactured (tonne/tonne) *Joffre, Alberta; Corunna, Ontario; and Sarnia, Ontario sites	NA	0.44	0.40	0.42	0.38
Net Greenhouse Gases (CO <sub>2</sub> equivalents) Released per Unit Quantity of Product Manufactured (tonne/tonne) *Company-wide	0.44	0.45	0.38	0.41	0.40
<b>Product Stewardship</b>					
Percent of Selected Major Business Partners participating in the Partnerships in Commitment (PIC) Program (Suppliers/ Customers) North American and European Carriers and Off-site Facilities	NA	86%	92%	93%	93%
<b>Transportation Safety</b>					
Number of Non-Accident Transportation Releases (NAR) of Hazardous Materials per Unit Quantity (Kt.) Shipped by Rail	5	10	6	4	4
<b>Audit</b>					
Percent of Total Audit Opinions rated in the top two tiers of the five-tier ranking system	60%	77%	76%	71%	95%

In addition to these voluntarily reported metrics, we also participate in the American Chemistry Council's public reporting Web site. For further information on our performance and industry aggregate reporting, please visit [www.responsiblecare-us.com](http://www.responsiblecare-us.com).

# CONTACT INFORMATION

## QUESTIONS & FEEDBACK

We hope this summary has helped to increase your awareness of NOVA Chemicals' Responsible Care philosophy, practices and performance. If you have questions, feedback or would like additional information, please contact us during business hours or visit our website at [www.novachemicals.com](http://www.novachemicals.com).

NOVA Chemicals contact information:

Canada: 403.750.3600  
U.S.: 412.490.4000  
(ask for Responsible Care)  
E-mail: [Care@novachem.com](mailto:Care@novachem.com)

**You can also visit the websites of the industry associations to which we belong:**

American Chemistry Council @  
[www.americanchemistry.com](http://www.americanchemistry.com)

Canada's Chemical Producers @  
[www.ccpa.ca](http://www.ccpa.ca)

American Plastics Council @  
[www.plastics.org](http://www.plastics.org)

Canadian Plastics Industry Association @  
[www.cpia.ca](http://www.cpia.ca)

Plastics Europe @  
[www.apme.org](http://www.apme.org)

Styrene Information and Research Center (SIRC) @  
[www.styrene.org](http://www.styrene.org)