

# NOVA CHEMICALS

## RESPONSIBLE CARE®

ANNUAL REPORT | 2001



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## PRESIDENT'S MESSAGE



**Jeffrey M. Lipton**

President and  
Chief Executive Officer

Welcome to NOVA Chemicals' Responsible Care Annual Report, which summarizes our philosophy, goals and achievements in the areas of safety, health and environmental protection.

We have been a Responsible Care company since the program's inception in 1985. During this time our commitment to its principles has steadily grown. Now firmly ingrained into our corporate culture, Responsible Care is part of our daily business. NOVA Chemicals is committed to being a leader in Responsible Care performance; striving to operate with ZERO incidents; and working to ensure our products are safely manufactured, safe to use and effectively managed throughout their lifecycle.

Responsible Care is a core value of the chemical industry, which remains a vibrant and rapidly growing business. It is the center for many dynamic, new technologies and the producer of many materials at the core of our modern lifestyles. In addition, we are the safest manufacturing industry and the single largest industrial investor in research and development in America.

Even so, the chemical industry still faces many obstacles and challenges. Foremost among them is the general public's lack of understanding about our products and operations. We are good neighbors, good employers and operate our businesses in a safe and sustainable manner, but it is imperative that we communicate more effectively. Simply put, we must foster a clearer understanding of the value our products provide to society, the risks associated with these products and how we reduce these risks to acceptable levels. Accordingly, this year's report outlines our strengths as well as our weaknesses and future challenges.

Through our work and that of our peers, we aspire to a new awareness that the chemical industry helps to make the world a better place. It is our intention that this report will help to provide the foundation for an open dialogue and better understanding of NOVA Chemicals and the chemical industry. If we are successful in this task, it will greatly assist us in our present efforts to make an ongoing contribution to healthy communities, stronger economies and a sustainable future.

WE ARE THE SAFEST

MANUFACTURING INDUSTRY AND

THE SINGLE LARGEST

INDUSTRIAL INVESTOR IN

RESEARCH AND DEVELOPMENT

IN AMERICA.

## PROFILE OF NOVA CHEMICALS CORPORATION

NOVA Chemicals Corporation is a focused, commodity chemical company, producing styrenics and olefins/pol olefins at locations in the United States, Canada, France, the Netherlands and the United Kingdom. NOVA Chemicals Corporation common shares trade on the Toronto and New York exchanges under the trading symbol NCX.

### EMPLOYEES

4,600 worldwide

### ANNUAL SALES

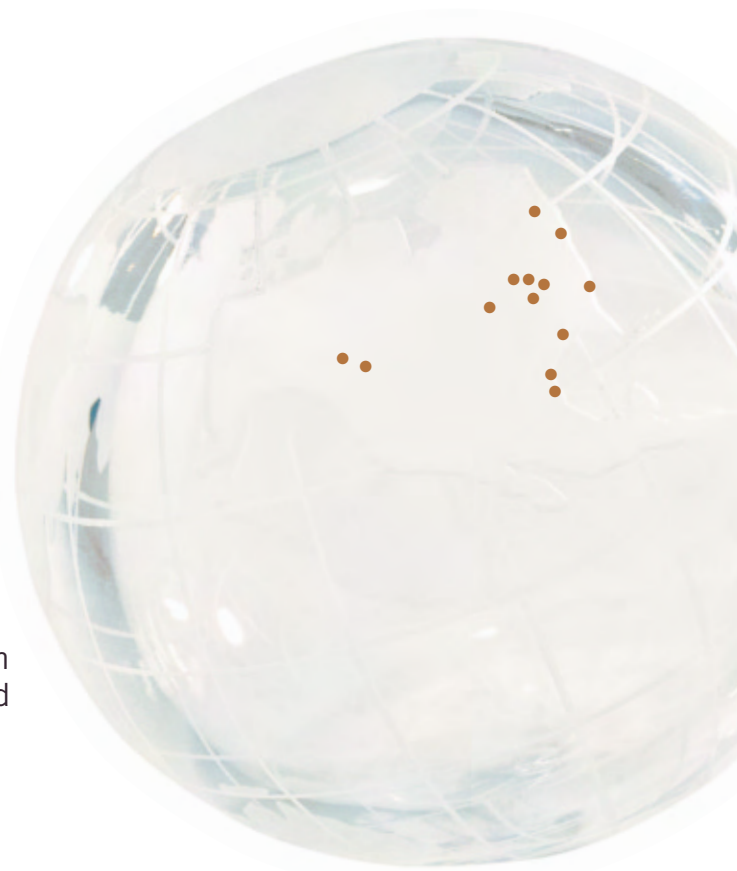
2001 Revenues – \$3.2 billion

### CORPORATE OFFICES

Calgary, Alberta – Corporate Head Office  
Pittsburgh, Pennsylvania – U.S. Operating Center

### RESEARCH SITES

Breda, the Netherlands; Calgary, Alberta;  
Chesapeake, Virginia; Monaca, Pennsylvania



### PLANT LOCATIONS

#### CANADA

Corunna, Ontario  
Joffre, Alberta  
Montreal, Quebec  
Moore Township, Ontario  
Sarnia, Ontario  
St. Clair River, Ontario

#### USA

Bayport, Texas  
Belpre, Ohio  
Channelview, Texas\*  
Chesapeake, Virginia  
Decatur, Alabama  
Monaca, Pennsylvania  
Painesville, Ohio  
Springfield, Massachusetts

#### EUROPE

Berre, France\*  
Breda, the Netherlands  
Carrington, England  
Ribécourt, France



\* Channelview and Berre are not included in Responsible Care reporting.

## PRODUCTS

### STYRENE

Styrene monomer is the primary raw material for producing solid polystyrene and expandable polystyrene. NOVA Chemicals is the largest styrene monomer producer in North America, and the 4th largest worldwide.

### SOLID POLYSTYRENE (SPS) AND HIGH PERFORMANCE STYRENICS

CD and DVD cases, food and cosmetic packaging, medical devices, office accessories, television cabinets and other electronics products are made with solid polystyrene (SPS). NOVA Chemicals is the co-leader in SPS in North America, the 6th largest in Europe, and the 4th largest worldwide.

### EXPANDABLE POLYSTYRENE (EPS)

NOVA Chemicals is the largest expandable polystyrene (EPS) producer in North America, the largest in Europe, and the 2nd largest in the world. EPS is used to make construction materials, foam cups and packaging.

### ETHYLENE

Ethylene is the primary feedstock for the production of polyethylene. NOVA Chemicals is the 5th largest ethylene producer in North America and the 10th largest worldwide.

### POLYETHYLENE

Grocery bags, garbage bags and shrink-wrap are made from linear low-density polyethylene (LLDPE). Low-density polyethylene (LDPE) is used in squeezable bottles, foam packaging and cable insulation. High-density polyethylene (HDPE) is found in industrial drums and children's toys. NOVA Chemicals is the 5th largest polyethylene producer in North America, and the 9th largest worldwide.

### PETROCHEMICAL CO-PRODUCTS

NOVA Chemicals produces petrochemical co-products used internally or sold to industrial customers as fuel, or for manufacturing chemicals, specialty resins, synthetic rubbers, inks, adhesives, coatings and other products.

## HOW OUR PRODUCTS HELP IMPROVE THE QUALITY OF LIFE



**P**lastics play an increasingly important role in our daily lives. NOVA Chemicals' polyethylene and polystyrene products are used in places you might not immediately think about, but without them our lives would be very different.

### AT HOME

NOVA Chemicals' products contribute to keeping food fresher longer. Foam meat trays are made from crystal polystyrene, while the clear plastic wrap on top is often made from polyethylene film. These plastics help to protect the food from germs and other contamination. Polystyrene can be found in egg cartons, soup bowls, coffee cups, and plastic utensils. Polyethylene is used for flexible packaging applications—such as squeezable bottles for ketchup, shampoo and soaps—providing the shatter-resistance glass packaging doesn't offer.

Plastics are not only in your home, they may actually be a part of your home. Insulated structural panels for floors, walls and roofs are made from EPS sandwiched between two pieces of oriented strand board. Insulated concrete forms, used in commercial buildings and homes, are multi-layered wall systems also containing EPS and are strong and energy-efficient.



### ON THE ROAD

Geofoam blocks made of EPS are used as insulation on highways, as fill for embankments and to stabilize slopes along roadways.

Speaking of driving, have you ever thought about how much plastic is actually in your car? Automobiles are now made with strong, durable, lightweight polymers that improve gas mileage. NOVA Chemicals' DYLARK® resin is used in instrument panels and auto trim, while ARCEL® resin is used in infant car seats.



### AT PLAY

Polystyrene foam is used to line bike helmets to provide added protection. NOVA Chemicals' ARCEL resin is used to make sporting goods and recreational products, like "boogie boards." Due to its durability, polyethylene is used to manufacture many children's toys, including sandboxes, tricycles and art easels.

### IN TECHNOLOGY

NOVA Chemicals' polystyrene is used in many electronics products. NOVA Chemicals' ZYNTAR® resin offers ignition-resistance in televisions and computers, thereby reducing the potential for fires.

#### ULTRA LOW™ PENTANE EPS RESIN REDUCES CUSTOMERS' EMISSIONS

Most EPS resins contain approximately 6% pentane, which is added as a blowing agent to expand the bead into foam. During processing of EPS, pentane can be emitted into the environment. As air quality regulations become more pervasive and stringent, the demand for low Volatile Organic Compound (VOC) EPS products will increase. NOVA Chemicals' new ULTRA LOW pentane EPS contains approximately 3% pentane, and significantly reduces emissions at customer locations. In fact, NOVA Chemicals is working on technology that will eliminate pentane from the foam expansion process, using water as the primary blowing agent in processing EPS resin into foamed parts.

#### PLASTICS BRING LIFE TO MEDICAL APPLICATIONS

NOVA Chemicals' ZYLAR® resin and crystal polystyrene grades are approved for use in many medical products. These polymers reduce the costs for devices such as medical tubing, intravenous components, labware, respiratory systems, and diagnostic kits while maintaining the performance characteristics so critical in life-saving medical applications. Other high-impact polystyrene grades are used to make lancets, syringe hubs, and thermoformed trays for medical kits. Select polyethylene resins are used in pharmaceutical and medical packaging such as pill bottles and child-resistant closures.



#### STYROSUN® RESIN HELPS SAVE OUR FORESTS

STYROSUN resin is a weather-resistant polystyrene that is increasingly being used in applications typically reserved for wood, thus reducing the number of trees that are harvested. Manufacturers of outdoor furniture, decks, and other "plastic lumber" products are discovering its merits because NOVA Chemicals' STYROSUN resin is resistant to the damaging effects of exposure to ultraviolet (UV) radiation. STYROSUN resin is also used in telecommunications, outdoor signage, billboards, sports equipment, and decorative interior molding.

#### NOVAPOL® RESIN RECYCLING

NOVAPOL HDPE resins are used in plastic milk jugs, juice bottles, and other beverage containers, and many of these are now being recovered and reprocessed for use in packaging. These recycled products are also being used to make new durable garden and construction products such as decking, posts and marine piers. For example, the Alberta Milk Container Recycling Program is a voluntary stewardship program supported by the provincial dairy industry and operated in partnership with 135 Alberta municipalities. The plastic from an estimated 27 million milk containers (largely HDPE jugs) is recovered and reused annually.



## RESPONSIBLE CARE AT NOVA CHEMICALS



The Montreal, Quebec, staff with members of NOVA Chemicals Executive Leadership Team and Responsible Care Council at the President's Award for Responsible Care Banquet in Montreal on May 28, 2002.

**R**esponsible Care is an initiative developed by the chemical industry to improve performance in environmental protection, health and safety. It is based on a set of Guiding Principles and codes of practice that address issues such as community awareness and outreach; emergency preparedness and response; product stewardship; employee, contractor and process safety; transportation and distribution; pollution prevention; and security. From its beginnings in Canada in 1985, the initiative has now extended to over 47 countries in North America, South America, Asia and Europe.

NOVA Chemicals believes Responsible Care makes good business sense. The company continuously 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; and by implementing inherently safe technologies and processes. NOVA Chemicals is proud to be a founding member and an industry leader in Responsible Care.

### RESPONSIBLE CARE MANAGEMENT SYSTEMS

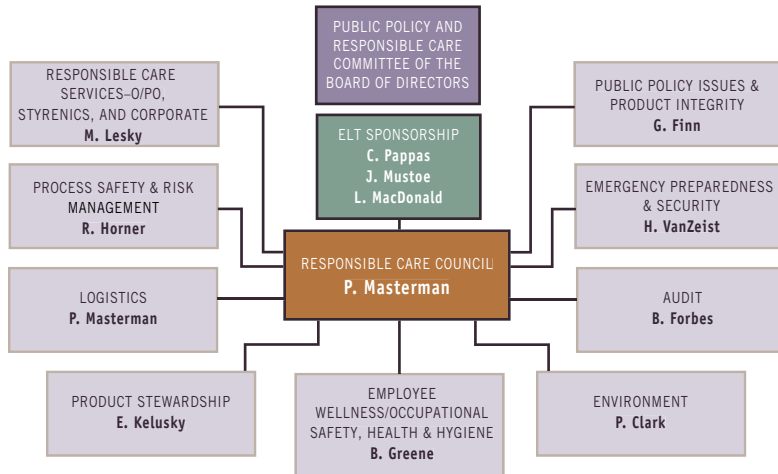
NOVA Chemicals' Responsible Care organizational structure reflects the conviction that health, safety and environmental performance is the responsibility of all employees and contractors. Responsible Care leadership requirements have been built into all businesses, and senior management shares accountability for the success of the company's Responsible Care program. Accordingly, the Board of Directors and Chief Executive Officer of NOVA Chemicals are actively involved in establishing the company's Responsible Care strategy, performance targets and objectives.

The Responsible Care Council (RCC), composed of senior leaders from across the company, oversees and guides NOVA Chemicals' Responsible Care program. The RCC reports directly to NOVA Chemicals' Executive Leadership Team and is responsible for ensuring that a strategy for continuous improvement in safety, health and environmental performance is pursued in all areas. The RCC stewards implementation of the Responsible Care policy and strategy by establishing plans, performance goals and objectives, and management systems. In addition to these duties, each RCC member champions a specific health, safety or environmental functional area and the functional experts engaged in support of that area.

At NOVA Chemicals, responsibility for Responsible Care excellence is shared by employees and contractors. This accountability brings a heightened awareness and understanding of the importance of Responsible Care and encourages superior effort and performance.



## RESPONSIBLE CARE COUNCIL



NOVA Chemicals seeks ongoing efficiency improvement in all of the company's operations, and contributes to social development through policies and practices that emphasize health and safety, workplace diversity, empowerment and shared leadership, life-long learning, and active community outreach and involvement. As recognition for NOVA Chemicals' adherence and commitment to the principles of Responsible Care, the company has been included in the Dow Jones Global Sustainability Index (DJGSI) for 2001. The DJGSI provides investors with information on the leading sustainability-driven companies, including approximately 240 companies from 61 industries in 27 countries, representing the top 10% of companies worldwide that pursue strategies influenced by sustainable development considerations.



## NOVA CHEMICALS' 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.

## RESPONSIBLE CARE® POLICY

**N**OVA 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 lifecycle 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.

## OPERATING PLANTS SAFELY AND EFFICIENTLY

**E**ffectively managing process safety helps NOVA Chemicals reduce the risk of fires, explosions and accidental releases at its facilities. The company employs a comprehensive set of Responsible Care process safety standards and guidelines to help minimize the number and impact of these incidents. These standards outline specific actions aimed at guiding the management of process risk, the management of change, checking equipment integrity, and reviewing projects. NOVA Chemicals' facilities strive to operate in a manner well above the minimum 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

Any uncontrolled fire that occurs at a chemical plant—no matter how small—could potentially cause harm to employees and contractors, as well as serious damage to equipment, facilities and the environment. NOVA Chemicals' approach to eliminating them is leading edge, and requires that events that could potentially lead to a fire are strictly reported, monitored and eliminated. One very important step towards this goal is to identify Loss of Process Containment (LOPC) incidents, or, in other words, incidents that can initiate an uncontrolled process fire. A company-wide team works to identify and review process fires and LOPC incidents to share learnings and develop company-wide recommendations to reduce the occurrence of these events.

Each site also has a process safety or process fire team that works to eliminate potential process fire hazards such as electrical system integrity, hydrocarbon leaks from flanges and pump seals, and polymer leaks at any stage in the manufacturing process. Internal targets are set and measured for the reduction of these types of incidents, including charring, sparks, overheating and smoke.

### THE VISIONS™ PROGRAM

The Monaca, PA, and Joffre, Alberta, sites began initial testing of Metegrity, Inc.'s VISIONS software program in late 1999. The VISIONS system allows maintenance and reliability groups at manufacturing facilities to maintain valuable records of inspections, tests, and recommendations on fixed equipment such as piping, vessels, tanks and reactors. For example, at the Monaca plant, an analysis of information collected in VISIONS led to the discovery that microorganisms in the river water used to condense



Routine process safety monitoring

recovered styrene were causing corrosion in the cooling equipment. This corrosion allowed water to mix with the styrene, thereby increasing the amount of contaminated water that needed to be disposed of off-site. By eliminating this problem, the team was able to reduce this type of hazardous waste.

Based on the recommendation of a company-wide team that evaluated two other similar software programs and practical applications at sites, NOVA Chemicals will begin implementing VISIONS across the company in 2002.

#### ACCIDENTAL RELEASES

In December 2000, a portion of a pipeline at the Corunna, Ontario plant failed, resulting in a release of aromatic hydrocarbons, including benzene. One month later, a product transfer line failed at the company's Sarnia, Ontario plant, resulting in a release of styrene, benzene and ethylbenzene. For these two incidents, NOVA Chemicals was fined a total of Cdn. \$600,000 for violations under Ontario's Environmental Protection Act in 2001.

In addition to extensive cleanup activities for both incidents, NOVA Chemicals conducted investigations into these incidents and continues to take proactive steps to prevent further occurrences of this nature.

Inadequate "winterization" was deemed a significant factor in the December incident, and as a result the winterization program was reviewed and augmented. Another major improvement was the addition of a nitrogen/helium leak testing system to detect leaks before hydrocarbons are introduced into the process. These efforts are in addition to ongoing pipeline integrity, maintenance and winterization activities at NOVA Chemicals' facilities.



Monaca, PA: At the D3 packaging line, newly installed ionized air blowers reduce the risk of a static spark igniting the Expandable Polystyrene (EPS) beads. The blowers neutralize the static charge as the EPS beads drop into the carton, and thereby help to eliminate a possible ignition source.



## KEEPING WORKERS SAFE

**N**OVA Chemicals operates on the premise that all work-related illnesses and injuries can be prevented. The company's occupational safety programs and initiatives 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 fosters a "safety culture"—a shared perception that everyone is responsible for striving to maintain the health and safety of his or her fellow employees.

### INCIDENT RESPONSE, REPORTING AND LEARNING

A key tool in reaching NOVA Chemicals' occupational safety objectives is the Incident Learning Process (ILP). The ILP system is used company-wide to rigorously review all injuries, environmental releases, transportation incidents, production losses, and "near hit" events. The ILP system is structured to enable all plants to share information to prevent recurring incidents.

### BEHAVIORAL-BASED SAFETY (BBS) PROGRAMS

Employees and contractors are encouraged to maintain a high level of awareness for their personal safety and that of their co-workers, both on and off the job. However, since each facility and work situation poses its own set of challenges to safety, NOVA Chemicals' plants use company-wide programs in conjunction with site-specific initiatives to manage their safety performance.

Behavior-Based Safety (BBS) programs contribute to continuous safety improvement in production and maintenance tasks through observation, employee feedback and behavior modification. Employees monitor behavior during task-related acts and then develop solutions to positively reinforce safe behaviors and modify "at-risk" behaviors to reduce the chance of injury. These systems enable the sites' employees to conduct "observations" to assess whether co-workers' work practices are safe or at-risk. These observations are based on an inventory of critical behaviors, including the use of personal protective equipment, job inspections, tools and equipment, body positioning, environmental awareness, housekeeping and office ergonomics.

In 2001, several sites launched BBS programs, including the Belpre, OH; Chesapeake, VA; Painesville, OH; and Carrington, England, facilities. Plant workers at the Joffre, Alberta, site utilize a behavior observation checklist to identify both safe and at-risk behaviors in the SAFESTART program. SAFESTART is also linked to an award and recognition program that provides motivation for working safely. In 2001, the Joffre site reached over 3 million hours without a lost-time accident.

NOVA Chemicals has four sites in Ontario, and they all actively participate in an innovative contractor safety-training program administered by the Sarnia-Lambton Industrial Educational Co-operative. The program provides courses in BBS programs and other relevant topics geared towards contract workers in a manufacturing environment. Through these and other initiatives, these sites also combined to achieve over 3 million hours without a lost-time accident in 2001.

The safety of employees and contractors was a top priority during the 2001 move to NOVA Chemicals' new United States Operating Center (USOC) in Pittsburgh, PA. All employees assisted by packing their personal items, and safety was constantly reinforced by messages on proper moving procedures. Over the course of six weeks, 362 employees were successfully relocated without incident.

Warehouse and shipping area at Monaca, PA.





During 2001, the Corunna, Ontario, site took extra precautions to increase safety awareness during a planned maintenance shutdown. Daily safety bulletins were published covering topics such as the proper use of personal protective equipment, and the safe handling of compressed gas cylinders. These and other safety initiatives helped the Corunna site reduce its total recordable case rate (TRCR) to 2.49 and its away-from-work injury/illness case rate (AWCR) to 0.

#### **OCCUPATIONAL SAFETY PERFORMANCE COMPANY-WIDE**

During 2001, NOVA Chemicals' away-from-work injury/illness case rate (AWCR) for employees was 0.15, almost twice the rate of the previous year. As a result, the company did not reach its objective for an employee AWCR of less than 0.08. The employee total recordable case rate (TRCR) decreased from 1.52 in 2000 to 1.12 in 2001, achieving the company's target of less than 1.20.

For 2002, the company has set an away-from-work case rate target of 0.08 and an employee total recordable case rate objective of 1.10.

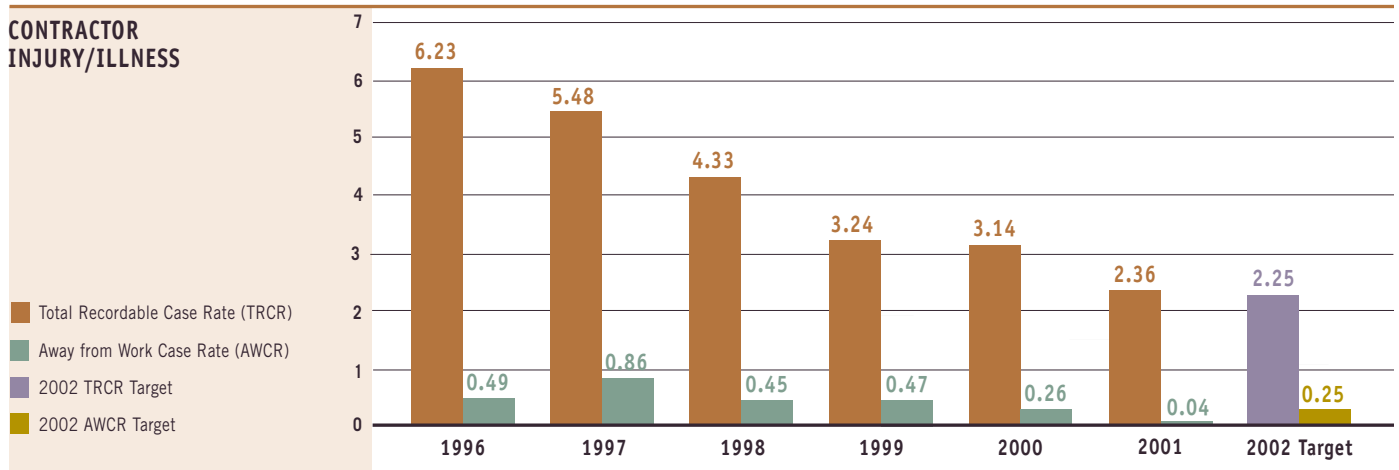
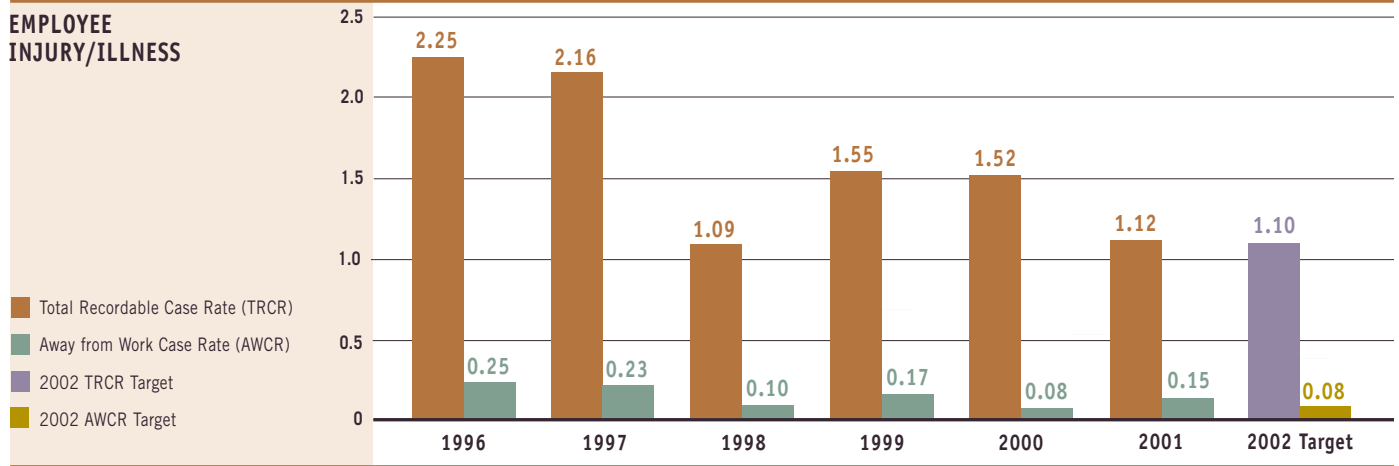
The AWCR and recordable case rates for contractors both decreased significantly in 2001 over the previous year. The AWCR for contractors was 0.04, and the TRCR was 2.36.

Five sites operated more than a million hours without a lost-time accident. These are Monaca, PA (1 million hours), Belpre, OH (1.14 million hours), Chesapeake, VA (1 million), Joffre, Alberta (3 million) and Moore Township, Ontario (2 million).

#### **RECOGNITION FOR WORKING SAFELY**

NOVA Chemicals is the proud recipient of the American Chemistry Council's (ACC) Performance Improvement Award for safety in 2001. This is the ACC's second highest award, and it reflects a 25% improvement, company-wide, over a five-year period.

In addition to this corporate achievement, many sites received awards for their accomplishments in safety. The Bayport, TX, site was honored by the ACC, the National Petrochemical & Refiners Association and the Texas Chemical Council; the Chesapeake, VA, facility was recognized by the ACC; and the Decatur, AL, site was presented awards by the Business Council of Alabama.



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) as a rate per 200,000 hours worked.

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.



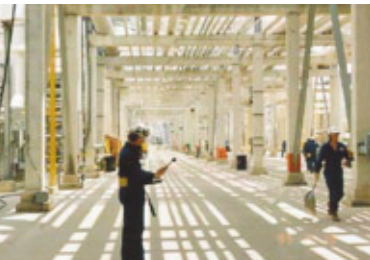
## PROMOTING WORKER HEALTH & INDUSTRIAL HYGIENE

NOVA Chemicals is committed to providing an environment that is conducive to the health of employees and contractors. Staffed by full and part-time health professionals and industrial hygienists, NOVA Chemicals implements a variety of occupational health and hygiene programs. These programs focus on assessing hazards, limiting exposures to potentially hazardous materials, developing safe work practices, and educating the workforce about personal protection and maintaining general good health.

### FOCUS ON PREVENTION

If a worker is exposed to a biological, chemical, physical or ergonomic hazard, he or she could potentially develop an adverse health reaction. NOVA Chemicals seeks to prevent exposures with chemical hazard reviews and a hazard-monitoring strategy. The company uses a centralized Material Safety Data Sheet (MSDS) database to help inform employees and customers about the hazards to which they may be exposed.

The company's health program also features medical surveillance programs, including testing, physical exams and personal counseling and education for its employees. NOVA Chemicals' web-based "Wellness Checkpoint" health-risk assessment and resource tool provides employees with up-to-date health data and information on a range of lifestyle-related topics. This information can be accessed both on the job and at home.



Routine noise level monitoring  
at the Joffre, Alberta,  
polyethylene plant.

### EXPOSURE AND HEALTH RISKS

Industrial hygiene teams develop and implement yearly monitoring strategies for potential exposure to contaminants that could occur through either routine or non-routine work activities. For example, benzene is a substance that has been identified as a human carcinogen and therefore exposure levels must be carefully monitored and minimized. Testing, however, is very difficult because low-levels of benzene can result from consumption of certain foods and drugs as well as actual exposure, and the current urine phenol test can only detect a level of 10 parts per million (ppm).

To address this issue, the Corunna, Ontario site, implemented the Urine Phenyl Mercapturic Acid (PMA) program, a state-of-the-art testing procedure. Urine PMA testing is a sensitive biological exposure index that can detect concentrations of benzene in the body as low as 0.5 ppm. Urine PMA testing is not yet commercially available in



The Joffre, Alberta, facility  
monitors the effectiveness of  
local exhaust ventilation systems  
on a regular basis.

the U.S. or Canada, but NOVA Chemicals currently forwards samples to the inventor of the process in Wales, U.K. for evaluation.

The Corunna site also developed the "Site Air Quality Monitoring Program" for benzene in 2001. Monitors were installed at 44 different locations in the plant and around the perimeter, and readings are taken every six hours.

#### **HELPING WORKERS STAY ALERT: FATIGUE COUNTERMEASURE**

Fatigue Countermeasure (FCM) programs are designed to improve the quality of life through better sleep, diet and lifestyle habits. As part of the company's emphasis on prevention, NOVA Chemicals sponsors a FCM Team. The team publishes the "Alert and Active Times" (an online employee newsletter), facilitates employee training and supports FCM programs at plant sites.

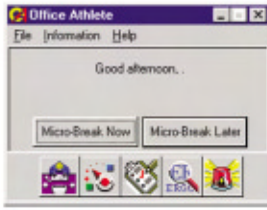
In 2001, NOVA Chemicals' North American sites completed the implementation of FCM programs, and most plants have also set up alertness recovery rooms and exercise equipment to help employees combat fatigue, particularly during night shifts. The Carrington, England plant was the first of NOVA Chemicals' European facilities to initiate a FCM program.

#### **AUTOMATIC EXTERNAL DEFIBRILLATOR (AED) PROGRAM**

Defibrillation is the delivery of an electrical shock to the heart through electrode pads to allow the heart to return to its normal rhythm with a pulse. NOVA Chemicals recognizes early defibrillation as a key to saving the life of a person that has experienced sudden cardiac arrest (SCA). As of 2001, all North American facilities are equipped with AEDs in both plant and office locations. All site occupational health professionals and emergency responders have been certified to use AEDs by the American Heart Association and receive annual cardiopulmonary resuscitation training (CPR). The Carrington, England site also has 24-hour access to an AED at their occupational health unit. Other European sites will be creating action plans to acquire this equipment where permitted under law.



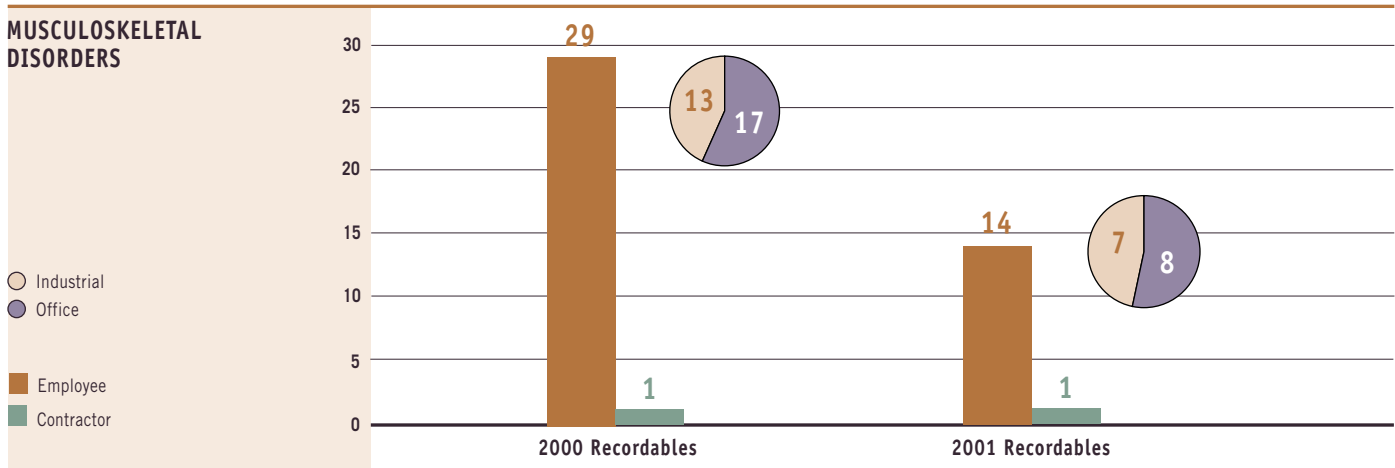
AED testing and training at  
Joffre, Alberta



#### ERGONOMICS "AT WORK"

The increased use of computers in the everyday work environment has led to an increased risk and incidence of repetitive strain injuries. Through leadership support, training, furniture replacement, employee participation and encouragement of stretching and rest breaks, the company significantly reduced the total recordable case rate of office musculoskeletal disorders (MSD, repetitive strain) in 2001.

As part of ongoing efforts to proactively reduce MSD injuries, a software program called Office Athlete™ has been installed on each employee's computer. This automatic system provides guidance on ergonomic risks and reminds workers to take breaks at regular intervals to minimize the risk of repetitive stress injuries.



## PROTECTING THE ENVIRONMENT

**N**OVA Chemicals is committed to minimizing its impact on the environment. By reducing environmental discharges, the company can both help preserve the environment and eliminate waste.

NOVA Chemicals' strategy to limit its environmental impact focuses on five objectives:

- 1) Minimize the potential environmental risks associated with products during their lifecycle.
- 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 believes that climate change has the potential to become a serious global problem. The company is taking voluntary, reasonable and cost-effective actions to reduce emissions of greenhouse gases (GHG) and their potential adverse effects on the environment.

The implications of climate change are of strategic importance for NOVA Chemicals. The company has set targets, implemented efficiency programs and is researching new technologies to manufacture each kilogram of product with less energy and lower GHG emissions. NOVA Chemicals' commitment to the reduction of GHG emissions is supported by the recent construction of one of Canada's largest cogeneration facilities, which provides steam and power to the company's world scale petrochemical complex located in Joffre, Alberta. When the cogeneration facility is operating at full capacity, it will offset annual Canadian GHG emissions by approximately 1,600 kilotonnes. These offsets allow NOVA Chemicals to reduce net GHG emissions from Canadian operations to approximately 20% below 1990 levels despite significantly increased petrochemical production.

In addition to the emissions reduction strategy, NOVA Chemicals also participates in several voluntary, cooperative efforts with government and industry to develop fair, workable policies to protect the environment and help reduce emissions. The company is a founding member of Canada's Voluntary Challenge and Registry (VCR) program, and achieved "gold level" certification—VCR's highest rating—for excellence in reducing GHG emissions in 2001. NOVA Chemicals believes that all governments should continue to develop and promote incentives and common sense measures that encourage voluntary emissions controls and reductions.



The Joffre, Alberta, facility's cogeneration plant supplied enough electricity to the Alberta electrical grid to power 270,000 homes in 2001.

#### ENVIRONMENTAL MONITORING PROJECTS

NOVA Chemicals' sites employ routine environmental monitoring as part of their Responsible Care programs. Here are a few examples:

**BAYPORT, TX:** The Bayport site participates in the Friendship Park Air Monitoring Station, a joint project with three other neighboring companies to monitor ambient air quality around this group of industrial manufacturing operations. The public can view this data on-line and learn how to interpret the results.

**CORUNNA, ONTARIO:** In cooperation with the Sarnia-Lambton Environmental Association, the site provided funding for a mobile ambient air-monitoring trailer for the community. The trailer is equipped to monitor BTEX (benzene, toluene, ethylbenzene, and total xylene), TRS (total reduced sulfur) and non-methane hydrocarbons, and can be set up in Lambton County upon need. In addition, the site installed two noise monitors at the location in the plant closest to residents. The monitors help the plant anticipate and mitigate noisy activities, which were decreased by repairing the flare tip and replacing the decoke pot at the site.

**JOFFRE, ALBERTA:** The site studied the effects of its lighting on the night sky in the surrounding community. Based on the results, the plant minimized lighting impacts by installing directional lighting, controlling lighting in non-critical areas, and utilizing specific wavelength lighting sources. Lighting impacts from the facility are now generally below those provided by outdoor yard lighting at nearby residences.

**SPRINGFIELD, MA:** In cooperation with the Chicopee River Watershed Council, NOVA Chemicals' staff routinely collects water samples from the Chicopee river and its major tributaries to monitor for pollutants. The site donated monitoring equipment, absorbs a portion of the analytical costs and supplies volunteers and technical expertise. The information is compiled and reported to the Massachusetts Department of Environmental Protection for incorporation into their watershed-wide quality assessment.

#### ALBERTA'S ETHYLENE CROP RESEARCH PROJECT

In 1997, the Alberta Research Council began a multi-year study called the Alberta Ethylene Crop Research Project. It was funded and managed jointly by NOVA Chemicals, neighboring companies in the region, the Alberta government and a local agricultural community member. The project studied both the long- and short-term effects of ethylene on local crops such as barley, wheat, canola, field peas and oats. The research data indicated that there are no adverse effects on local crops due to petrochemical operations, and will provide the Alberta government with information to establish an updated ambient air ethylene guideline for the province.

#### ENVIRONMENTAL PROTECTION PERFORMANCE COMPANY-WIDE

Each year, NOVA Chemicals sets company-wide targets for performance in four key areas: waste disposal, regulatory permit exceedances, greenhouse gas emissions, and hydrocarbon emissions.

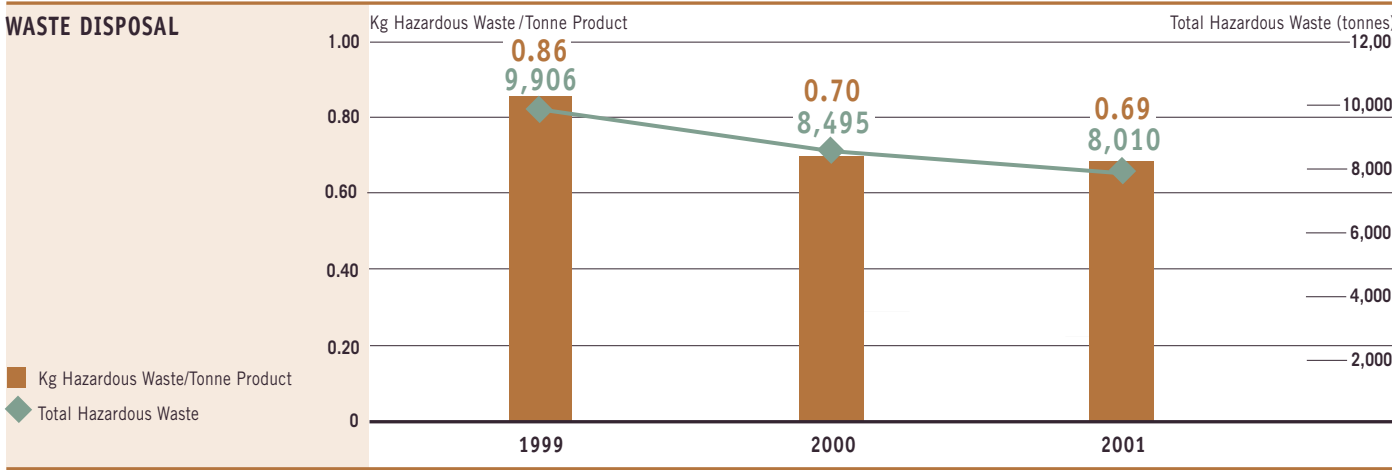


The Sarnia-Lambton Environmental Association's mobile monitoring station in Ontario, Canada.

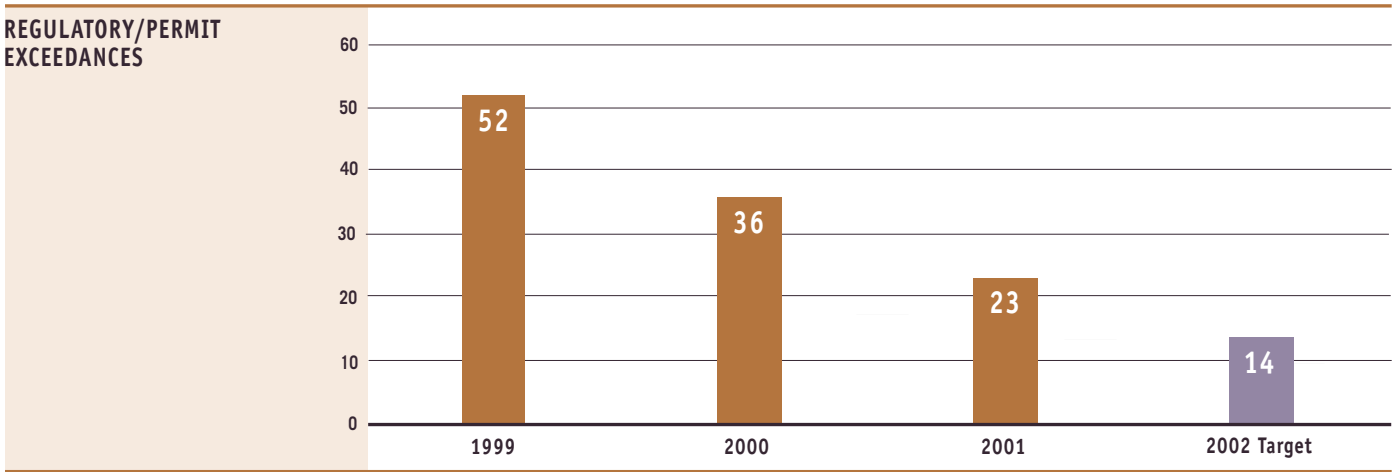


The Chesapeake, VA, site was featured in a *New York Times* article entitled "Together at Last: Cutting Pollution and Making Money." The site created an 11.5-acre wildlife habitat on plant property by planting 24 species of trees and fruit-bearing shrubs. The acreage now supports migratory birds and other wildlife.

**WASTE DISPOSAL:** Through reuse and recycling initiatives, NOVA Chemicals limits its disposal of waste. The company’s goal is to reduce hazardous waste disposal by 50% per unit of product manufactured between 1999 and 2005. NOVA Chemicals reduced hazardous wastes disposed by approximately 20% per unit of product manufactured from 1999 to 2001.

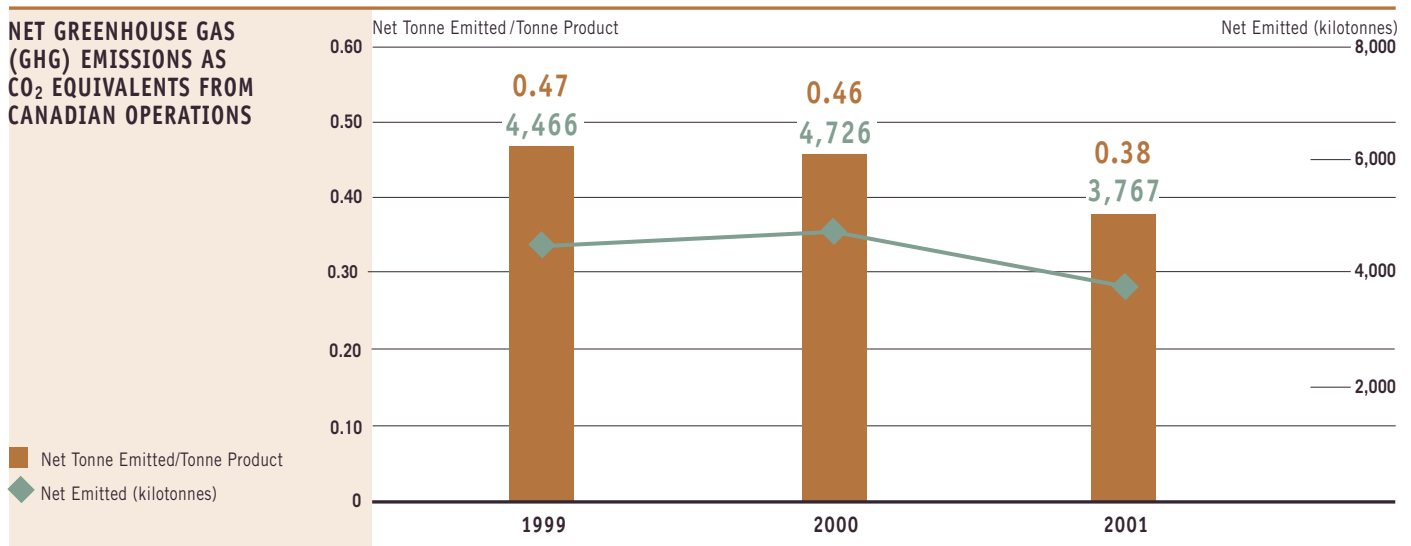


**REGULATORY PERMIT EXCEEDANCES:** Unusual operating conditions and unplanned equipment failures can cause a facility to temporarily exceed the limits of its operating permit. In 2001, the company had 23 exceedances, three more than the company’s goal of 20. The target for 2002 is to reduce this number to 14.

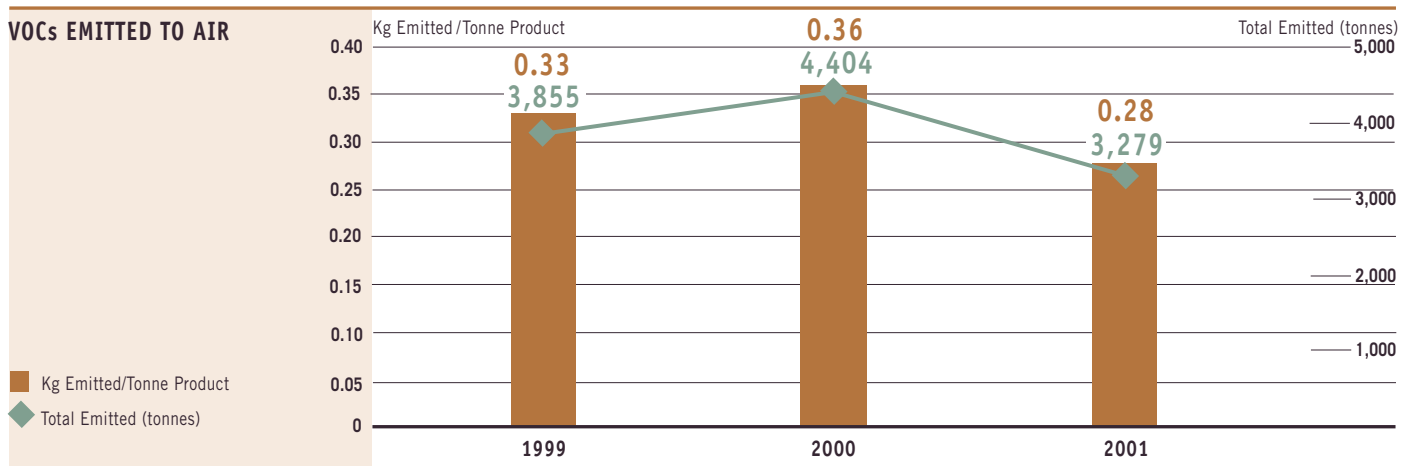


**GREENHOUSE GAS EMISSIONS:** In 2001, the construction of the Joffre, Alberta, cogeneration facility enabled NOVA Chemicals to significantly reduce net greenhouse gas emissions per unit of product in Canada. As indicated in the chart below, net greenhouse gas emissions from Canadian operations were reduced by approximately 20% below 1999 levels.

The company's goal is to reduce net greenhouse gas emissions per unit of product manufactured by 18% between 1990 and 2012. Cleaner energy, greater energy efficiency and energy conservation are the cornerstones of NOVA Chemicals' efforts to lower greenhouse gas emissions.



**VOLATILE ORGANIC COMPOUND (VOC) EMISSIONS:** As a result of a company-wide Leak Detection and Repair program, flare reductions, equipment changes and lower manufacturing rates, VOC emissions were approximately 25% lower per unit of product manufactured in 2001 compared to 1999. The company's goal is to further reduce VOC emissions by 25% per unit of product manufactured from 1999 levels by 2005.





## PROPERLY DISMANTLING AND REMEDIATING OLD SITES

**N**OVA Chemicals is a company built in part by acquisition and as a result has had facilities that were no longer economically and technologically sustainable. The company's goal is to restore these sites in compliance with relevant regulations to standards appropriate for industrial use. NOVA Chemicals employs cost-effective, state-of-the-art technology toward achieving this objective. In 1990, NOVA Chemicals established a multi-disciplinary team to manage these inactive properties and environmental liabilities. When the team was formed, a \$50 million accrual was established to address existing environmental issues at these sites. Since that time, 15 sites have been dismantled and remediated, and work is progressing on five others.

### APPLYING TECHNOLOGY

During the course of the company's dismantling, reclamation and remediation activities, NOVA Chemicals helped identify and pioneer the use of innovative soil and groundwater treatment technologies, such as soil vapor extraction and subsurface air injection systems. These have since become widely accepted and utilized throughout the industry. The end result is a cost-effective method for the simultaneous remediation of soil and groundwater.

NOVA Chemicals continues to search for new ways to safely reduce the impact of dismantling and reclamation activities, decrease costs, and realize the capital value of the property by returning it to productive industrial use.

### PROJECTS COMPLETED IN 2001

**COPLEY, OH:** This former manufacturing site was one of the first properties remediated under the Ohio Environmental Protection Agency's Voluntary Action Program. In 2001, the property was sold to a firm specializing in refurbishment of rockets from NASA's Saturn Apollo Program. The company opened to the public a museum on the site that features restored rockets from various Mission Apollo space missions.

**JOLIET, IL:** This facility, comprised of three polystyrene reactors, was shut down and dismantling activities were completed in December 2001. Activities included asbestos removal and tank and line cleaning, along with demolition of the process areas, furnace, storage, and conveyance structures.



The restored site in Copley, OH, is now a Mission Apollo Program museum.

## MANAGING PRODUCTS THROUGH THEIR LIFECYCLE

**F**rom design through manufacturing, to sales and use, through recovery, reuse and disposal, NOVA Chemicals is committed to managing the impacts of its products. By working closely with customers, suppliers, carriers, and other parties, the company helps manage its products through their lifecycles. To this end, the company researches its products, maintains accurate product information, ensures compliance with product regulations, advises customers on the best product grade for their application, and works with trade associations to manage issues confronting the chemical industry.

### TAKING THE LEAD ON RESEARCH

In 2001, NOVA Chemicals volunteered to review six of its olefin products as part of the U.S. Environmental Protection Agency's (EPA) High Production Volume Challenge program. This research will further characterize the human health and environmental health and fate implications of these chemicals.

NOVA Chemicals also sponsored research on ethylbenzene as part of the EPA's Voluntary Children's Chemical Evaluation Program pilot. This commitment requires the company to conduct toxicological reviews and other assessments to more fully understand the hazards associated with ethylbenzene, a key feedstock in the production of styrene. The research will be designed to provide exposure and hazard data in efforts to protect children's health.

NOVA Chemicals has consistently supported the Chemical Industry Institute of Toxicology (CIIT) Centers for Health Research for over 20 years. During this time, the company has provided funds in excess of \$1 million to assist CIIT in their mission to conduct fundamental research on the potential adverse effects of chemicals on human health. In addition to financial support, the company's scientists regularly collaborate with CIIT researchers.

### TAKING PRODUCT STEWARDSHIP INTO PARTNERS' FACILITIES

NOVA Chemicals routinely reviews its partners' abilities to safely handle and use its products. Through its "Partnerships in Commitment" (PIC) program, the company builds relationships with customers, suppliers, carriers and distributors based on the shared goal of improving safety, health and environmental practices. To date, Responsible Care information has been provided to over 1,000 commercial parties through this formal educational and outreach program. In 2001, over 90% of NOVA Chemicals' selected business partners participated in the program, the highest rate since the initiative began seven years ago. Information on the program was also revised and translated into French, Spanish and Chinese.

Along with providing information and evaluation tools, NOVA Chemicals also works side-by-side with customers to resolve product-related issues. As examples, in



NOVA Chemicals' products are used in a wide variety of consumer and industrial applications.



2001 an industrial hygiene study was conducted for a customer handling ARCEL resins, and a team helped another customer to identify and correct contamination problems in their processing of NOVAPOL polyethylene pipe resins.

#### COMMUNICATING PRODUCT INFORMATION

Providing current safe handling information is one of product stewardship's most important tasks. In 2001, NOVA Chemicals continued to revise, reformat and translate its Material Safety Data Sheets (MSDS) for distribution to all customers and partners who handle the company's products. In addition, information briefs were created to update customers on regulatory and legislative developments; key publications on unloading, storage and handling were revised and distributed to relevant parties; and shipping cartons for EPS and ARCEL resins were redesigned to include product safety information.

#### NEW PRODUCTS

Product integrity and stewardship activities are closely tied to other areas of NOVA Chemicals' businesses, particularly the commercialization of new products. In 2001, SCLAIR ASTute™ resins made at the company's new Joffre, Alberta, polyethylene facility were evaluated with respect to food contact regulations in multiple jurisdictions. Customer product trials required focused technology support and speedy resolution of customers' needs and questions.

Work was also done to address product regulatory needs related to the commercialization of the NOVACAT™ T catalyst, including revisions to the product MSDS, a transportation regulatory review and coordination of North American emergency response support.

#### PROMOTING GOOD STEWARDSHIP

NOVA Chemicals plays an active role in industry product stewardship and encouraging long-term environmentally and economically sustainable plastic resource recovery and recycling programs. The company is a member of the American Chemistry Council (ACC), American Plastics Council (APC), Canadian Chemical Producers' Association (CCPA), the Canadian Environment and Plastics Industry Council (EPIC), the Chemical Industry Association (CIA) in the United Kingdom, the British Plastics Federation (BPF), the United Netherlands Chemical Industry (UNCI), the Union of Chemical Industries (UCI) in France, and the Association of Plastics Manufacturers in Europe (APME).



NOVA Chemicals' Dylite® EPS Beads

## TRANSPORTING PRODUCTS SAFELY

Safely and efficiently transporting NOVA Chemicals' products worldwide requires a concerted and focused effort from the company's logistics group and manufacturing sites in cooperation with railroads, barge companies and other carriers. To accomplish this, the logistics team utilizes several tools. They employ the transportation risk management process to assist in choosing the best methods and routes of transport; perform rigorous carrier evaluations; and thoroughly document and investigate incidents to determine root causes and prevent recurrence using the company-wide Incident Learning Process (ILP).

### ENSURING SAFE DISTRIBUTION THROUGH CARRIER EVALUATIONS

NOVA Chemicals Logistics Safety Process is used to evaluate road, rail, marine and pipeline carriers based on the following four guidelines:

- **COMMITMENT:** Carriers must provide a written commitment to transport NOVA Chemicals' products in compliance with the company's Partnerships In Commitment (PIC) Program, designed in accordance with applicable Responsible Care standards.
- **SELF-ASSESSMENT:** Carriers are requested to complete and return a health, safety and environment self-assessment. The assessment covers topics such as employee hiring criteria, training, incident history, incident investigation, emergency response, operating and maintenance procedures, community outreach and security measures.
- **RISK DETERMINATION PROCESS:** Based upon the self-assessments and records of safety performance, NOVA Chemicals then completes a risk determination profile for each carrier. Action plans are developed with each carrier to address areas for improvement. Continuity of business with the carrier is dependent upon their response to the required actions.
- **FIELD ASSESSMENT:** These are conducted by NOVA Chemicals' personnel or contractors and are conducted for higher-risk carriers, such as those that transport hazardous materials.

### RAILCAR SPECIFICATIONS

NOVA Chemicals' Railcar Specifications Committees work to ensure that specifications for the company's fleet of tank and hopper cars are uniform and consistent, and meet or exceed regulatory standards. When cars have similar equipment, loading, shipping, and unloading is easier and safer.

In 2001, the group reviewed the various gasket materials used in NOVA Chemicals' railcars for suitability and compatibility with products being shipped. A "gasket matrix" was issued to railcar maintenance providers to provide guidance based on the committee's assessment. The company also works very closely with railcar component manufacturers to develop new equipment. This year, NOVA Chemicals collaborated with a supplier to create a unique vacuum relief piping assembly for styrene monomer tank cars. The assembly allows for the elimination of vacuum relief valves from the tank cars, which had been a source of Non-Accidental Releases (NARs) during transportation. The new piping assembly protects the tank car from implosion while unloading, and requires less costly maintenance than the valves.



NOVA Chemicals' Joffre, Alberta, railyard has the capacity to store more than 1,500 railcars.

## NOVA CHEMICALS AND TRANSCAER

NOVA Chemicals participates in the Transportation Community Awareness and Emergency Response Program (TransCAER), a partnership between carriers and chemical companies. As a member, NOVA Chemicals works to reduce chemical transportation incidents, provides emergency response assistance in the event of an accident, and helps educate the public and relevant parties (such as police, fire and ambulance departments) about the transportation of hazardous chemicals.

## TRANSPORTATION SAFETY PERFORMANCE COMPANY-WIDE

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

In 2001, the number of NARs decreased by four compared to 2000. Our target for 2002 is to have no more than one NAR per 120 kilotonnes of hazardous materials shipped by rail. Based upon projected rail shipments of hazardous materials for 2002, a target of one NAR per 120 kilotonnes shipped would equate to six NARs for the year.

NOVA Chemicals continues to show a strong reduction in NARs. Since the mid-1990's, NARs have dropped from an average of 20 per year to ten in 2000 and six in 2001.

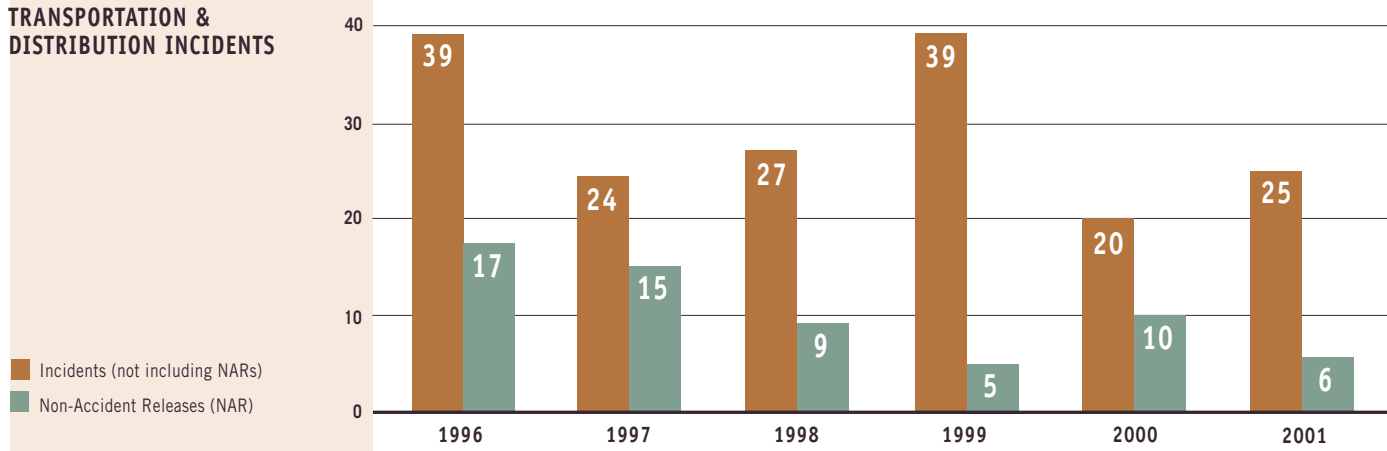
## RECOGNITION FROM THE RAILROADS

NOVA Chemicals' logistics and manufacturing teams received safe-shipping awards from all Class 1 rail carriers in 2001. The Burlington Northern Santa Fe, Canadian National, Canadian Pacific Railway, CSX Corporation, Kansas City Southern and Norfolk Southern railroads all honored the company for its achievements in safety. Of particular note was the Union Pacific (UP) railroad's Pinnacle Award. This honor was given to NOVA Chemicals' Corunna, Ontario; Joffre, Alberta; Sarnia, Ontario; and Bayport, TX sites for shipping in excess of 1000 rail cars of hazardous materials without incurring a NAR. In order to receive the award, shippers must provide UP with details of inspection programs and actions taken to prevent NARs. NOVA Chemicals was one of only 29 from a field of 1200 hazardous materials shippers to receive the Pinnacle Award.



In November 2001, the company sponsored a three-day, joint TransCAER outreach session in Wyoming, Ontario. Tours of the Canadian Chemical Producers' Association's TransCAER Safety Train (a tank car that permits observation of all working parts) were conducted as part of the program.

## TRANSPORTATION & DISTRIBUTION INCIDENTS



## MAINTAINING AND ENHANCING FACILITY SAFETY AND SECURITY



NOVA Chemicals' emergency  
response vehicle

**E**mergency preparedness and security have always been cornerstones of NOVA Chemicals' Responsible Care program. The company's emphasis is on prevention, but as a chemical manufacturer, each plant must be ready and able to respond to potential crisis situations in order to protect and preserve the safety of its workers, the community and the environment. The company's Emergency Preparedness and Security Council ensures that the organization has appropriate plans and competencies in place to effectively manage security issues, emergency situations and potential crises at all of its facilities.

### HEIGHTENED SECURITY

In the aftermath of the tragic events of September 11, 2001, a U.S. government study concluded that the chemical industry is a potential target for organized terrorist attacks. Based on this information, NOVA Chemicals has continued to increase its emphasis on security. Internal security, emergency preparedness, and global security standards were reviewed and strengthened. All of NOVA Chemicals' plants were assessed against the revised standards and actions were taken to heighten overall security.

The company shared these internal improvements in partnership with other chemical producers through its work with the ACC and CCPA to develop mandatory security standards for the chemical industry. All member companies are currently implementing these standards.

### SITE WATCH

In Sarnia, Ontario, NOVA Chemicals is working closely with other industry partners as a member of the Community Awareness and Emergency Response Association, which launched a new program in late 2001 called Site Watch. The program is based on a "good neighbor" policy that encourages employees to report any circumstances they view as suspicious in the Sarnia, Ontario area. The intent is to develop an industry-wide security network in the community. As a visible sign of this commitment, the Site Watch logo will be visible on all of the company's gates and vehicles, as well as along access roads.





## EMERGENCY PREPAREDNESS

NOVA Chemicals' planning process for emergency or crisis situations is comprehensive, encompassing the site and surrounding areas, other industries in the vicinity, the community, transportation routes and ancillary facilities. The company's strategic, three-tiered approach includes site planning and response, NOVALERT and crisis management.

### SITE PLANNING & RESPONSE

NOVA Chemicals' facilities are required to have a documented Emergency Response Plan. Each site's emergency response plan is developed to address the risks and hazards related to the operation of their individual facility and in accordance with applicable regulations. These plans clearly define the roles, internal and external resources, people and equipment necessary to manage responses to emergency situations.

To aid in achieving these goals, NOVA Chemicals has adopted the Canadian Standards Association's CAN/CSA Z731-Emergency Preparedness Standard as the basis for the company's internal Responsible Care standard. The standard establishes minimum emergency preparedness components, ranging from developing a policy statement and training to debriefing after an event. In many cases, NOVA Chemicals exceeds Standard Z731, and each site pursues rigorous exercises to test systems and continuously improve capabilities.

### NOVALERT

NOVA Chemicals' Logistics Emergency Response Team (NOVALERT) has developed a world-class program to respond to off-site transportation incidents. Composed of 32 technical advisers, the team's function is to support the first emergency personnel to arrive at the scene. The team is on-call 24-hours-a-day and distributed on a regional basis so they can quickly respond to any situation.

The European NOVALERT program was launched in October 2001 and is managed from the Carrington, England 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 16 countries and nine languages with coverage 24-hours-a-day.

### CRISIS MANAGEMENT

In the event of an emergency, NOVA Chemicals' Crisis Management Team provides strategic and technical support to facility personnel. The team guides the response, helps interface with the media, and addresses immediate business concerns. In 2001, NOVA Chemicals relocated its Crisis Management Center to the newly constructed U.S. Operating Center in Pittsburgh, PA. The center is equipped with a world-class communications and database system. During the past year, the Springfield, MA, Belpre, OH, and Breda, the Netherlands, sites staged emergency response drills to test and refine the company's Crisis Management Plan.



A rescued student is helped out of a stretcher during a drill at the Monaca, PA, site.



Emergency Response Training: Late last year, the Chesapeake, VA, site's Emergency Response Teams held a series of drills. EMTs treated "patients" that suffered chemical burns, electrocution and crush injuries, while the HazMat Team donned Level A suits in record time.





Montreal, Quebec: The Montreal, Quebec, styrenics facility celebrated twenty years of operation by hosting an Open House this past year. Visitors included local residents, high school students, and local municipal representatives.



Decatur, AL: Each March and September, the site holds a "Chemicollection" event that gives local residents the opportunity to properly dispose of hazardous household chemicals. Employees volunteer to collect and sort chemicals and paint for removal and disposal.



## REACHING OUT TO THE COMMUNITY

**N**OVA Chemicals has a deeply vested interest in the communities in which it operates. As a chemical manufacturer, it is incumbent upon the company to share information about its facilities, operations, products and the measures taken to protect workers, neighbors and the environment. Most importantly, NOVA Chemicals strives to understand and respond to the concerns of local communities and residents.

### COMMUNITY ADVISORY PANELS

The heart of NOVA Chemicals' efforts to reach out to its local communities is a system of liaison and outreach groups, or Community Advisory Panels. Comprised of community residents and leaders, these groups help the sites keep neighbors informed about emergency response plans and capabilities, as well as any special operating conditions. Community representatives voice concerns and help the company communicate more effectively with its neighbors. Many sites use newsletters and bulletins to further enhance communication between facility personnel and the community.

Surveys are conducted in communities where NOVA Chemicals has operations to assess concerns and measure the effectiveness of the plant's outreach efforts. In 2001, an independent consultant completed a comprehensive community-focused audit for NOVA Chemicals' facilities in the central Alberta area. The sites' favorability rating of 6.4 is well above the chemical industry's average rating of 4.6, and illustrates the outstanding work done by the facility to address community concerns and adhere to Responsible Care standards.

A survey was also completed by an independent consultant for NOVA Chemicals' operations in the Sarnia-Lambton area of Ontario, and NOVA Chemicals was rated well overall. The company enjoys a very high familiarity rating among community leaders, and NOVA Chemicals is seen as a company that has a strong economic and social impact on the community.

### EDUCATING AND ASSISTING LOCAL COMMUNITIES

In addition to outreach regarding plant operations, NOVA Chemicals regularly sponsors activities that encourage children to become involved in science. NOVA Chemicals' sites hold events of general interest and benefit in order to engage interested members of the community.

Monaca, PA: In 2001, the site sponsored the Penn State-Beaver Campus Math Options program designed specifically to acquaint seventh-grade girls with careers in science and engineering. This year, approximately 70 girls learned about the roles that chemists and chemical engineers play in the production of plastics. In addition to seeing demonstrations of polymer creation, the girls also had the opportunity to make their own polymer — a version of the popular toy "Slime™."



The Ontario Sites: NOVA Chemicals' Corunna, Moore Twp., and Sarnia, Ontario employees designed and constructed a display as part of the "Engineering Week" activities sponsored by the Lambton County chapter of the Professional Engineers of Ontario. The company's display simulated an office environment where various engineering disciplines work together to build a modern petrochemical plant. Included in the hands-on set-up was an on-line quiz that offered students the chance to win a tuition-paid spot at a weeklong summer science camp held at a Canadian university.

## EVALUATING AND IMPROVING PERFORMANCE

**N**OVA Chemicals uses company-wide and site-based tools and systems to evaluate performance and promote continuous improvement in applicable areas of Responsible Care.

### INTERNAL AUDIT SYSTEMS

The NOVA Chemicals Responsible Care Audit Program evaluates facility management systems and performance against the company's Responsible Care standards and regulatory requirements. These standards establish minimum requirements to ensure adherence to the principles of Responsible Care, which are then implemented through facility-based processes and procedures.

NOVA Chemicals' trained internal audit teams conduct regular assessments of the health, safety and environmental management systems at each location. An audit team typically includes personnel from other NOVA Chemicals' facilities, enabling the plants to better share information on best practices. External auditors are systematically employed to help achieve the most detailed and objective audits possible.

The auditors assess and report on the site's conformance with Responsible Care standards and local regulatory requirements. The audit team reviews the findings, or non-conformance items, with the plant leadership team and assigns an "audit opinion" or ranking. The facility is then required to establish a corrective action plan, and the completion of the corrective action is shared regularly with the company's management. Audit performance results are also regularly reported to NOVA Chemicals' Responsible Care Council, senior management and the Board of Directors.

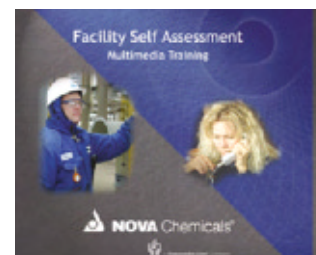
In addition to internal audits, NOVA Chemicals also periodically engages external consultants to provide independent assessments of the effectiveness of the company's Responsible Care standards and management systems.

### FACILITY SELF-ASSESSMENT

NOVA Chemicals' newly established Facility Self-Assessment (FSA) program is designed to supplement the existing Responsible Care Audit Program. It requires sites to evaluate and validate compliance with applicable regulatory requirements and company standards. Each business is accountable for the development and administration of the program, which seeks to engage operators and maintenance personnel as well as Responsible Care professionals.

### RESPONSIBLE CARE VERIFICATION

Compliance to the Responsible Care codes of practice is required for all companies belonging to the Canadian Chemical Producers' Association (CCPA) and the American Chemistry Council (ACC). As a member of both the CCPA and the ACC, NOVA Chemicals participates in independent third party verification to demonstrate compliance with Responsible Care codes. The company's processes were initially verified by the CCPA in 1994 and the ACC in 1998, and these assessments certify that NOVA Chemicals was in full compliance with the Responsible Care codes of practice.



NOVA Chemicals' Audit Team developed the Facility Self-Assessment Multimedia Training CD-ROM to assist sites in designing and establishing their own Facility Self-Assessment (FSA) Program. These detailed self-assessments involve a review of site procedures and documents.

#### AUDIT PERFORMANCE COMPANY-WIDE

In 2001, NOVA Chemicals personnel conducted 24 Responsible Care audits to measure operational performance and compliance with regulatory and internal health, safety and environmental requirements.

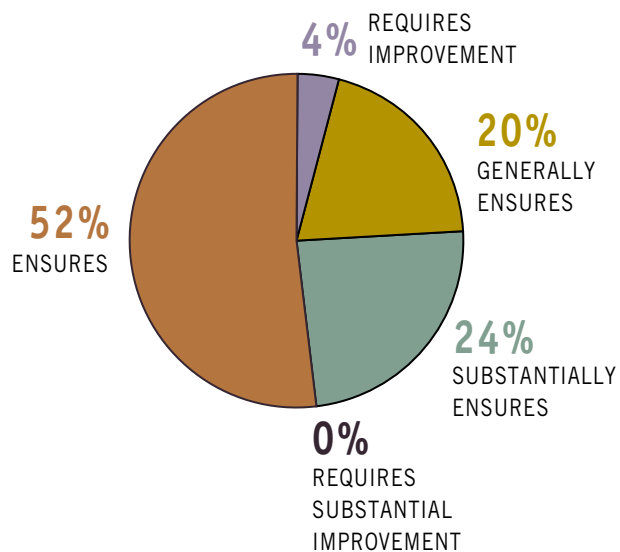
#### AUDIT OPINION DEFINITIONS

Each subject area reviewed is rated using one of five possible audit opinions:

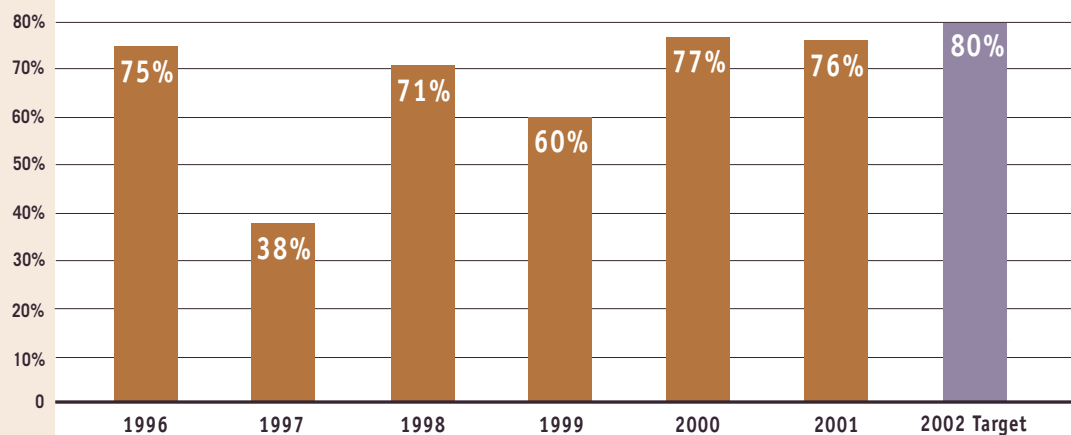
- *Ensures compliance* when systems are deemed effective to deliver a high degree of compliance and the facility meets virtually all requirements.
- *Substantially ensures compliance* when generally strong systems are in place and requirements are met with only a few isolated exceptions.
- *Generally ensures compliance* when deficiencies are noted in management systems and applicable requirements are not all being met.
- *Requires improvement to ensure compliance* when several deficiencies are noted in the management systems and performance and some of these reflect the absence of required programs.
- *Requires substantial improvement to ensure compliance* when many deficiencies are noted and several significant departures from established criteria are involved.

76% of the 2001 audits reported performance at the "Substantially Ensures Compliance" level or above. This level of performance did not quite meet the target of greater than 80% within that range. For 2002, NOVA Chemicals has set a target of 80% of audit opinions rated "Substantially Ensures Compliance" or higher. 91% of the audit follow-up items from 2001 were completed on or before the targeted completion date. For 2002, NOVA Chemicals is aiming to complete 95% of the scheduled follow-up items within the scheduled completion time frame.

## 2001 AUDIT OPINIONS



## AUDITS % AT ENSURES AND SUBSTANTIALLY ENSURES COMPLIANCE LEVELS



Responsible Care audits conducted for benchmarking purposes at facilities which have not been previously audited have not been included in the performance data reported for 2001.

# NOVA CHEMICALS' RESPONSIBLE CARE PROGRAM

## KEY PERFORMANCE MEASURES AND TARGET SUMMARY

MEASURES	2000 ACTUAL	2001 TARGET	2001 ACTUAL	2002 TARGET
<b>INCIDENT SUMMARY</b>				
Percent of Critical Incidents + Major Incidents + Serious Incidents vs. Total Number of Incidents of all classifications	6.4%	<5.0%	5.7%	<5.0%
<b>TRANSPORTATION SAFETY</b>				
Number of Non-Accident Transportation Releases (NAR) of Hazardous materials per Unit Quantity Shipped by Rail	1/468	1/110	1/127	1/120
<b>OCCUPATIONAL SAFETY</b>				
Away from Work Case Rate (AWCR) Employees	0.08	0.08	0.15	<0.08
Away from Work Case Rate (AWCR) Contractors	0.26	0.30	0.04	<0.25
Total Recordable Case Rate (TRCR) Employees	1.52	1.20	1.12	<1.10
Total Recordable Case Rate (TRCR) Contractors	3.14	3.00	2.36	<2.25
<b>ENVIRONMENT</b>				
Number of Regulatory/Permit Exceedances	36	<20	23	<14
Quantity of Hazardous Waste (with water) Disposed per Unit Quantity of Product Manufactured	0.70	50% reduction (1999-2005)	0.69	50% reduction (1999-2005)
Quantity of Volatile Organic Compounds (VOC) Released per Unit Quantity of Product Manufactured	0.36	25% reduction (1999-2005)	0.28	25% reduction (1999-2005)
Quantity of Greenhouse Gases (CO2 equivalents) Released per Unit Quantity of Product Manufactured	0.38	25% reduction (1999-2005)	0.42	25% reduction (1999-2005)
<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	83%	>90%	91%	>90%
<b>AUDIT</b>				
Percent of Audit Action Plans completed within Original Scheduled Date	91%	>95%	91%	>95%
Percent of Total Audit Opinions rated at least "Substantially Ensures"	77%	>80%	76%	>80%

## FOR MORE INFORMATION

For all Responsible Care inquiries, please contact Mark Lesky,  
Director of Responsible Care at NOVA Chemicals at **412-490-4237**.  
Or, e-mail him at [leskymj@novachem.com](mailto:leskymj@novachem.com).



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