



ROCHE COLORADO CORPORATION

ENVIRONMENTAL PROGRAMS STATUS REPORT

September 30, 2009

Roche Colorado Pollution Prevention Certifications and Memberships:



Introduction

Report History and Outline

The annual Environmental Programs Status Report, which was first issued in 1998, is part of the voluntary pollution prevention program at Roche Colorado Corporation (Roche Colorado or RCC). The report serves as an update to the City of Boulder on the current status and results of Roche Colorado's pollution prevention activities. As always, a copy of the latest Environmental Programs Status Report is available for general public review on our website, www.rochecolorado.com.

This section of the Environmental Programs Status Report details the production and technical development activities at Roche Colorado and the voluntary environmental performance programs in which the company participates. The remainder of this report includes the following sections:

- **Environmental Compliance and Regulatory Status Changes**
- **Pollution Prevention Goals and Objectives**
- **2008 Summary Tables**

Production Activities Summary

Roche Colorado, a subsidiary of Roche Holdings, Inc., manufactures bulk intermediates and active ingredients for prescription and over-the-counter medicines. The company sends the compounds it produces to other manufacturing sites for formulation into finished pharmaceutical products. As a multi-purpose facility that can handle small and large scale production, the medicinal compounds that Roche Colorado manufactures frequently change in response to market demand and the development of new therapeutic innovations.

The primary compounds that Roche Colorado currently produces are active pharmaceutical ingredients or intermediates for the following products:

- Taspoglutide

Taspoglutide is an investigational diabetes drug that is indicated as a once-weekly treatment for patients with type 2 diabetes. While Taspoglutide currently in undergoing Phase III clinical trials, initial studies found that it significantly improved glucose control and weight loss after only eight weeks of treatment.

- Enfuvirtide (Fuzeon®)

Enfuvirtide was the first of a class of HIV therapies called "fusion inhibitors" that block the HIV virus from infecting healthy cells.

- Ganciclovir (Cytovene® or Cymevene®) and Valganciclovir (Cymeval®)

Ganciclovir and Valganciclovir are drugs for the treatment of CMV retinitis in patients with compromised immune systems, including patients with AIDS and organ transplant recipients.

- Saquinavir (Invirase®) and Nelfinavir (Viracept®)

Saquinavir and Nelfinavir are protease inhibitors that act to impede an enzyme that is vital in the later stages of HIV reproduction.

- Highly Active Pharmaceutical Products and Other Manufacturing Activities

Roche Colorado's facilities also include small scale manufacturing laboratories for work in the production of highly active compounds, drugs that are effective in very small doses. Some of the highly active compounds currently in production at Roche Colorado are active ingredients for the endometriosis treatment, Nafarelin (Synarel®), and the osteoporosis treatment, Calcitriol (Rocaltrol®). Roche Colorado also made a catalyst for polyethylene manufacturing, but production on this compound ended in 2008.

- Technical Development Activities

Roche Colorado's technical development department serves as a center of excellence for designing manufacturing processes for medicinal compounds that produce high purity drug products, while optimizing cost, reliability and safety in our operations. These same development activities also have significant environmental benefits:

- Improving the inherent safety of our manufacturing processes often entails the discovery and development of chemical synthesis routes that minimize or eliminate the use of environmentally undesirable materials and high pressure and high temperature process conditions.
- Starting with the simplest materials as building blocks for our products, and improving the efficiency of our manufacturing processes, minimizes the demand for raw materials.
- Maximizing the ability of our existing equipment to manufacture our products minimizes the need to construct and operate new facilities.

Roche Colorado's technical development facilities include both laboratories for process research and pilot scale production facilities for manufacturing drug products in the quantities necessary for approval by regulatory agencies, to supply the clinical trials for new drugs, and to demonstrate new manufacturing processes.

Voluntary Environmental Performance Programs

Roche Colorado recognizes that a true commitment to pollution prevention entails the pursuit of goals that exceed applicable regulatory and legal standards. It is with these goals in mind that Roche Colorado participates in a variety of federal, state, local and industry-wide initiatives that set challenging pollution prevention standards. The following are examples of the pollution prevention programs in which Roche Colorado currently participates:

City of Boulder Pollution Prevention Program

Roche Colorado has been a voluntary participant in the City of Boulder's Pollution Prevention Program since its inception. Participation in the Pollution Prevention Program began with the development of a "Pollution Prevention Master Plan and Statement of Commitments." This document, which appears in its original form on the company website, mapped Roche Colorado's comprehensive commitment to pollution prevention in all of its pharmaceutical research, development, and manufacturing activities. In particular, the "Pollution Prevention Master Plan and Statement of Commitments" set specific emissions reduction targets and the strategies for realizing these and other pollution reduction goals. Roche Colorado tracks its success in abiding by the terms and spirit of the "Pollution Prevention Master Plan and Statement of Commitments" through this annual report to the City of Boulder, now titled "Environmental Programs Status Report."

Partners for A Clean Environment

Roche Colorado has been certified under the City of Boulder's Partners for A Clean Environment (PACE) program since 2001. PACE businesses must meet a stringent list of criteria, demonstrating a sincere commitment to a company-wide pollution prevention program and the implementation of projects that have a quantifiable benefit to the environment.

Colorado Environmental Leadership Recognition

Environmental Leadership certification recognizes companies that voluntarily perform above and beyond the existing mandated environmental regulations. Environmental Leaders, like Roche Colorado, must have a comprehensive and operational environmental management system and a pollution prevention plan that commits the company to a program of continuous environmental improvement. In its letter announcing the Environmental Leader certification, the Colorado Department of Public Health and Environment thanked Roche Colorado for the "effort and dedication" it brings to environmental issues. Under this program, Roche Colorado has participated in organizing statewide workshops and mentoring programs. In 2003, Roche Colorado received the highest environmental honor that the State of Colorado bestows, the title of "Gold Level" Environmental Leader.

Responsible Care[®] Program

Roche Colorado has been certified under the American Chemistry Council's Responsible Care[®] RC14001 and the ISO 14001 standards since 2006. This certification was obtained through a comprehensive independent audit of Roche Colorado's environmental, health, safety and security management system. The Responsible Care[®] program requires companies to go

above and beyond regulatory requirements, openly communicate results to the public, and extend these best practices to business partners through the industry supply chain.

EPA National Environmental Performance Track

In 2007, the US Environmental Protection Agency's (EPA) granted Roche Colorado membership into the National Environmental Performance Track program. Though the new EPA Administrator, Lisa Jackson, announced this year that the agency was "halting" the Performance Track Program, Roche Colorado was pleased to be recognized under the program for our strong environmental record that goes above and beyond legal requirements. To qualify for membership in the Performance Track program, facilities had to demonstrate that they: adopted and implemented an environmental management system (EMS); demonstrated specific past environmental achievements; recorded sustained compliance with environmental requirements; committed to continued environmental improvement; and committed to public outreach and performance reporting.

EPA Climate Leaders Program

In 2004, the Roche Group affiliates in the United States became an EPA Climate Leaders Partner. Climate Leaders is a voluntary industry and government partnership that encourages companies to develop long-term comprehensive climate change strategies and to set greenhouse gas emissions reduction goals. After achieving an initial 8 percent reduction goal in 2006, the Roche Group affiliates set an aggressive goal to reduce greenhouse gas emissions by 10 percent by the end of 2010, against a base year of 2001. Again, they met their goal ahead of schedule, with an 18 percent reduction in 2008. The Roche Group affiliates are currently working to establish a third goal. As a number of the pollution prevention goals and objectives illustrate below, Roche Colorado has contributed to achieving the Roche Group's voluntary greenhouse gas emissions goals through its own energy conservation and management program.

Laboratories for the 21st Century Partnership Program

In 2008, Roche Colorado became a partner in Laboratories for the 21st Century (Labs21). Labs21, co-sponsored by the United States EPA and the Department of Energy, supports the development of sustainable, high performance, and low-energy laboratories. The goal of Labs21 is to create environmental showcase laboratories that take a "whole-building" approach to laboratory design, focusing on a laboratory's entire energy system rather than specific building components. The Labs21 program provides Roche Colorado with access to technical assistance from nationally recognized experts along with the tools and resources to enhance the company's laboratory designs and to establish performance goals. Periodically Roche Colorado taps into the technical resources at the National Renewable Energy Laboratory (NREL) for design support in its efforts to improve the energy efficiency of company laboratories.

Indian Country School Laboratory Hazard Consultation Program

The Indian Country School Laboratory Hazard Consultation Program was designed by the EPA to help schools identify and manage hazardous chemical risks in their laboratories and to share pollution prevention techniques that help avoid the use of chemicals. Roche Colorado has been engaged in this endeavor with the EPA from the outset, helping to design program procedures and through participation in an initial pilot analysis at a Denver school in 2005. Subsequently, Roche Colorado employees conducted safety surveys and chemical inventories at four tribal schools in Wyoming and participated in the production of a video to recruit other companies across the nation into the Laboratory Hazard Consultation Program. Roche Colorado has received a great deal of recognition for its work on the Laboratory Hazard Consultation Program, including the 2007 24-Karat Gold Challenge Award from the Colorado Department of Public Health and Environment. In addition, five Roche Colorado employees received the 2005 Environmental Achievement Award from the EPA for their personal commitment to the program.

Colorado Environmental Partnership

The Colorado Environmental Partnership (CEP) is a membership organization consisting of representatives from the business community, government agencies, and public interest groups. The CEP hosts forums that provide opportunities for members and subject matter experts to discuss topics of mutual interest, share experiences, and recognize environmental achievements. The Colorado Environmental Partnership also collaborates with organizations that share its goals in hosting public events for business audiences on a range of topics related to environmental performance and sustainability. Roche Colorado has been an active member of CEP, encouraging employees to assume leadership roles and sponsoring some of the forums that the organization hosts.

Environmental Compliance or Regulatory Status Changes

For a short time in 2008, Roche Colorado was subject to the Maximum Achievable Control Technology (MACT) regulations for Miscellaneous Organic Chemical Manufacturing in the production area that produced a catalyst for polyethylene manufacturing. Roche Colorado discontinued manufacturing operations in this affected area of the plant in 2008. There are no plans to resume these activities in the future.

Pollution Prevention Goals and Objectives

As presented in the 2008 Environmental Programs Status Report, Roche Colorado is committed to pursuing long-term pollution prevention goals associated with its energy consumption and “Ecobalance.” This section presents the progress Roche Colorado made in 2008 towards these two goals, including specific program achievements, and plans for further action in 2009-2010.

Long-Term Goal #1: Reduce the energy consumption per Roche Colorado employee by 10 percent from 2005 to 2010.

2008 Update: Total energy consumption decreased by 12.2 percent from 2007 to 2008 and has dropped by 11.7 percent as compared to 2005. However, due to a workforce reduction in 2008, energy consumption per Roche Colorado employee has increased by 4 percent from 2007 to 2008 and 8.1 percent compared to 2005.

Objective 1a: Evaluate and identify metering needs for the main site utilities (electricity, natural gas, water, and high purity nitrogen). The effort will consist of identifying the major consumers of the utility for each building/area and identifying metering equipment in place or needed. This effort eventually will assist Roche Colorado in identifying areas with the greatest potential for utility savings.

Achievement: Natural gas meters were installed in 2007. Thirty (30) new meters were installed on the electricity, steam, compressed air, and nitrogen systems in 2008. No additional metering is planned at this time. This objective is complete.

Objective 1b: Install a building management system (BMS) in an effort to optimize building utility operations.

Achievement: A portion of the “backbone” (hardware/software) of a building management system was installed in several of the production facilities in 2007 and 2008. Additional expansions of the building management system throughout the site are now planned for installation in 2009 and 2010.

Objective 1c: Evaluate installation of boiler controls to improve efficiency and operational control. It is anticipated that these boiler controls could decrease the system’s natural gas consumption by 10 percent.

Achievement: Evaluation complete. A boiler control study was completed in February 2007 which identified several potential system upgrades to improve boiler management and reduce natural gas consumption. These improvements will be implemented as funding allows. This objective is complete.

Objective 1d: Evaluate the reduction of air change rates for existing site ventilation systems and install variable speed drives in new systems. The energy savings impact could be substantial.

Achievement: Roche Colorado will complete an evaluation of the site's warehouse in Q4 2009 to determine the necessary steps for modifying the existing air changes per hour. This information could lead to work in 2010. (See Objective 2b).

Objective 1e: Consider replacing standard V-belt drives on HVAC systems with synchronous belt and sprocket drives to reduce electrical consumption. Energy savings of 5-10 percent have been achieved for a given piece of equipment, depending on the type of equipment driven, operation cycles, and maintenance of existing V-belts.

Achievement: Two HVAC systems have been converted to synchronous belt drives, reducing electrical consumption by an estimated 12,000 kwh/year. Additional units will be converted as production schedules and funding permits. This objective is complete.

Objective 1f: Re-pipe the breathing air system to reduce energy use and maintenance costs. Initial estimates predict energy savings of over 15,000 kWh per year per system.

Achievement: Two of the three breathing air system were re-piped in 2007. The third system was re-piped in 2008. This objective is complete.

Objective 1g: Implement all requirements of the Roche Group Directive K18 – Energy Conservation. (Roche Group directives are corporate wide requirements for addressing a variety of issues where a concerted and consistent approach is desired). Through Directive K18, the Roche Group seeks to adopt a systematic approach to sustained improvement in energy performance throughout all of its world-wide sites. The directive incorporates requirements for establishing an energy conservation process, designing or selecting new energy consuming equipment/systems, and optimizing existing equipment.

Achievement: Implementation of Directive K18 has begun. Employees were trained on the directive's requirements during the Roche Energy Fair in 2008. Evaluation and optimization of existing systems is being addressed by the site energy manager and a newly-formed Energy Conservation Team. The Energy Conservation Team is a cross-functional employee team that meets monthly with the objective of identifying, evaluating, and implementing energy reduction measures and/or related cost savings opportunities. The goal of designing and selecting new equipment and systems to high efficiency standards is

covered by Roche Colorado's project engineering staff and is verified during design reviews. Specific examples of system and equipment improvements in 2008-2009 are detailed in the achievement sections under this energy consumption goal.

Objective 1h: Optimize Post Process operations and maintenance activities to reduce energy consumption.

Achievement: Operational parameters on the thermal oxidizer have been optimized to reduce natural gas consumption. Savings are expected to be at least 2000 decatherms annually. Operation of the aeration basin has also been optimized to reduce electricity consumption. Electrical savings are estimated at 219,000 kWh annually. This objective is complete.

Objective 1i: Identify additional opportunities to reduce utility consumption.

Achievement: Roche Colorado completed an Energy Kaizen exercise in September 2008. In this week-long exercise, a cross-functional employee team identified approximately 75 energy reduction measures (ERMs) for further evaluation. A compressed air audit also was completed by Ingersoll-Rand which identified potential improvements in the compressed air system. The Roche Colorado Energy Conservation Team will evaluate all of these ERMs.

The following objectives supporting long-term goal #1 are new in 2009 and were not listed in the 2008 report:

Objective 1j: Evaluate the reduction of supply pressure on steam, compressed air, and nitrogen utility systems. This measure could reduce the energy that is required to generate the utility as well as reduce the impact of system leaks. (Note: Roche Colorado has an on-going leak detection program to minimize leaks in its nitrogen utility system.)

Objective 1k: Evaluate the possibility of minimizing lab hood flow through the use of sash stops and variable frequency drives. This measure could reduce the energy use necessary to power hood fans.

Objective 1l: Evaluate an adjustment in the operation of administration building doors. This measure could minimize the air exchange between internal and external air, thus reducing energy usage associated with heating and cooling the administration building.

Long-Term Goal #2: Improve the "Ecobalance" in points per employee by 10 percent from 2005 to 2015. (Ecobalance is an internal performance calculation which considers the resource use, waste generation, and emissions to

measure a relative footprint of environmental impact. The Ecobalance calculation weighs different types of emissions, waste, and resources according to defined factors associated with their negative impact on the environment.)

2008 Update: Roche Colorado's Ecobalance decreased (improved) by 14 percent from 2007 to 2008. See Appendix A for more details on the Ecobalance.

Objective 2a: Evaluate all site-wide solvent waste streams and prioritize them based on recovery potential.

Achievement: Roche Colorado is performing evaluations on new processes as well as current processes for solvent recovery potential using both on and off-site opportunities. No new high priority waste streams have been identified for solvent recovery.

Objective 2b: Continue to work towards the elimination of all ozone depleting compounds across the plant site, with 2010 and 2015 deadlines. 2006 activities included meeting with other American Roche sites in order to streamline the approach to achieving this goal and to share information. Additional 2006-2007 milestones included designing the layout of the new system and projecting a rough cost estimate.

Achievement: In progress. 2006 and 2007 milestones met. An additional design effort for new technical solutions was completed in 2008. Additionally, as part of this effort, it is expected that a project focused on the recirculation of air in the warehouse will be completed in 2009 which will lead to an evaluation of reduced air changes per hour which may be implemented in 2010.

Objective 2c: Evaluate offsite recovery of ethyl acetate and hexane waste streams.

Achievement: Evaluation complete. These two solvents form an azeotrope, making them difficult to recover, and a re-sellable product can not be produced in 2009.

Objective 2d: Continuously improve employee education about recycling procedures in an effort to maximize bottle, can, and paper recycling.

Achievement: Continuous. Roche Colorado instituted an enhanced recycling program in 2009 that incorporated new green purchasing opportunities, improved recycling education and receptacles for standard materials, and a new composting program. Training was provided for employees on this enhanced recycling program through the internal monthly newsletter and at pollution prevention training sessions, including an upcoming movie. A preliminary trash survey was conducted in late 2008 to serve as a baseline for progress toward improved recycling. A follow-up survey is planned for later in the fall of 2009.

Objective 2e: Evaluate the re-use of solvent for cleaning the cryogenic condenser instead of sending the stream offsite as waste after a single use. This project could avoid up to 300,000 L of waste generation per year.

Achievement: Complete. The solvent re-use project for the cryogenic condenser was successfully implemented in 2009, greatly reducing the required virgin solvent and minimizing waste generation.

Objective 2f: Develop strategies to reduce solvent utilization in the solid phase synthetic approach to peptides.

Achievement: There was significant progress over the last year (2008-2009). Roche Colorado demonstrated that solvent from one process may be re-used in another process without compromising product quality. This prevents the need to discard otherwise good solvent when changing between processes. The company ran demonstration batches in the Pilot Plant with solvents that were recovered using regenerable adsorbents that remove residual reagents. The data from this demonstration will be filed with the FDA, allowing the use of this technique in the manufacture of one specific product. Roche Colorado also ran demonstration batches in the Pilot Plant to show the acceptability of using an alternative solvent that will increase recoverability and re-use when compared to the solvents currently in use.

Objective 2g: Evaluate the general trash recycling program and identify opportunities for further diversification of recycle streams.

Achievement: See response to 2d.

Objective 2h: Reduce paper usage by managing some records that are currently printed on paper as electronic files.

Achievement: Complete and ongoing. Several documents, including some shift reports, are now handled electronically. Purchasing transactions, which were previously handled on paper, are now handled via email. Other opportunities are still being explored.

Objective 2i: Evaluate an offsite opportunity for recovering additional NMP waste streams for reuse in Roche Colorado's production processes.

Achievement: In process. A solvent recovery contractor is conducting an evaluation study on the feasibility of refining waste NMP to recovered NMP specifications.

Objective 2j: Evaluate offsite recovery of an ethanol waste stream.

Achievement: In process. An ethanol recycling program has been identified. The feasibility of this program is still under evaluation.

Objective 2k: Evaluate unused equipment for potential use to increase segregation capacity for offsite solvent recovery.

Achievement: Evaluation complete. The opportunities identified are not economically feasible at this time but will be considered in the future as production needs change.

The following objectives supporting long-term goal #2 are new in 2009 and were not listed in the 2008 report:

Objective 2l: Assess the possibility of implementing a composting program.

Achievement: Assessment complete. A composting program has been implemented in cooperation with the non-profit recycling organization, EcoCycle, for coffee, filters, and paper towels. Additional composting opportunities are being explored.

Objective 2m: Conduct a Lean 6 Sigma project to optimize the waste water recovery unit in order to minimize the offsite incineration of aqueous waste.

Objective 2n: Implement piping improvements and efficiencies in one manufacturing plant in order to reduce fugitive emission points. This will reduce VOC and HAP air emissions.

Other Pollution Prevention Activities

The following activities represent additional efforts to prevent pollution in 2008 and 2009:

- All employees received the Colorado Air Pollution Control Division's electronic notices of Winter High Pollution "Red" Advisory Notices and Summer Ozone Action Alerts and are encouraged to avoid pollution-causing activities on those days.
- Roche Colorado employees participated in the Boulder County Clean Air Consortium Summer Clean Air Challenge.
- Roche Colorado participates in the Boulder County Facility Managers Network. This network is a self-directed group that brings together facilities managers from major institutions in the county, including municipalities, educational institutions, and large private facilities, to address ways to increase energy and water efficiency, improve indoor air quality, and reduce waste and pollution.
- Roche Colorado employees participated in the Roche corporate "2010 ECompetition." This contest is aimed at encouraging employees to offer innovative solutions for meeting the economic, ecological, and social needs of all Roche sites. The 2010 ECompetition winners will be announced in 2010. Roche Colorado traditionally has been well represented amongst the global winners.
- Roche Colorado employees attended the Annual Roche North American Energy Conservation Summit. Once again, the focus of the Summit was sharing knowledge amongst the sites, discovering and resolving common energy consumption issues, and exploiting the expertise of external resources.
- Roche Colorado employees have been receiving increased encouragement to use alternative transportation options in their work commute through an enhanced education campaign. This campaign includes a new Commute website, which employees can access via the Roche Colorado intranet, featuring the latest information on bus access to Roche Colorado, Eco Pass program benefits, and an on-line message board for transportation related issues. Employees also are receiving regular email messages explaining some of the alternative commute support services Roche Colorado offers, such as the Bike Pool program.

In addition to the projects and plans mentioned above, all Roche Colorado process teams continue to identify and evaluate pollution prevention opportunities in their areas of expertise. The Pollution Prevention Team supports and tracks all pollution prevention efforts at Roche Colorado, with a focus on reducing energy consumption and solvent usage and increasing solvent recovery in production processes.

2008 Summary Tables

2008 Production at Roche Colorado

In 2008, as measured by mass, Roche Colorado decreased the production of bulk pharmaceuticals, pharmaceutical intermediates, and fine chemicals by 6 percent from 2007. Much of this is due to changes in the production mix and the typical per-batch volumes of those materials. The following values are affected both by pollution prevention efforts and by production changes.

Recycling of Raw Materials- Onsite Recycling

The list below compares process requirement and recycling for chemicals that were recycled onsite. The "process requirement" represents the amount of each material needed during the year. The "amount recycled" reflects the reuse of a compound in a process, rather than disposing of it. The "percent recycled" is the percentage of the process requirement that was met using recycled material instead of new raw material. The overall amount recycled in 2008 was down 56 percent from 2007. The amount recycled per unit production was down 53 percent from 2007. These changes were due to production adjustments.

Chemical ¹	Process requirement (lbs)	Amount recycled (lbs)	Percent Recycled
Acetic Acid	242,376	171,529	71%
Acetonitrile	1,021,301	794,452	78%
Ethyl Acetate	473,447	91,985	19%
Hexane	484,714	138,193	29%
HMDS	94,639	31,815	34%
Tetrahydrofuran	138,356	41,678	30%
TOTAL		1,269,652	

¹ Offsite recycling is not included in this list. See table below, "Bulk Liquid Sent Offsite- Waste and Recycling"

Water Usage

The following table details where water was used at Roche Colorado in 2008. The decrease primarily is due to lower production levels in 2008.

Type of Usage	2004 (gallons)	2005 (gallons)	2006 (gallons)	2007 (gallons)	2008 (gallons)
Process	19,053,851	15,855,606	23,069,716	18,508,721	18,711,304
Commercial	3,847,666	2,089,025	2,434,368	2,312,927	1,831,245
Cooling	11,142,777	10,368,224	10,077,216	12,217,516	10,402,551
Irrigation	2,939,706	3,232,145	2,454,700	3,436,000	3,046,900
Total	36,984,000	31,545,000	38,036,000	36,475,164	33,992,000

Wastewater Pretreatment Plant Discharge

Aqueous wastes from production are sent through Roche Colorado's on-site pretreatment facility. Wastewater leaving the system is discharged to the City of Boulder treatment facility. The following table lists the major components of the wastewater that Roche Colorado discharges to the City of Boulder treatment facility:

	Discharge (in Pounds unless otherwise indicated)					
	1995 (Baseline)	2004	2005	2006	2007	2008
Volume, gal	21,035,000	11,929,650	9,026,897	10,875,147	12,493,466	10,681,994
Total Organic Content (TOC)	115,000	34,152	30,762	35,877	19,239	11,136
Chromium	31	13.0	11.6	30.6	14.6	24.7
Copper	4.3	16.6	10.6	11.8	9.6	6.3
Lead	2.8	0.5	0.5	0.9	0.0	0.0
Nickel	4.1	4.4	5.0	9.9	3.7	3.1
Zinc	73	36.0	39.9	67.0	23.2	35.4

ND = Not detected

Bulk Liquid Sent Offsite- Waste Disposal and Recycling

The following values represent the amount of material sent offsite in bulk quantities for recycling, energy recovery, or incineration. The bulk liquid sent offsite per unit product produced increased by 9 percent from 2007 to 2008. This is due to a change in the production mix and the required solvent for each product.

Description	2004	2005	2006	2007	2008
Total bulk liquid sent offsite (kg)	7,798,000	13,529,000	12,362,000	6,409,000	6,538,130
% Change from previous year	-59%	+73%	-9%	-48%	+2%
% Sent offsite for recycling	46%	46%	31%	27%	52%
% Sent offsite for energy recovery	26%	32%	31%	31%	21%

Energy Consumption

Energy Type	2004	2005	2006	2007	2008
Natural Gas (therms)	1,520,290	1,572,120	1,701,750	1,616,910	1,366,410
Electricity (KWH)	27,259,168	27,358,464	28,164,187	26,534,031	24,829,292

Air Emissions

The following table displays Roche Colorado's air emissions, divided into Toxic Release Inventory (TRI) compounds, Hazardous Air Pollutants (HAPs), and Volatile Organic Compounds (VOCs). From 2007 to 2008, overall VOC emissions decreased by 25 percent, and HAP emissions decreased by 46 percent. Changes in production caused some emissions to increase or decrease, and other emissions were reduced by pollution reduction measures.

	1989 (Baseline)	2004	2005	2006	2007	2008
Reported under SARA Title III, Toxic Inventory Report (TRI)⁴ [values in pounds]						
Acetonitrile ^{1,2}	--	2,396	926	3,900	4,500	3,600
Cyclohexane ²	--	--	--	890	--	--
Dimethylformamide ^{1,2}	--	330	377	260	120	90
Hexane ^{1,2}	36,600	11,100	9,100	14,800	10,100	5,700
Methanol ^{1,2}	109,600	7,800	6,200	7,400	5,600	4,300
Methyl chloride ^{1,2}	6,700	--	--	--	--	--
n-Methyl-2-pyrrolidinone ²	--	78	109	340	90	80
Methylene chloride ¹	103,300	6,200	10,500	6,200	12,500	5,100
Toluene ^{1,2}	284,400	7,800	6,900	3,800	2,100	900
Triethylamine ^{1,2}	--	83	193	210	--	--
Acetone ³	242,500	2,075	2,906	4,727	1,600	1,100
Hydrochloric acid ¹	4,000	4,557	1,362	1,133	440	500
Methyl Tert-Butyl Ether ^{1,2}	--	6,100	7,200	4,500	8,100	3,900
Pyridine ²	--	31	44	7	45	30
Total TRI air emissions (tons)	375	23	21	21	22	12
% change from previous year	--	-52%	-9%	0%	+5%	-46%
% change from 1989	--	-94%	-94%	-94%	-94%	-97%

Total HAP emissions (tons)	293	24	22	21	22	12
% change from previous year	--	-49%	-8%	-5%	+5%	-46%
% change from 1989	--	-92%	-92%	-93%	-92%	-96%

Total VOC emissions (tons)	490	32	24	26	20	15
% change from previous year	--	-18%	-25%	+8%	-23%	-25%
% change from 1989	--	-93%	-95%	-95%	-96%	-97%

¹ These chemicals are also classified as HAPs and are included in the HAP total above.

² These chemicals are also classified as VOCs and are included in the VOC total above.

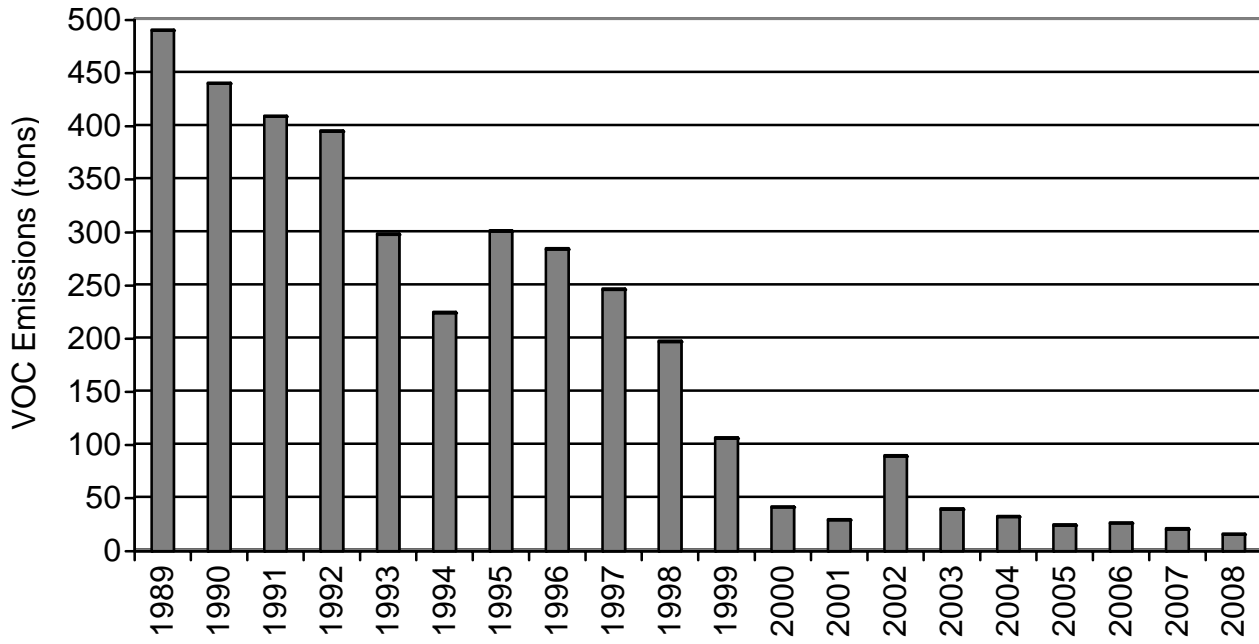
³ Acetone is no longer included in TRI. It is also no longer classified as a VOC. After 1996, it is not included in the VOC total.

⁴ Shaded blocks indicate that TRI reporting for that chemical was not required during that year. They are not included in the TRI emission total.

HAP = Hazardous Air Pollutant

VOC = Volatile Organic Compound

VOC Emissions Trend



General Waste Recycling

In 2008, Roche Colorado recycled a considerable amount of general waste:

- Recycled paper: 39 metric tons (24% of total waste paper)
- Recycled cardboard: 29 metric tons (78% of total waste cardboard)
- Metals: 107 metric tons (88% of total waste metal)
- Wood: 35 metric tons
- Carbon: 3.0 metric tons
- Lamps: 0.2 metric tons
- Batteries: 0.4 metric tons

In 2008, Roche Colorado recycled approximately 150,000 pounds of office paper, shredded documentation, newspaper, cardboard, magazines, and phone books. These efforts helped to save an estimated 1,106 trees from destruction.

Pollution Control Investments and Expenditures

This section summarizes the costs associated with pollution control and waste prevention measures in 2008. It is important to note that the amount of money spent can not be an indicator of a successful pollution prevention program. The best forms of pollution prevention, primarily source reduction, do not always involve significant investments in equipment or other capital expenditures, but rather necessitate mostly employee time and resources for research, development, and implementation of process changes.

Investments	Expenses
\$1,004,000	\$5,288,000

Appendix A

Long Term Goal #2: Ecobalance

Roche Colorado Corporation
2008 Environmental Programs Status Report

Ecobalance Analysis

RCC Ecobalance 2008 according to the method set out by the Swiss Agency for the Environment (BAFU)

Goal: Reduce RCC Ecobalance from 56.17 to 50.56 from 2005 to 2015

Ecofactors (impact values) according to BUWAL (the former Swiss agency for environment, landscape and forestry)

Emission	Factor	Units ¹
NOx	67	UBP/g
SO2	53	UBP/g
VOC	32	UBP/g
NH3	63	UBP/g
HCl	47	UBP/g
PM10 (dust)	110	UBP/g
CO2	0.2	UBP/g
Total Halogenated Hydrocarbons	2000	UBP/g
TOC	18	UBP/g
Phosphate	2000	UBP/g
Nitrogen	69	UBP/g
Heavy metals	200	UBP/g
Waste to Landfill	0.5	UBP/g
Primary Energy	1	UBP/MJ
Raw Material Use	1	UBP/g

Roche Colorado Ecobalance 2007-2008²

Category	Emission	Ecofactors	Units ¹	2007			2008		
				2007 amount (MT)	2007 Impact (=UBP* amount/10 ⁶)	2007 % contribution	2008 amount (MT)	2008 Impact (=UBP* amount/106)	2008 % contribution
Emissions to air (MT)	CO2	0.2	UBP/g	32038	6407.6	20.09%	30335	6067	27.28%
	NOx	67	UBP/g	10	670	2.10%	8	536	2.41%
	SO2	53	UBP/g	0.04	2.12	0.01%	0.04	2.12	0.01%
	VOC	32	UBP/g	28	896	2.81%	17	544	2.45%
	R11 equivalentents	2000	UBP/g	0.139	278	0.87%	0.005	10	0.04%
	PM10 (dust)	110	UBP/g	1	110	0.34%	1	110	0.49%
Emission to water (MT)	TOC	18	UBP/g	9	162	0.51%	5	90	0.40%
	heavy metals	200	UBP/g	0.025	5	0.02%	0.032	6.4	0.03%
	Phosphorus	2000	UBP/g	8.701	17402	54.55%	4.442	8884	39.95%
	Nitrogen (total)	69	UBP/g	8.919	615.411	1.93%	2.291	158.079	0.71%
Landfilled waste	total amount	0.5	UBP/g	337	168.5	0.53%	263	131.5	0.59%
Primary energy (TJ)	total consumption	1	UBP/MJ	270.652	270.652	0.85%	251.655	251.655	1.13%
Raw materials (MT)	total consumption	1	UBP/g	4914	4914	15.40%	5448	5448	24.50%
Total impacts				31901			22239		
Total number of employees				366			296		
Impact/employee				87.16			75.13		

Note 3

Note 4

1 UBP = Umweltbelastungspunkt (environmental impact value)

2 Values are projected in November of the reporting year.

3 The Ecobalance combines several environmental impact factors in an attempt to predict the overall environmental footprint of a plantsite. The increase in Ecobalance from 2005 to 2008 at RCC is primarily due to an increase in the phosphorus in the waste water, which is the result of change in production, and a significant increase in one onsite recycling operation. This water is then further treated by the Boulder Publicly Owned Treatment Works (POTW) before being discharged to Boulder Creek.

4 The 2008 Ecobalance assumes a 30% removal rate of phosphorous by the POTW, and a 75% Nitrogen removal. (source listed below)

Note 4 source: Water Environmental Federation Wastewater Treatment Course Operations Training 2001