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Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Office of Technical Assistance

Case Study No. 46
February 1997

Toxics Use Reduction Case Study

ACUSHNET RUBBER COMPANY ACHIEVES ISO 14001 CERTIFICATION

SUMMARY

Acushnet Rubber Company of New Bedford, Massachusetts is the first company in Massachusetts to obtain certification in ISO 14001, an international standard for environmental management. The company is also the first in the world to become certified in ISO 14001, ISO 9001 (a standard for quality programs), and the American automotive industry's QS-9000 quality standards. According to Jack Bailey, Acushnet's Environmental Health and Safety Director, the company was able to move quickly to achieve ISO 14001 certification by taking advantage of the work previously done in completing a toxics use reduction (TUR) plan.

The International Organization for Standardization's (ISO) 14001 certification is a set of specifications for corporate environmental management systems. The standard requires that companies develop and implement criteria for environmental performance for their facilities, and maintain them by a system of careful monitoring. Meeting the standard is an important factor in international competitiveness because many large corporations require it of suppliers. It is particularly important for participation in the European market.

Because of Acushnet's previous work in toxics use reduction planning, it already had a portion of the information tracking systems required for ISO 14001 certification in place. A Continuous Improvement team, led by Bailey and supported by Environmental Compliance Specialist Nelson Alves, was already active and thus could move rapidly to motivate both management and production workers. The preparation of a TUR plan had already led Acushnet to examine its manufacturing processes and use of toxic chemicals more closely. The company also made use of the assistance services provided by the Commonwealth's Toxics Use Reduction Program. Acushnet worked with the Office of Technical Assistance (OTA), communicated with the Department of Environmental Protection (DEP), and hired an intern through the Toxics Use Reduction Institute (TURI). The company credits these programs with helping it to achieve ISO 14001 certification.

Acushnet's commitment to both strong environmental and quality programs has resulted in an estimated \$2 million in annual savings. The company has realized increased efficiency of operation and substantial reductions in discharges and emissions. It also has reduced water and energy consumption. All of these positive changes occurred during a time when the company had increased its level of productivity to meet a greater demand for its products.

BACKGROUND

Acushnet Rubber Company, which employs 900 people, has been doing business in Massachusetts since 1910. Acushnet designs and manufactures elastomeric products which serve several specific



functions within key industrial markets such as automotive, office products and high performance o-ring seals. Products include windshield wiper blades, brake components and urethane products such as cleaning blades for laser printers and copiers. Processes performed at this facility involve the mixing and curing of rubber compounds, spray coating, tumbling, forming and adhesion of rubber and metal parts.

TOXICS USE REDUCTION PLANNING

Acushnet's ISO 14001 certification fit well into a program that had already resulted in several toxics use reduction planning successes. The company's management has defined the following objectives:

- designing products to minimize environmental, health and safety (EHS) impacts in production, use, reuse and ultimate disposal;
- preventing pollution; and
- involving and communicating with all interested parties including the local community, customers, government agencies, subcontractors and employees.

Acushnet's Environmental Management System includes several procedures which demonstrate the company's pollution prevention philosophy. The EHS department has a procedure in place to ensure that it has the opportunity to assess the environmental impacts of all new raw materials, manufacturing aids, processes, finished products, and other related activities. The criteria for this assessment, as identified in Acushnet's procedural manual, include:

- overall impact on air, water and waste;
- whether the material is TURA listed;
- the relative hazards of the raw material and finished goods;
- the results of a life cycle cost analysis focused on environmental impact.

Before acceptance into the plant, each new material is rated on waste disposal cost, the toxicity of the substance and the total cost of the toxic. In this way, the company avoids introducing any new potential pollutants to the manufacturing process and also avoids any additional disposal and clean-up costs associated with toxic chemicals.

TOXICS USE REDUCTION MODIFICATIONS

Acushnet's ability to quickly and successfully obtain ISO 14001 certification was bolstered by the company's previous work on the environmental impacts of the processes and materials used at the plant.

Acushnet has realized an annual savings of almost \$2 million as a result of toxics use reduction (TUR) and energy and water conservation projects. Some of the company's successful TUR projects include:

- reducing the use of trichloroethylene in degreasing operations through process and equipment improvements and employee training;
- replacing methylene chloride use in machine cleaning with a less toxic alternative;
- switching to a non-CFC mold release for the rubber molding process; and
- installing a new zinc oxide dispensing system which reduces toxic waste and materials handling.

TCE Reductions: Acushnet has reduced the use of trichloroethylene (TCE), used in vapor degreasing operations, from 40,000 lbs in 1989 to less than 10,000 lbs in 1996. The facility has cut usage

of TCE by 50% on a unit of product basis, (i.e., the volume of TCE used per part cleaned was cut in half.) Reductions have been achieved through employee retraining, a series of equipment modifications, and the installation of an on-site batch solvent still. Physical changes to the degreaser included installation of additional refrigerated chiller coils and temperature controls and increased freeboard height. Workers were trained to help reduce TCE emissions by keeping the degreasing unit closed when not in use.

In 1995, Acushnet's Continuous Improvement team took this project one step further, contacting the company's parts vendors regarding the oil being used in part stamping. The team requested that these vendors switch to vanishing oil in their machining operations so that Acushnet could eliminate the use of TCE completely. Acushnet could then introduce parts stamped with this lighter oil directly into the manufacturing process without the need for degreasing. Approximately 80% of the parts Acushnet purchases from vendors are flat metal parts which can be stamped using vanishing oil. The other 20% are cylindrical parts which must be made using heavier oils. Acushnet has incorporated a two-step aqueous cleaner to replace the TCE formerly used to clean cylindrical parts.

The process of convincing vendors to use a different machining oil took 1½ years. In December 1996 the facility eliminated the use of TCE for cleaning parts. The elimination of this cleaning process from Acushnet's facility saves \$20,000 in chemical costs, \$50,000 in labor and \$14,000 in energy costs annually. Additional cost reductions from decreased chemical tracking, training for hazardous materials handling, etc. result in a total annual savings of \$100,000. The cost savings from the TCE minimization and elimination project has helped to fund the ISO 14000 certification effort at Acushnet.

Methylene Chloride Elimination: In 1991, Acushnet was using 30,000 lbs of methylene chloride to clean urethane mixing vessels and purge lines between product batches. This process alone generated 9 tons of emissions annually. Because of the health hazards created by the use of this OSHA suspected carcinogen and its regulation as a hazardous air pollutant and a TURA reportable chemical, Acushnet undertook an extensive investigation to find a less toxic alternative. In 1992, the company switched to dibasic ester (DBE). This material worked so well it dissolved the rubber gaskets in the production equipment being cleaned. Rather than discarding DBE as an unacceptable alternative, Acushnet replaced the existing gaskets with Teflon gaskets manufactured in-house. The company then trained its employees in the use of DBE as a cleaning agent. Additionally, to eliminate unnecessary cleaning, Acushnet rescheduled jobs to end frequent purging of the lines between batches. Acushnet is also vacuum distilling the DBE and it is reused approximately 5 times before it is spent. The distillation unit and the increased cost of the DBE paid for itself within six months. The switch has eliminated 30,000 lbs of methylene chloride and substituted 2,000 lbs of less toxic dibasic ester. This new material produces only about 200 lbs of air emissions per year. As a result of these changes, the volume of cleaner required in this process was reduced by two-thirds, and the dibasic ester substitution is a success.

Mold Release Substitution: In 1990 Acushnet was emitting 10 tons of CFCs through the mold release used on its rubber molding process lines. One of the components of the mold release was 1,1,1 trichloroethane (TCA), a Class I CFC and ozone-depleting substance. The company made the decision to eliminate CFCs from its process because of the threat of the Montreal Protocol's labeling requirement. (Companies would be required to label their products as "manufactured using CFCs" if they were still using ozone-depleting substances in 1994.) Acushnet then switched to a mold release consisting mainly of VOCs. The company was dedicated to reducing the emissions from the plant, so they continued to test lower VOC products. Acushnet now uses a mixture of water and a small volume of isopropyl alcohol as the mold release. By 1995, emissions from the mold release process used were decreased to 2.2 tons. These reductions are even more impressive, considering the fact that business doubled during this time period.

Zinc Oxide Dispensing System: In addition to making multiple process changes at the plant, Acushnet has implemented changes to its materials handling systems. Waste generated during materials handling operations (both solid and hazardous) can be substantial in a high-volume manufacturing plant

such as Acushnet. In 1994, the company purchased an automatic zinc oxide dispensing system which reuses recyclable super sacks instead of 50 pound paper bags. The company has also reduced spillage and potential damage to containers by reducing the amount of materials handling. Acushnet has realized a 5% reduction in TURA reported byproduct as a result of this project. At a cost of \$31,000 this project will pay for itself in less than 4 years.

Water Conservation and Energy Savings Programs: Acushnet has implemented a water conservation program to reduce the use of water from 400 million gallons of water annually to 25 million gallons. The company has conserved water by recirculating its non-contact cooling water and some process water. Additionally the company now recycles and reuses the oil/water mixture used in its hydraulic system. In-line filters have been installed to recover the water in this mixture which is only 2% oil and 98% water. In the course of this conservation program, volumes of oil, grease and zinc discharged to the municipal sewage treatment plant have dropped proportionally. Showers in sanitary facilities have been repiped and flushometers have been installed in toilets to reduce water use in non-manufacturing operations as well. In addition, Acushnet has participated in two "Green Lights" programs designed to help the company conserve energy. In the first program, Acushnet saved 900,000 kilowatt hour- per year in electricity consumption by switching to more energy efficient lights and electric motors. Five years after the initial program, the facility was re-lamped saving another 650,000 kilowatt hours per year.

RESULTS

Reductions Achieved: Acushnet's overall air emissions have decreased from 60 tons per year in 1988 to a projected estimate of less than 10 tons per year in 1997. These reductions result from a variety of projects undertaken at the company. The initiative to eliminate TCE and the change to a low VOC mold release were major contributors to this facility-wide decrease in both toxics use and emissions.

Economics: Acushnet has realized a \$100,000 per year savings through the elimination of TCE. The company's aggressive water and energy conservation programs also have paid off; currently more than \$1,750,000 in sewer and water charges are saved. Annual energy conservation savings of \$124,000 paid for the cost of implementing the energy program in less than 18 months.

While achieving success with its environmental program, Acushnet has also realized substantial growth in its manufacturing operations. The company has doubled its business since 1990 and added 200 jobs in 1996 alone. Acushnet's excellent environmental and economic records will be strongly supported in the coming years with the company's newest certification. The ISO 14001 certification will potentially result in elevated profit margins and increased competitive advantage for the company. Acushnet credits the Massachusetts Office of Technical Assistance and the TURA program for helping to lay the groundwork for ISO 14001 certification.

This case study is one in a series prepared by the Office of Technical Assistance (OTA), a branch of the Massachusetts Executive Office of Environmental Affairs. OTA's mission is to assist industry in reducing the use of toxic chemicals and/or the generation of toxic manufacturing byproducts. Mention of any particular equipment or proprietary technology does not represent an endorsement of these products by the Commonwealth of Massachusetts. This information is available in alternate formats upon request. OTA's confidential, nonregulatory services are available at no charge to Massachusetts businesses and institutions that use toxics. For further information about this or other case studies, or about OTA's technical services, contact: Office of Technical Assistance, 100 Cambridge Street, Room 2109, Boston, Massachusetts 02202; phone #(617)727-3260; fax #(617)727-3827; electronic bulletin board #(617)727-5621; web site URL: <http://www.magnet.state.ma.us/ota>.