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# Reducing Pharmaceutical Pollution
January 2013

Eve Hart

The pharmaceutical industry continues to face challenges in controlling and preventing environmental pollution. The industry is growing at a rapid pace with increased production and accelerated research and development activities. With the industry's expansion, its impact on the environment also is intensifying.

In order to take preventive measures against pharmaceutical pollution, all manufacturing and distribution processes must be carefully monitored and controlled. This requires the use of computerized systems to collect information in real time from potential polluting processes and to report this information to management in order to assist it in making decisions using up-to-date information. These systems must be highly available (four nines and beyond), as a serious lapse in reporting may have a devastating environmental impact should something go wrong during the system's downtime.

According to Rob Dinsmore, availability computing expert, high availability computing can help organizations identify the risks beforehand and take  preventive actions in order to avert the crisis.

## Factors Influencing Growth in the Pharmaceutical Industry

A number of factors are influencing growth in the pharmaceutical industry. They include an increase in the number of diseases, rising living standard of individuals in developed regions of the world, increasing elderly population, introduction of newer and more effective products as a result of extensive research and development practices, increasing consumer awareness, and changing consumer trends. All these factors create a potential opportunity for the pharmaceutical companies to expand their operations in order to cater to the rising demand globally for medications.

## Pharmaceutical Pollution

With the industry's expansion, the impact on the environment is also intensifying. The nature of the pharmaceutical industry is such that it can have a high impact on the environment, and the industry has received significant criticism due to its perceived lack of environmental controls. The production of pharmaceutical products results in high carbon dioxide emissions; and the temperature requirements for production results in the release of ozone-depleting substances, a major concern with global warming.

Regulatory controls require pharmaceutical companies to fulfill their corporate social responsibilities to mitigate the environmental impact of their activities. In order to comply with these regulatory requirements, companies need to be completely aware of all aspects of their processes and their overall impact on the environment. High-availability computing can help companies collect the relevant data.

## Steps Taken by Companies to Address Environmental Impacts

### *Policies and Objectives*

The first step for minimizing the environmental impact of pharmaceutical companies is developing the policies and objectives for reduction of waste, for safety of employees and consumers, and for conservation of the environment. These objectives and policies act as the underlying framework that leads companies towards greener ways to implement their processes.

### *Responsibility for Reducing Environmental Impact*

Another important step is to define the responsibilities of management for implementing and utilizing the practices that lead toward the preservation of the environment. In order to implement policies and objectives effectively, a pharmaceutical company must guarantee that policies are carried out efficiently and within a reasonable time frame. These arrangements may include the assignment of additional responsibilities to management, instructions to staff regarding implementation of policies and objectives, training of staff members, and supervision of staff to ensure that the necessary steps are taken in a timely manner.

### *Active Plans to Prevent Pollution*

Environmental pollution is one of the biggest concerns in the pharmaceutical industry. In order to reduce environmental impact, it is important that companies operating in the industry develop active plans to prevent pollution. Such plans may include adopting cleaner manufacturing practices, recycling materials, using energy-efficient equipment, modifying manufacturing processes to reduce environmental impact, and eliminating wastes and hazardous emissions.

## Role of High-Availability Computing in Reduction of Environmental Impacts

In order to determine the right path to reduce environmental impacts, an organization needs all the available information to make effective decisions. High-availability computing can help a pharmaceutical company collect in real time the relevant information, such as the extent of energy consumption at each step in the manufacturing process, the extent of waste, availability of resources, and many other crucial parameters.

With their increases in production, pharmaceutical companies are taking active steps to modify their manufacturing processes to make them environmentally friendly. One of the most important steps is the utilization of computers for the acquisition of all relevant information. This includes the real-time monitoring of all manufacturing processes. Consequently, the monitoring systems must be highly available so as not to lose any information. The proper management of the electronic records required to support the auditing of environmental management is governed by the U.S. Food and Drug Administration's Code of Federal Regulations Title 21 Part 11 (CFR21/11) entitled, " Electronic Records; Electronic Signatures."

In addition to automating process monitoring, multinational pharmaceutical companies are introducing other innovative practices to reduce waste and to prevent pollution. These practices include the use of Environmental Management Systems (EMSs). Such systems are standardized, and there is uniformity in the application of these practices around the globe. Environmental management practices are governed by international standards agencies such as the International Organization for Standardization (ISO). ISO 14000 is a family of standards to help organizations minimize how their operations (processes, etc.) negatively affect the environment. This specification defines an EMS as "part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, and maintaining the environmental policy."

For large-scale manufacturing facilities, it is also important to have a strong communication system. A strong communication system helps different segments of the organization in sharing information in real time.

## Summary

By following the practices mentioned above, a pharmaceutical company can manage its environmental impact. The company may need to make investments to reduce its environmental impact. In order to assess the feasibility of the investment, management must consider all the relevant factors. They include environmental performance data pertaining to the company, industry-specific information, comparisons to the industry, and feedback from stakeholders.

An added plus is that practices that adversely impact the environment are often wasteful. Reducing a company's environmental footprint may also lead to cost savings. Wasted raw materials and returned goods do not add any value to a company. Effective management of the environmental aspects of a company's operation can improve its bottom line.

High-availability computing can assist management in making decisions that are based on information that is up-to-date and complete.