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Cleaning and the Environment

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In this age of environmental concern individuals are outwardly interested in the healthy state of their surroundings. As populations increase and we become more connected with our environment and each other through global communication, commerce and transportation, that interest also increases. Our desire for a clean environment represents a powerful sense of destiny and hope for the future.

We cannot isolate ourselves from the earth's natural processes and our immediate environment—whether it be natural or built. Every element of our existence is derived from our surroundings. Those elements that constitute our physical form and all living and non-living matter have existed since the earth was formed from the sun nearly 4.6 billion years ago. As a result, the environment provides man with nourishment and energy. Energy emitted from the sun travels millions of miles to earth, where it is stored in plants through photosynthesis. Along with other essential elements, matter then is transferred to man through the food chain.

The Many Benefits of Our Environment

The environment provides many benefits. It heals us and helps us stay healthy. While medicines are derived from the elements of the environment and living organisms, sometimes simply being exposed to sunlight and fresh, clean air makes a difference in how we feel.

Our surroundings educate. Science and technology are the products of observing, studying and using the physical, chemical and biological world around us.

The environment fulfills us when it is used to recreate, apply our sciences and practice our arts. Its natural resources and energy also serve as a unique means of capital, allowing us to run our businesses and the economy. In return, man gives back to the environment all the matter and energy that establishes his existence.

Environmentally Aware

The environmental concern of late has been the extent to which human interaction with natural systems is depleting life-sustaining resources. While valid, this concern is not critical. Indeed, humans are part of the natural world. They possess unique spiritual, social-political and economic needs beyond what nature provides. We must build our own environment to meet those needs. The requirement that environments must support life, good health and human productivity warrants closer examination of how the environment we build and inhabit is organized and managed.

A new environment and economic theory is emerging that recognizes four factors.

The environment is not fully elastic. Past theories surmised that the natural system's supplying potential was infinite.[1] The economic system was free to extract as much as possible from the natural system, which was perceived as vast with unbounded abilities to assimilate diseconomies. Man did not need to clean. Instead, dilution sufficed until it was feasible to relocate to a clean environment. When the consumer population was smaller, relative to size and the carrying capacity of the natural environmental system, this supposition was reasonable. As populations grew, the earth's limitations were more apparent and a non-traditional economic view of the natural system surfaced.[2] The natural system is since perceived as a unique form of economic capital that must be kept clean if we are to sustain a suitable quality of life.[3]

The environment is not an issue, it is a "value." Industrialized societies often perceived the environment as a free good—an expendable, renewable resource. The worst offenders considered the environment a resource with no value in itself. Instead, it was valued as a dumping ground or limitless sink for the diseconomies or wastes of living and industrial operations. This "dumping ground" mentality has been replaced by "green and clean."[4]

The environment—whether natural or built—is a unique form of capital.[5] Capital that produces income and

wealth takes on four forms:[6] financial, human, technological and environmental. Each of these is essential to business and human existence. All goods, services and human health conditions connect with the environment and its quality. Wealth is not readily created in clean space, especially in today's age of high-tech information.

The perception of sustainable development has changed. Previously, sustainable development was narrowly defined as improving the quality of life while living within the carrying capacity of supporting ecosystems. The emerging concept of "sustainability" is, however, rapidly expanding to include environmental, economic and social equity. To this end, there is a growing recognition that these factors be considered simultaneously.[7] The connection between each element increasingly forces changes to the traditional way consumers and businesses operate and relate to each other; how new technologies and products are developed, sold and used; how markets are structured; and how communities develop and grow.

Solving the Environmental Problems

Responsible consumption and conservation are ways to solve environmental problems. It is important to recognize, however, that creating wealth and protecting the environment coexist. The environment cannot be protected by conservation alone. Wealth and surplus must provide the resources—mainly energy—to maintain order and keep objects and places clean. Maintaining the diseconomies that supply and demand causes keeps the biosphere alive and the built environment functioning. Sustaining a healthy economy also is critical to controlling pollution and maintaining a clean and healthy environment. Without wealth there are no resources to manage and control pollutants, especially through cleaning. Additionally, the world's natural resources must be used efficiently and the environments that create wealth must be kept clean.

Before the market demand for effective cleaning services can be understood we must comprehend the utility of cleaning. Supply and demand, not utility directly, determine cleaning's financial value. As consumers recognize that value, the demand for effective cleaning increases. The cost for that cleaning depends on the availability of capable firms to deliver high performance and effective cleaning services. For cleaning to be valued—particularly in a business and economic sense—individuals must be knowledgeable and educated about its usefulness and benefits.

Why Clean?

Clean is a condition of the environment that is free of unwanted matter. Cleaning is the process used to achieve the clean condition. Best viewed as a fundamental environmental management process, cleaning is a systematic, science-based process that puts unwanted matter in its proper place or where it does not cause harm or adverse effects. Understanding the importance and effectiveness of cleaning allows us to fully appreciate its usefulness and the contributions it makes to the quality of life.[8]

Man cannot live and survive amidst waste. A clean environment that includes clean air, water, land and energy, is essential for human existence, conducting business and creating wealth. These components must be sustained through conservation and proper management. Additionally, by-products of human activity should be separated from man at the sanitary level the cleaning process provides.

From the start of civilization, man has been the only species that cleans its environment, albeit for the sake of survival. Other animal life "foul the nest," move out and allow the cycles of nature to produce the waste. As long as man has lived in human settlements, he has been forced to keep his environment in order or clean.[9]

As a result of biological necessity, humans manage their lives by managing their environment. The basic objective of the human settlement/built environment is to define a living space to defend man from his surroundings. In settlements, natural elements, such as rain, snow and dirt, remain outside at a distance. Other living creatures—particularly humans and animals—are kept at bay.

Once human settlements emerged, environmental management systems became necessary for separating inhabitants from their own waste products. Man no longer could strike his tent and move on. Wastes grew and needed to be placed out of the way. Well-designed wells and garbage pits were found at the archeological sites of isolated dwellings and villages. Ancient settlements that survived and evolved into modern built environments sustained life because of the evolving process of environmental management, the center of which is the sanitation revolution and cleaning.[10]

Usually, the cause of adverse environmental effects can be explained or managed. We have better direct control and influence over environments that are closest to us, such as the built environment in which we live and work. These environments can be managed and kept orderly and functional primarily through cleaning.

Cleaning Reduces Environmental Risks, Enables Sanitation

Sanitary conditions are where the risk of adverse health effects is low or acceptable.[11] Effective cleaning reduces exposures to hazardous matter, thereby reducing risks while contributing to a sanitary state.

Indoor environments are readily manageable, unlike ambient environments where the causes of pollution and its control are complex. Built environments can be designed, operated and maintained to suit their inhabitants' needs.

We need to better understand the influence natural and manmade environments have on our health. Once we do, it becomes apparent that effective management, especially in the form of cleaning, is the key to removing unwanted by-products and reducing serious health risks.

Adverse effects, while harder to define, usually are described as conditions we will pay to control or correct, such as health, comfort and property values. On a micro-scale, environmental change is part of natural evolution. Adverse macro-change in built environments due to human activity, however, is preventable through effective management, mainly cleaning.

Five basic methods can be employed to limit pollution to a desirable and safe level: source management, which includes source removal or modification; activity management; design intervention; dilution; and cleaning that includes housekeeping, maintenance and restoration. Cleaning reduces adverse exposure levels and risks by removing problem substances from the environment, thereby reducing or eliminating exposure and effect. Effective cleaning often is the most cost efficient means of managing risk in a built environment.[12]

Clean and Green

Today's talk is all about "green;" that universal symbol of value, respect and concern for the life-sustaining processes and cycles of the natural environment system, of which we all are a part. Those same processes determine our health and quality of life that we, as humans, can adversely affect and alter by our activities if wastes are not managed properly.

Traditionally, the concept of "green" has centered on preventing pollution, minimizing waste and recycling, all to prevent unwanted matter from harming the natural environment. The concepts of clean and "green" are complimentary. Clean is a condition free of unwanted matter, with matter being any substance that has mass and is influenced by gravity. Substances are solids, liquids and gases and can be living or non-living. Matter can be measured and described quantitatively. Conversely, unwanted matter is any substance that obstructs human endeavors, poses a risk or causes an undesirable or adverse effect. Often this type of matter is referred to as pollution, although it goes by other names, such as wastes, soils, dirt, dust, trash and pathogenic microorganisms.

Cleaning is the method used to achieve a clean environment. It can best be viewed as a fundamental environmental management process of putting unwanted matter in its proper place. This ensures an environment that is sustainable and functioning.

Cleaning also is a systematic, science-based process. When applied to environments and environmental sub-compartments, that process is comprised of specifying and understanding the nature and characteristics of what is to be made free of unwanted matter, such as pollution or soils. It also locates, identifies and understands the physical, chemical or biological characteristics of the unwanted matter to be removed; separates and contains the matter prior to removal; transports and removes the unwanted substance from the environment or the object to be cleaned; and properly disposes or repositions the matter so as not to degrade or harm other environments or the natural environmental system.

The question then becomes how clean is clean?

In the tradition of environmental health clean is perceived on three levels: sterilization, disinfection and sanitation. For an environment to be considered sterile it must be 100 percent contamination-free. Sterilization can be achieved, although it is extremely difficult since in routine cleaning items and places—as a rule—are not sterilized.

An environment is considered disinfected if the vast majority (99 percent) of its harmful substances are removed or made safe. The pathogens most threatening to humans also must be eliminated. A disinfected condition only can be achieved with considerable work and energy.

Sanitary environments are cleaned to the extent that general health is protected. Some contamination, however, is present and an acceptable risk level for disease exists. At a minimum, cleaning always must attain a state of "sanitation," since unsanitary conditions pose a likely health risk. Cleaning is designed to rectify any risky conditions. Environments must be cleaned regularly to keep them sanitary. If the health risk has not improved to a sanitary level, cleaning has not been accomplished.

Effective cleaning removes unwanted matter to the greatest or optimum extent possible. Doing so ensures acceptable risk—the reduced probability of an adverse effect for humans, their valuables and the natural environment—from exposure to such matter. By virtue of this definition and its thoughtful design, effective cleaning fully protects the environment.

Michael D. Berry, Ph.D., was chairman of the Science Advisory Council for the Cleaning Industry Research Institute (CIRI) in 2006. The information contained in this article was extracted from Dr. Berry's papers and presentations at CIRI's 2007 Cleaning Science Conference and Symposium. His entire paper and Power Point presentation, as well as those of other symposium presenters, are available at www.ciri-research.org.

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