

ISO 14001 AS IT SERVES THE NATURAL STEP CONDITIONS

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SUMMARY

ISO 14001 serves the Natural Step conditions by providing a needed structure for application of the principles. Oki Semiconductor Manufacturing demonstrated this by becoming certified to ISO 14001 before adding The Natural Step's principles to provide a shared mental model and serve as a compass to guide decisions toward sustainability.

KEY WORDS/PHRASES: Environmental management systems

THE NATURAL STEP

It is widely accepted that mankind's current interaction with nature cannot be sustained. Nature's productive ability is declining, pollution is increasing, and population is growing by 90 million people each year. The potential for our grandchildren to live good lives is diminishing.

The Natural Step is a concept and an organization that was started in Sweden by Dr. Karl-Henrik Robért, a leading pediatric cancer researcher. Dr. Robért recognized that the cancers with which he was dealing weren't due to the children's life choices and that there were limits within which a living cell will properly function. He engaged fifty of Sweden's leading scientists to define a set of basic environmental principles on which everyone could agree. After twenty-one drafts, the four scientifically-based Natural Step system conditions for sustainability were established.

Using a systems view, the conditions recognize that in nature everything is contained and recycled without waste. Indeed, each "waste" is food for something else. This cyclical system has operated for billions of years. Unfortunately, this is not the way our society operates. Our current system is linear, transforming materials and resources into hazardous and non-hazardous waste that is building up in nature. We must find ways to fulfill the equation "waste = food" within our industrial and societal systems.

The four Natural Step system conditions are:

1. *In order for a society to be sustainable, nature's functions and diversity are not systematically subject to increasing concentrations of substances extracted from the*

Earth's crust.

This condition indicates that toxic metals, minerals and greenhouse gasses must not be allowed to build up in nature.

2. *In order for a society to be sustainable, nature's functions and diversity are not systematically subject to increasing concentrations of substances produced by society.*

This condition refers to persistent human-made substances such as DDT and PCBs that can remain in the environment for many years, and accumulate in the tissue of organisms, causing profound effects through the food chain. Freon and other ozone depleting compounds may increase risk of cancer due to added UV radiation.

3. *In order for a society to be sustainable, nature's functions and diversity are not systematically impoverished by physical displacement, over-harvesting or other forms of ecosystem manipulation.*

This conditions calls for us to avoid taking more from the biosphere than can be replenished by natural systems and to not encroach upon nature by destroying the habitat of other species. Society's health and prosperity depends on the continuing capacity of nature to renew itself and rebuild waste into resources.

4. *In a sustainable society, resources are used fairly and efficiently in order to meet basic human needs globally.*

This condition indicates that with six billion people we must be efficient with regard to resource use and waste generation in order to be sustainable. Social stability requires fairness with regard to meeting basic human needs in order to have the cooperation needed to make the changes required to satisfy the first three conditions.

In addition to these system conditions, The Natural Step includes other concepts that are useful. They include backcasting, a process which consists of framing goals with regard to a future desired outcome, and determining short-term decisions and investments needed to achieve that future; systems thinking, understanding and respecting the overall principles of a system; and step-by-step implementation of strategy. It recognizes that if people are trained and given the opportunity they will be able to begin taking first steps by picking "low hanging fruit."

Natural Step can be used to map out a series of steps that will eventually lead to sustainability. It serves as a guide to decision making, it is not prescriptive, and does not judge. It comes without the burden of requiring adopters to implement a specific structure, but without a certain amount of structure it is difficult to implement successfully

I was introduced to The Natural Step during the same month that our company was being certified to the ISO 14001 standard. I could recognize the system conditions as valuable and important, but we had previously had a kick-off meeting presentation that was very effective in mobilizing the workforce. We had been effectively working step-by-step on "low hanging fruit"

for a year or more. This resulted in a six-month headache. I knew there was value in the use of The Natural Step, but I didn't have a clear vision of how to apply the conditions to obtain that value.

ISO 14000

ISO 14000 is an international series of standards that define the required elements of an effective environmental management system (EMS). In addition to the ISO 14001, the standard for an EMS, the standards cover auditing, labeling, environmental performance evaluation, life-cycle assessment and environmental aspects in product standards.

The ISO 14001 standard requires a series of major steps beginning with the establishment of an environmental policy, planning, implementation and operation, checking and corrective action and management reviews. At each management review the entire system, from the environmental policy on, is analyzed for its effectiveness, creating a cyclical system of continuous improvement. The major steps are:

Environmental Policy

Planning

- Environmental Aspects
- Legal and Other
- Objectives & Targets
- Environmental Management Programs

Implementation and Operation

- Structure & Responsibility
- Training, Awareness & Competence
- Communication
- EMS Documentation
- Document Control
- Operational Control
- Emergency Preparedness & Response

Checking and Corrective Action

- Monitoring and Measurement
- Non-conformance and Corrective & Preventive Action
- Records
- EMS Audits, Internal and Third Party

Management Review

Similar to ISO 9000, the standard is very specific as indicated by its use of language such as *"shall establish and maintain a procedure to..."* to express clearly the requirements of each

element. The result is a very structured stable system that effectively manages not only environmental issues, but also the system itself.

THE PROBLEM

Typically when a company starts using The Natural Step, it will prepare an environmental policy, train all people on the system conditions and study its environmental impacts in light of the conditions and begin to try to improve. Ideally it will also use backcasting to develop a long-range vision and implementation plans and establish appropriate indicators and metrics. When these steps are completed, implementation of a sustainability strategy can begin.

The system conditions help people make better decisions when they are used; but without a solid process to systematize the application of the conditions, it is very likely to be haphazard. Too often, when a company goes through the above steps, a year or two later it will find that the initial momentum was lost and that it was just another "management game of the month" to the company's employees. This outcome is not necessary.

ISO 14001 TO THE RESCUE

After several meetings with key people in our organization, it started to become clear that what The Natural Step needed to be used effectively was a structure within which to apply it and that ISO 14001 was exactly that structure. Indeed if a company didn't have an ISO 14001 or similar environmental management system in place it would need to create one to achieve the best long-term results.

The ISO 14001 continuous improvement cycle of policy, planning, implementation and operation, checking and corrective action, and management review provides the framework for a thorough, lasting Natural Step application. The structure serves to ensure the effectiveness of the application of the system conditions. Specific areas where ISO 14001 serves the Natural Step system conditions can be identified by an analysis of the ISO 14001 requirements. Some of these areas are:

Environmental Policy: ISO 14001's requirement for an environmental policy sets the stage to include the Natural Step in the policy, either by direct reference to the system conditions or by reference to a goal of sustainability. This helps bring awareness of the conditions to all readers, both inside and outside the company.

Environmental Aspects: The ISO 14001 requirement to do an aspects and impacts analysis is an ideal framework to systematize the application of the systems conditions to the activities, products and services of the organization. A set of questions for each system condition can be used to establish a uniform ranking criteria that will help better identify the most significant aspects.

Legal and Other: Identification of the Natural Step system conditions as an "other" requirement

that the organization will follow will cement the commitment to the use of the conditions and will also lead the auditors to check on their use thereby further ensuring their effectiveness.

Objectives and Targets: The ISO 14001 requirement to establish objectives and targets creates an excellent opportunity to apply the conditions. Checklists can be created to analyze potential improvements to processes or products with respect to the system conditions before implementation. The use of checklists ensures continuous uniform application of the conditions.

Training, Awareness and Competence: One of the greatest values of The Natural Step is its shared mental model of the situation and the path to improvement. ISO 14001's requirement to train all people on the environmental policy and to be aware of the consequences of their actions sets the perfect opportunity to formalize the exposure of all employees to The Natural Step.

Communications: ISO 14001's requirement to establish a preplanned, structured communication system prepares the way to effectively apply The Natural Step conditions. Internal and external communications plans can be made that will help generate and maintain interest in TNS activities within the company and effectively communicate Natural Step activities and successes to the public.

Records: A very valuable element of ISO 14001 is its requirement to identify records to be retained to show the effectiveness of the management system. Checksheets that are designed to be used at decision points such as aspects and impacts analysis and new process and product decision meetings can systematize the application of the system conditions. These checklists can be retained as records to help ensure and become part of the proof of continuous improvement.

Audits: In my opinion, the auditing requirement of ISO 14001 is valuable because it requires the identification of criteria that can allow the determination of the effectiveness of the system. When The Natural Step is identified as an "Other" requirement, criteria must be identified that can establish its effectiveness.

Management Review: When The Natural Step is identified as an "other" requirement, ISO 14001's management review requirement will regularly bring the effectiveness and continuing suitability of application of the Natural Step to management's attention. This review process will lead to continuous awareness of progress and provide routine opportunities to make improvements.

These points show that ISO 14001 serves as a framework or structure that will not only enable the application of the system conditions, but will also ensure their long-term effectiveness. Even if a company doesn't have a need for an ISO 14001 environmental management system, if it wants to have a continuously effective application of The Natural Step it should develop a "TNS" management system. This system would ideally have all of the elements of an ISO 14001 EMS except operational control, emergency preparedness and response and EMS audits. The rest of the requirements will all serve The Natural Step conditions very well.

EXPERIENCES

At Oki Semiconductor Manufacturing, we started with ISO 14001 and then added the use of The Natural Step conditions into the existing structure. It was convenient to have the structure in place at the time of the integration of The Natural Step, but I feel strongly that it is best to do them together.

The use of The Natural Step combined with the involvement of all employees was an enormous source of energy and ideas for improvements. The understanding of The Natural Step's system conditions for living sustainably with the environment further cemented the commitment of all employees. The existing suggestion and quality circle team systems became avenues through which the majority of employees became active in helping find additional improvements.

People's pride in their company resulted in very high morale. This came especially clear when the plant was closed in 1998 by the parent company. There was no vandalism and many people expressed their positive feelings about having been able to have worked for a company that cares about the environment. An unmeasured benefit is that in 1998 before the plant was closed it was running far ahead of budget by nearly reaching its annual profit goal in the first five months of the year. Improved teamwork and morale is credited with the excellent performance.

I have been discussing the how ISO 14001 serves The Natural Step conditions. It should be pointed out that The Natural Step also serves ISO 14001 by enhancing employee training, and better informed decisions regarding aspects and impacts and processes, products and services.

As an example, before we included The Natural Step in our ISO 14001 EMS, through an objective and target, we replaced one industrially acceptable chemical with another and reduced the usage from 32,000 lbs. per year to 575 lbs. In addition, the resulting hazardous waste was reduced by 57,000 lbs. and had a savings of about \$60,000. We thought that we had a perfect example of "beginning of the pipe" improvement. After learning about The Natural Step and applying its conditions we realized that the new chemical, even in small amounts, might have been more hazardous and persistent in the environment than the original one. A later check confirmed that this was not the case, but we hadn't even asked the question because they were both readily available industrial chemicals.

CONCLUSION

Neither all structure nor all principle is ideal. ISO 14001's structure is an excellent framework for the effective application of The Natural Step principles and the principles help improve training and decisions made within an ISO 14001 EMS. They serve each other very well. Indeed, ISO 14001 is often referred to as a sailboat, carefully constructed with a strong hull, shrouds, sheets and sails that is capable of taking an organization to improved environmental performance, while The Natural Step is referred to as a compass to help guide the boat to the sustainable future we all wish for our grandchildren.