ISO 14001 - EXPERIENCES OF AN EARLY ADOPTER

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SUMMARY

Oki Semiconductor Manufacturing was an early adopter of the ISO 14001 standard. Internal resources were used to develop a system based on the essence of the ISO 14001 requirements which resulted in many economic, organizational and environmental benefits.

KEY WORDS/PHRASES: Benefits, beyond-compliance, environmental management systems, empowerment, The Natural Step

BACKGROUND

Oki Semiconductor Manufacturing was established in 1989 as a subsidiary of Oki Electric Industry Co. Ltd. At that time land was purchased and a manufacturing plant was constructed. There were approximately 135 people employed at the plant producing DRAM and automobile engine control microcontroller integrated circuits. The company was developed with a focus on the customers, quality and employee involvement. Our original long-term goals included quality, on-time delivery, low cost manufacturing, being a good community member, creating an enjoyable workplace and "to be totally responsible to the environment." As OKI's CEO, I took that last goal seriously.

ORIGINAL DRIVERS

In the early years we were in the regulatory compliance mode like most other companies. We had a very good record and were not having spills or fines and were proud of our accomplishments. Still, we had our problems. Our Environmental and Safety Manager was over burdened and working as a "Lone Ranger". She was often at cross purposes with the engineering, production and purchasing managers. They each had things they wanted to do that were not allowed or would affect our fees. In one case, in order to meet his cost saving goals, a purchasing manager wanted to buy certain chemicals in 55 gallon drums instead of 5 gallon containers. This would have changed our status so that it would cost us an additional $20,000 per year in permit fees. Obviously, when people with different agendas are working independently many mistakes can be made.

In January 1995 we decided to implement an ISO 14001 compliant environmental management system to improve the situation. Our primary goals were to improve teamwork by involving all employees in the system and to further reduce our risks of environmental accidents. We had registered our quality system to the ISO 9002 standard in 1994 and found it to be very effective not only in managing quality, but also in managing the system itself. We expected the same to be true for the ISO 14001 standard. Our original goals did not include becoming certified to the standard.

IMPLEMENTATION

At the time we began, the ISO 14001 standard was in final draft form. No one had become certified and no "how-to" books or knowledgeable consultants were available. Our progress was slow because we had to study each sentence and determine the essence of its requirements. Progress was also slow because not all managers had "bought in" to the new initiative. The rate of progress increased significantly when the development of the EMS was given credibility through its inclusion in our objectives management system.

Initially a steering committee including the environmental and safety manager, the president and key senior managers was formed. Working committees were formed that included all managers and key personnel. We began with the development of an environmental policy through a consensus process. The final policy was worded using "We the employees…" to help in the engagement of all people.

The initial aspects and impacts analysis was unexpectedly painful and time consuming. We struggled to determine the criteria and then to get all people to have similar understanding of the unfamiliar terms. A large database was developed that included aspects, impacts and a rating and ranking system. All managers and engineers were involved to do the analysis for their respective areas. This analysis found over 400 aspects from our activities which included manufacturing processes, landscape management, filbert orchard and wheat field farming and even employee commuting. Each aspect was evaluated by its real or possible affects on air, water, and the ground.

It is interesting to note that our significant aspects and their objectives and targets and programs were much more effective than Oregon's Toxic Use Reduction and Hazardous Waste Reduction Act. In some cases the objectives were the same, but when the goal was to achieve "our" objectives and targets" our people were much more highly motivated. This was another demonstration of the effectiveness of getting people involved as opposed to a top down decree.

A kick-off meeting presentation was very effective in mobilizing the workforce. The global environmental situation was explained along with actions we each could take to help reduce the problems. The company's commitment to ISO 14001 compliance was extremely well received, perhaps partially because the people were Oregonians. Through training and the understanding the potential consequences of their actions, the employees accepted the desired feeling of direct responsibility for the company’s environmental performance.

This involvement of all employees was an enormous source of energy and ideas for

improvements. The existing suggestion and quality circle team systems became avenues through which the majority of employees became active in helping find additional improvements. Later a system of understanding from Sweden called The Natural Step was used to create a shared mental model of the problem and a path to improvement. The understanding of The Natural Step's system conditions for living sustainably with the environment further cemented the commitment of the employees.

The Natural Step System Conditions were later formally applied as additional tools in the aspects and impacts analysis and new product and new process analyses. By including them on checklists we were more certain to be considering the appropriate factors when making decisions. As an example, 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. 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 small amounts of the new chemical 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 considered the possibility because they were both readily available industrial chemicals.

RESULTS

The environmental management system was greatly improved by having more structured audits, better documentation, a formal integrated root-cause corrective action system, and appropriate records and internal audits and reviews.

Environmental impacts and risks were reduced significantly through reduced purchases of toxic materials, reduced generation of toxic waste; improved reuse, reclaim and recycling; reduction of solid waste and reduction of the use of natural resources.

Organizational improvements included better teamwork through the involvement of all employees and a heightened awareness of how each person's actions may affect the environment. After training, employees worked diligently to seek out risks, reduce hazardous and solid waste, find ways to reuse or recycle everything possible and to reduce the use of natural resources. Employee volunteer projects saved 3.2M gals of water and reduced solid waste by 75%. One of the programs of the ISO 14001 system resulted in the modification of a process to reduce a high use toxic by approximately 98% and the related toxic waste by 77%, saving nearly $60,000 per year.

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.

Economic benefits included reduced chemical costs, reduced hazardous waste expenses, reduced

analysis costs, and even lowered insurance premiums. The annual savings of $80,000 resulted in a six-month return-on-investment on out of pocket costs for development and certification of the system. A summary of financial benefits is shown in Table 1.

We were very pleased to be ready when much later our parent company required all organizations to become ISO 14001 certified.

CONCLUSION

Like many journeys, the path led to unexpected places. The economic, organizational and environmental benefits listed above are far greater than were ever expected at the beginning. Tremendous power was released by the full involvement of all people in the organization. Environmental impacts were reduced more than expected and the resulting morale and commitment was overwhelming.

A valuable element of the ISO 14001 certification system is third party audits. They act as a conscience for the organization so that no matter how pressing the current business issues may be, the EMS won't be compromised.

A win-win situation was created between the company, the environment and our grandchildren. For me personally the journey led to a deep interest in sustainable development - development that balances economic, social and environmental issues.

Our people threw a great party!

Table 1
Annual Savings

1. Reduction of the usage of hazardous materials			
• Chemicals reduced by	32,000 lbs	100%	$3,400
(Replacement chemical)	575 lbs	+1.8%	-$ 607
• Chemical usage reduction	32,825 gal	22%	$5,051
2. Reduction of the generation of hazardous wastes			
• Overall Reduction from 1996 through 1997	57,417 lbs		$54,427
3. Reduction of non-hazardous solid waste generated			
• Garbage reduced from 416 to 265 cu. yds/year	151 cu. yds	36%	$1,179
4. Reuse, Reclaim and Recycling			
• Recycled/reused, some paid, some sold	42,101 lbs		$3,500
5. Reduction of the use of natural resources			
• Water usage reduced in processes and irrigation	3,600K gallons		$5,600
6. Other Financial Benefits			
• Reduction of Insurance costs, annual			$3,900
• Waste water permit - reduced sampling and reporting			$3,840
Total Tracked Savings			**$80,290**
ISO 14001 development and registration costs			
• Training, temporary help and certification audits			**$38,500**
Net First Year Savings			**$41,790**