

HONDA OF AMERICA MANUFACTURING, INC.: Lean Manufacturing and Environmental Management at Honda

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Wendy Stockley, Environmental Manager for Honda's two Ohio-based automobile manufacturing plants, was about to be visited by Mr. Suzuki, the most senior environmental official from Honda headquarters in Japan. The company had recently taken a strong interest in certification under the new ISO 14000 environmental management standards. Suzuki had asked Stockley to evaluate the environmental practices of the Ohio plants in light of the ISO standards. In particular, he was interested in whether lean production practices, the cornerstone of Honda's high-quality manufacturing operations, were helping to achieve environmental performance or whether they were a hindrance.

Suzuki believed that ISO 14000 would increase in importance as a benchmark used by consumers, governments, and local communities for judging manufacturing plants. If he was correct in his view, understanding whether the Honda production system was complementary or antagonistic to meeting these standards would be critical to many of the company's decisions.

Although the manufacturing plants of other automobile companies in the United States had explicitly designed their environmental policies around federal and state regulations, Honda had tried to design policies that followed from, and were integrated with, its lean production philosophy. These policies were generally more flexible than traditional approaches and focused more on the end goal of efficiency than on meeting regulations. Stockley hoped to find the Honda approach better adapted to the ISO 14000

standards because of these characteristics. To respond to her charge, Stockley had gathered data on the environmental management and performance at the two Ohio-based Honda plants, East Liberty and Marysville. She had also obtained data from her associates on the plants' general productivity, quality performance, and environmental regulatory compliance. Further, she hired consultants to compare Honda's U.S. environmental practices to those of their main U.S. transplant competitor, Toyota.

Background¹

The Honda Motor Company was formed in 1948 by Soichiro Honda to compete in the Japanese motorcycle industry. In 1962, Honda produced its first car, and in 1995 the Honda Group manufactured, sold, and repaired motorcycles, automobiles, and other power products, with automobiles accounting for 78 percent of its sales and motorcycles for 14 percent. In 1995, net sales for all Honda operations were approximately \$40 billion, and the company employed approximately 92,000 people worldwide.²

The first Japanese automaker to establish operations in the United States, Honda began producing motorcycles in America at a plant outside Marysville, Ohio, in 1979. Honda expanded its Marysville facilities in 1983 to produce the Accord automobile. One reason for the move was Honda's policy of "localization," which includes four areas: products, profit, production, and management.³ As a part of this localization policy, Honda attempted to carry out production activities in its major consumer markets. In an acceleration of the company's move to the United States, the Anna engine plant began production of automobile and motorcycle engines in 1985, and Honda opened a second automobile assembly plant in East Liberty, Ohio in 1989. Collectively these plants were referred to as Honda of America, or HAM.⁴ Honda had the largest production volume of any transplant company operating in America.

Honda's main transplant competitor in the United States was Toyota Motor Manufacturing (TMM). For comparison with Honda, at the end of fiscal 1995, net sales for all Toyota operations were more than \$120 billion, and the company employed more than 97,000 people worldwide.⁵ After four years of a successful joint venture with General Motors producing cars in California, TMM began production of the Camry at a new plant in Georgetown, Kentucky, in 1988. It had opened a truck assembly plant in Indiana as well.

Lean Manufacturing at HAM

"Flexible" or "lean" manufacturing was a concept used to describe a Japanese automobile manufacturing system that led to higher quality and productivity than that typically found in mass production manufacturing facilities. At the root of the lean manufacturing approach was a continuous striving to improve quality. For both Honda and Toyota, quality was a driving principle in their operations throughout the world.

As the name suggested, a lean production system was characterized by the leanness of its operations. It was so named because of its focus on efficiency. Operating on a "just-in-time" (JIT) basis, it consisted of low inventory, relatively small production lots, and minimal buffers, allowing instant feedback of problem conditions during production. Continual improvement in striving to eliminate waste was facilitated by tracking and analyzing production data, a task often performed by production personnel.

¹ Much of the information for this study comes from interviews conducted with environmental and other personnel at Honda's Marysville, East Liberty, and Anna Engine facilities and from data supplied by the company. The authors also conducted interviews with Honda personnel in Japan and other countries.

² *Honda Annual Report 1995*.

³ Hideo Sugiura, "How Honda Localizes Its Global Strategy," *Sloan Management Review* (Fall 1990), pp. 77-82.

⁴ Data from *Honda Annual Report*, *ibid.*, and *Ward's Automotive Yearbook*, 1995.

⁵ *Toyota Annual Report 1995* (12-month net sales figures are estimated from 9-month data because of changes in the fiscal year initiated in 1995).

Conceptually, however, JIT manufacturing was only one dimension of lean production. Besides offering a more flexible manufacturing system through the minimization of buffers, lean consisted of work systems that expanded human capabilities. Lean work systems could be characterized by multi-skilled workers, multi-skilled teams, and close supplier relations. Human resource policies in lean operations rewarded creative problem solving and high levels of organizational commitment.

The manufacturing operations at HAM relied on lean management philosophies and work systems found in Honda's Japanese parent corporation. Honda's transition to the United States was influenced by its policy of localization as it sought to combine its company culture with the local culture. This blend was achieved by developing, with the help of both U.S. and Japanese managers, a unique management philosophy for HAM facilities. Although Americanized in some respects, many of the Honda management practices remained intact at HAM. The use of company uniforms, a common cafeteria and parking lot, and in-depth training of Honda's approach to quality fostered a common HAM culture. In addition, HAM recruited selectively to ensure that its employees were well matched to its management philosophies. These human resource policies worked together with flexible technology and JIT supplier relations to create efficient operations in the United States.

ISO 14000

Stockley was concerned that the new ISO 14000 standards, about which Honda headquarters was clearly enthusiastic, would pose a significant burden for her U.S. plants. Upon investigation, the standards appeared to be fairly flexible in their implementation. Nonetheless, issues of concern remained.

ISO 14000, a series of voluntary standards governing environmental management systems, was sponsored by the International Standards Organization (ISO) in Geneva. It was based on ISO 9000, a quality standard that industry had widely accepted. The 14000 series of standards were not specific to any single industry, and they could be applied to manufacturing or service firms.

ISO 14000 was designed to focus on environmental management structures that govern operational processes, rather than focusing on the processes themselves in a proscriptive fashion. This factor allowed for great flexibility in some respects. The standards also required firms to be engaged in environmental management activities such as auditing, employee training, performance evaluation, and life-cycle assessment.

For Honda and most other companies, the ISO 14001 standard was the key document in the 14000 series. It provided a framework for implementing environmental management standards that increased the consistency and proactivity of environmental activities within the organization and increased employee involvement in environmental management. Plant-wide training on environmental issues and the company environmental policy was required. In addition, environmental roles had to be defined for all workers--from bottom to top. A company had to be audited, both internally and by an external entity, against the ISO 14001 standards.

Environmental Policy and Management

In response to mounting political saliency of environmental issues during the early 1990s, Honda strengthened its commitment to environmental protection by addressing environmental issues on a global scale. In 1992, Honda adopted its "Global Environmental Declaration," which provided a vision of how each Honda company should strive to evaluate the environmental impacts of its activities, design products that reduce the impacts of use and disposal, recycle and conserve resources and energy, and promote environmental awareness among employees and society (see Attachment A). It encompassed generally

accepted principles that were found in many other progressive environmental charters like, Agenda 21 (see Attachment B).⁶ In line with company culture, Honda's policy emphasized the responsibility of each associate (production worker) in the design and implementation of environmental activities.

To implement these environmental policies, Honda relied on the text of speeches by the company president and senior managers to guide the formulation of specific, concrete goals at the plant level. Over the past few years, these speeches had increasingly focused on environmental issues. Documents and posters continuously highlighted these statements to motivate the work force toward common environmental goals.

Honda's Environmental Issues and Approach

Because of environmental regulations and public pressure from advocacy groups, automakers must examine and improve their environmental performance. Auto assembly plants are emitters of significant pollution to air, water, and land, and they use large amounts of energy.

Volatile organic compounds (VOCs) emitted from the paint shop are among the most egregious pollutants found at auto assembly plants because of their contribution to urban smog and their potential toxicity. VOCs are released from the application of paint as well as the cleaning of parts with solvents. Honda emitted approximately 1.2 million pounds of toxic air pollutants from its Marysville plant in 1996, most from the paint shop.⁷

The level of VOCs emitted was affected by many factors, including paint composition (high or low solvent content), application technology, transfer efficiency, and VOC abatement technology. Paint was applied with paint guns (which required frequent cleaning with solvents) and was then baked onto the cars in ovens, releasing more VOCs. Most of these emissions were captured in vents and incinerated, but some escaped to the air. Unused spent paint was de-watered into sludge, but some escaped into waste water outflow. Thus contamination of all three media (air, water, and land) resulted from the paint process.

All these emissions were regulated at the federal and/or state levels. The EPA regulated under several laws, and others it enforced directly. Many states had specific environmental regulations of their own, and some of them exceeded federal regulations. Permitting and reporting requirements under the Clean Air Act, Clean Water Act, Resources Conservation and Recovery Act, Superfund Amendments and Reauthorization Act, Safe Drinking Water Act, and other statutes were complex and demanding. The Clean Air Act, for example, contained requirements for automakers, including annual emissions, daily emissions, and paint composition. Transplant auto manufacturers faced this regulatory framework with less experience than domestic manufacturers.

In general, Honda and other transplant companies were more familiar with the Japanese environmental regulatory style, which contrasted with that of the U.S. government. Although Japan's environmental regulations govern air, water, and land pollution, they were more flexible and based more on cooperation than the "command-and-control" regime in the United States. In fact, voluntary agreements may have carried as much weight as formal laws for guiding business practices. For example, the "Keidanren Global Environment Charter" had guided business management with regard to the environment since 1991 (see Attachment C).⁸ This general charter read much like the Honda environmental charter, stressing cooperative, multi-sectoral approaches to the environment that cross organizational boundaries and

⁶ *Agenda 21-Earth Summit: The United Nations Programme of Action from Rio*. United Nations Publications, 1993.

⁷ U.S. Environmental Protection Agency, *Toxics Release Inventory, 1995*.

⁸ The Keidanren is the leading Japanese cross-industry trade association that plays a key role in establishing Japanese informal industrial policy.

hierarchies.

How Lean Contributes to the Environment

Honda had tied its approach to environmental management to its existing manufacturing strategy and operating philosophy of lean production. In this way, it differed from U.S.-based companies, which had traditionally treated environmental concerns as regulatory issues best addressed through either legal means or the adoption of end-of-pipe technologies. Relative to the U.S. companies, Japanese firms had established environmental programs that more extensively integrated environmental with other manufacturing issues. They avoided the creation of separate environmental staffs who focused on regulations and buffered from core activities in the plant. For example, direct representatives to the EPA were designated from each department rather than being centralized in a separate regulatory compliance unit.

Lean manufacturing facilities were dedicated to a waste reduction philosophy that could be readily extended to achieve the goals of environmental protection. Although not comparable to the efficiency levels of their Japanese counterparts, this dedication was evident at HAM, where waste minimization motivated many environmental activities. For example, a waste-reducing focus in the paint shop led to measurable reductions in VOCs (see Attachment D). Because of this approach, end-of-pipe solutions were viewed as a diversion of resources and an option to be taken only as a last resort. One paint manager at HAM explained: “End-of-pipe technologies take a lot of my time and energy while contributing little to productive capacity. I just want to avoid them.”

Honda’s Human Resource Policies and the Environment

Rather than viewing production workers as just an extension of the production system, the lean production system emphasized the abilities of individual workers. Detailed selection criteria for new employees, employee development through training and job rotation, and outlets for creativity such as quality circles, employee development through training and job rotation, and outlets for creativity such as quality circles and suggestion systems served to enhance mutual respect among workers and motivated them to strive for continual improvement. The benefits of these human resource policies were evident in the environmental arena.

The first part of Honda’s human resource policies was an employment process that selected people who fit well with company culture. The next step was employee development, which included training in problem-solving techniques. For skill building, HAM thoroughly trained its workers in a number of problem-solving techniques, such as “root cause” problem analysis involving cause and effect (fishbone) diagrams, Pareto diagrams, and plan-do-check-act (PDCA) as well as countermeasure approaches to check group activity progress repeatedly in a climate of continuous change. At HAM, these problem-solving techniques were often explicitly applied to environmental issues.

Another important aspect of employee training was the development of multiple job skills through cross-training and job rotation. At Honda, this process went one step further as employees maintained broad responsibilities with less reliance on specialists. The Environment, Health and Safety Department (EHSD) staff fulfilled this broad approach to management by making sure that all departments received some cross-training in EHSD issues. One EHSD staff member observed: “Our vision is to look at the long-term payoff, so this cross-training investment ensures that, over time, multiple perspectives will contribute to solving the environmental challenges we face.”

The third aspect of their human resource policies was the mechanisms with which employees could practice problem-solving techniques and other developed skills. Quality circles, basically groups of team

members who studied and offered solutions to various problems, had resulted in a number of improvements in plant environmental performance.

Honda's problem-solving groups, called NH Circles (the NH stands for Now Honda, New Honda, Next Honda), assembled groups of 5-10 associates voluntarily to create solutions to a variety of problems. They conducted "waigaya" ("Y-Gaya"), which were discussion sessions "characterized by free, hierarchy-defying brainstorming of issues and problems."⁹ One NH Circle, "The Waste Reducers," trained shop employees in proper paint booth cleaning procedures and designed new equipment to prevent employees purging solvents directly in the booth water. As a result of these countermeasures, xylene recovery was increased to 95 percent and its use reduced through better cleaning techniques. Another NH circle instituted a cardboard recycling program in 1988.

Suggestion systems also provided an opportunity for employee participation in problem solving. HAM had a standard procedure for their employees' suggestions to be considered; approximately 90 percent of them were used. These suggestion systems were an important source of ideas for environmental improvements at both locations. HAM offered a special annual award for the best environmental health and safety idea. The winner gained extra recognition and more participation points for lifetime "NH points" for which they could later receive bonuses and peer recognition. This scheme motivated employees to participate in these activities and actively to search out areas for improvement.

Information Systems

For employees to identify and solve environmental problems in the workplace, it was essential that the appropriate information be readily available. Lean production involved defect detection that quickly traced every problem, once discovered, to its ultimate cause. Critical to lean production, then, was the recording and posting of key variables to monitor performance and goal achievement for dissemination to all workers, including those in production. This type of recording and posting could also be used to achieve environmental goals.

HAM recorded and charted a wide variety of environmental performance measures, such as energy and materials used for a number of operations, helping to promote the goal of continuous improvement at its plants. In general, associates themselves collected and tracked information, in keeping with the Honda value emphasizing involvement of all workers. The facilities groups in each plant provided energy and water use information to their area managers. The specificity of information depended upon the plants' metering capabilities.

The charted information then became part of a department's quarterly or monthly review for plant management. At that time, any deviation (above or below) expected usage had to be explained to facilitate learning about the departments' processes and future conservation efforts. Similar methods were applied to solid waste and recycling efforts. This information was posted in each department for all associates to monitor and act upon.

Environmental Regulation, Community Groups, and Voluntary Standards

Honda of America worked to develop healthy relations with government regulators and community groups at the local and national levels. In the early 1990s, federal activities prompted HAM managers to establish a more proactive environmental manufacturing strategy. Legislation, including the 1986 Superfund Amendments and Reauthorization Act (SARA), Title III, and the United States Clean Air Act

⁹ McDonald, John G., and Norihiko Shirouzu, "A New Look at the Honda Way: The Reorganization of Honda," Stanford Business School Magazine (March 1992), p. 17.

of 1990, made a closer, more explicit look at the environment seem prudent.¹⁰ The SARA bill generated a public list of toxic emitters, on which Honda's Ohio plants figured prominently. Such national environmental groups as The National Resources Defense Council and Greenpeace took an interest in Honda's activities.¹¹

HAM's environmental leadership addressed its environmental performance in a proactive but distinctly Honda way. After discussing strategy with corporate leadership in Japan, HAM management adopted an approach that would move beyond compliance and address the root causes of their environmental problems, stressing efficiency, flexibility, and creativity. This process was guided by Honda's 1992 "Global approach" that would move beyond compliance and address the root causes of their environmental problems, stressing efficiency, flexibility, and creativity. This process was guided by Honda's 1992 "Global Environmental Declaration." The concrete steps in its implementation included participation in a voluntary environmental program sponsored by the EPA, creating new environmental staffing functions that utilized lean production thinking and adopting an aggressive approach to air emissions reduction that went beyond regulatory minimum requirements.

HAM initiated participation in an EPA-sponsored voluntary emissions reduction initiative called the "33/50 Industrial Toxics Program." Under the program, Honda agreed to reduce toxic emissions 25 percent in 1994 and 50 percent in 1995. Its reasons for participation included investing in ahead-of-the-curve emissions reduction while at the same time fostering productive relationships with regulators and community groups. Honda reduced its air emissions two-thirds (on a per-unit basis) through an expensive investment in new technologies that eliminated emissions of ozone-depleting substances and initiated a switch to an entirely new painting process based on waterborne paints.

Honda's Competition

Historically, firms in the auto industry have taken a keen interest in the activities of their competitors. Honda's main transplant competitor, Toyota, also operated on the basis of lean principles. Concerned over differences between the two firms' approaches to the environment, Stockley hired a consulting firm to research the matter. It found that most of the differences in environmental management seemed to reflect more general organizational differences between the two car makers.

One of the most important differences between Honda and Toyota was the relationship between the transplant facilities and their parent companies. As discussed earlier, Honda's policy of localization encouraged the manufacturing facilities, such as HAM's, to develop indigenous capabilities in the regions where they operate. To set environmental goals and guide environmental activities, a number of committees operated at the corporate and plant levels. At HAM, environmental committees were typically project-oriented; for example the CFC Reduction Committee addressed issues at the company rather than corporate level. This structure resulted in less formal links to corporate offices and decision makers, and as a result, a majority of environmental decisions related to manufacturing were delegated to HAM managers. HAM also had strong ties to recently established U.S. R&D facilities and to a local supplier base, strengthening its indigenous decision making capabilities.

Toyota, by contrast, had a more structured and centralized management structure in order to ensure consistency across all production facilities. Most of the production technical research staff were based in Japan, requiring most technical decisions that influence production parameters to be sent there for approval. This approach significantly limited the autonomy of managers at TMM.

¹⁰ The American Automobile Manufacturers Association set the final tab for compliance with the 1990 Clean Air Act for the auto industry at \$3 billion by the year 2000 (*Ward's Auto World*, 30 [February 1994]:28).

¹¹ Executive News Service, a UPI report, January 16, 1990.

Toyota's structure for environmental management relied upon a similar top-down approach. The Toyota Environment Committee was a corporate-level group that set the global targets outlined in the President's yearly speech. To address environmental issues at a more detailed level, this group was further broken down into vehicles and facilities committees, and from there into smaller committees that address specific issues. In Japan, a facilities committee oversaw a committee on production engineering, which in turn served to set targets and themes for the production facilities in Japan and the United States. To encourage effective communication and monitoring of U.S. environmental issues, Toyota established a Japanese environmental coordinator for its U.S. operations. This position allowed TMM to have some input into environmental discussions that occurred in Japan.

These structural differences between Honda and Toyota were reflected at the plant level as well. HAM, for example, did not have a large specialized engineering staff for environmental activities, requiring a substantial effort to "push down" environmental responsibilities to the associate level. The corporate-level Environmental Health and Safety (EHS) for HAM was also located at Marysville, providing support for the EHS managers at Marysville and East Liberty who were responsible for day-to-day environmental activities. The facility staff in the plants and at the corporate level were responsible for resource-related issues (water and energy).

At TMM, a different approach was evident. The environmental staff consisted of 21 full-time employees working throughout facilities management, environmental quality labs, and environmental affairs. Thus Toyota relied on more environmental specialists and managers. Within each production shop, at least one waste minimization coordinator was held responsible for the implementation of ideas and their dissemination throughout the plant. These shop coordinators met monthly with an environmental waste minimization specialist. This formal control, though limiting flexibility for production workers to implement suggestions, offered a way to retain product and process consistency.

The Challenge

Stockley wanted to present her Japanese colleague with a thoughtful analysis of how Honda's current environmental management activities, rooted in lean production, would fare in the future. A central element of this analysis, she believed, involved how easily they could achieve ISO 14000 certification and how much of a burden this would place on the existing organizational structure.

Stockley also wanted to put her analysis in perspective. Honda, she believed, was already a leader in environmental performance, as the first round of their bench-marking effort against "best in class" suggested. She wanted to compare Honda's situation with that of their main transplant competitor, Toyota, and other leading manufacturers.

Further, Honda's approach might have some long-term consequences globally. These, she thought, had to do both with Honda's flexibility in meeting various local environmental requirements and stakeholder concerns and with the importance of consistency across Honda's global operations.

As Stockley organized her thoughts, she recalled a final point: Although she herself strongly believed that environmental management was critical to Honda's future, and Suzuki clearly believed it was gaining in importance, top management would have to be convinced of the benefits of any changes she proposed in terms of operating efficiency and the bottom line.

Attachment A

HONDA GLOBAL ENVIRONMENTAL DECLARATION:

As a responsible member of society whose task lies in the preservation of the global environment, we will make every effort to contribute to human health and the preservation of the global environment in every phase of our corporate activity.

Only in this way will we be able to ensure a successful future not only for our company but not for the entire world.

Honda should pursue our daily business activities under the following principles:

- We will make efforts to recycle materials and conserve resources and energy at every stage of our products' life cycle — from research, design, production and sales to service and disposal.
- We will make every effort to find appropriate methods to reduce waste and contaminants produced by the use of our products in every stage of the life cycle of these products.
- As both a member of Honda and of society, each associate will focus on the importance of making efforts to preserve human health and the global environment, and will do his or her part to ensure that Honda acts responsibly.
- We will recognize the influence that our corporate activities have on the environment and the societies where we do business, and strive to be considered a valued member of each community.

Adopted by Honda Motor Co., Ltd. 1992

Attachment B

30 Strengthening the role of business and industry

INTRODUCTION

30.1 Business and industry, including transnational corporations, play a crucial role in the social and economic development of a country. A stable policy regime enables and encourages business and industry to operate responsibly and efficiently and to implement longer-term policies. Increasing prosperity, a major goal of the development process, is contributed primarily by the activities of business and industry. Business enterprises, large and small, formal and informal, provide major trading, employment and livelihood opportunities. Business opportunities available to women *are* contributing towards their professional development. strengthening their economic role and transforming social systems. Business and industry, including transnational Corporations, and their representative organizations should be full participants in the implementation and evaluation of activities related to Agenda 21.

30.2 Through more efficient production processes. preventive strategies, cleaner production technologies and procedures throughout the product life cycle, hence minimizing or avoiding wastes, the policies and operations of business and industry, including transnational corporations. can play a major role in reducing impacts on resource use and the environment. Technological innovations, development applications, transfer and the more comprehensive aspects of partnership and cooperation are to a very large extent within die province of business and industry.

30.3 Business and industry, including transnational corporations, should recognize environmental management as among the highest corporate priorities and as a key determinant to sustainable development. Some enlightened leaders of enterprises are already implementing “responsible care” and product stewardship policies and programmes, fostering openness and dialogue with employees and the public and carrying out audits and assessments of compliance. These leaders in business and industry, including transnational corporations. are increasingly taking voluntary initiatives, promoting and implementing self-regulations and greater responsibilities in ensuring their activities have minimal impact on human health and the environment. The regulatory regimes introduced in many countries and the growing consciousness of consumers and the general public and enlightened leaders of business and industry, including transnational corporations, have all contributed to this. A positive contribution of business and industry, including transnational corporations. to sustainable development can increasingly be achieved by using economic instruments such as free market mechanisms in which the prices of goods and services should increasingly reflect the environmental costs of their input, production, use, recycling and disposal subject to country-specific conditions.

30.4 The improvement of production systems through technologies and processes that utilize resources more efficiently and at the same time produce less wastes - achieving more with less - is an important pathway towards sustainability for business and industry. Similarly. facilitating and encouraging inventiveness, competitiveness and voluntary initiatives are necessary for stimulating more varied, efficient and effective options. To address these major requirements and strengthen further the role of business and industry, including transnational corporations, the following two programme are proposed.

PROGRAMME AREAS

A) PROMOTING CLEANER PRODUCTION

BASIS FOR ACTION

30.5 There is increasing recognition that production, technology and management that use resources inefficiently form residues that are not reused, discharge wastes that have adverse impacts on human health and the environment and manufacture products that when used have further impacts and are difficult to recycle, need to be replaced with technologies, good engineering and management practices and know-how that would minimize waste throughout the product life cycle. The concept of cleaner production implies striving for optimal efficiencies at every stage of the product life cycle. A result would be the improvement of the overall competitiveness of the enterprise. The need for a transition towards cleaner production policies was recognized at the UNIDO-organized

ministerial-level Conference on Ecologically Sustainable Industrial Development, held at Copenhagen in October 1991.¹²

OBJECTIVES

30.6 Governments, business and industry, including transnational corporations, should aim to increase the efficiency of resource utilization, including increasing the reuse and recycling of residues, and to reduce the quantity of waste discharge per unit of economic output.

ACTIVITIES

30.7 Governments, business and industry, including transnational corporations, should strengthen partnerships to implement the principles and criteria for sustainable development.

30.8 Governments should identify *and* implement an appropriate mix of economic instruments *and* normative measures such as laws, legislations and standards, in consultation with business *and* industry, including transnational corporations, that will promote the use of cleaner production, with special consideration for small and medium-sized enterprises. Voluntary private initiatives should also be encouraged.

30.9 Governments, business and industry, including transnational corporations, academia and international organizations, should work towards the development and implementation of concepts and methodologies for the internalization of environmental costs into accounting and pricing mechanisms.

30.10 Business and industry, including transnational corporations, should be encouraged:

(a) To report annually on their environmental records, as well as on their use of energy and natural resources:

(b) To adopt and report on the implementation of codes of conduct promoting the best environmental practice, such as the Business Charter on Sustainable Development of the International Chamber of Commerce ICC and the chemical industry's responsible care initiative

30.11 Governments should promote technological and know-how cooperation between enterprises, encompassing identification, assessment, research and development, management marketing and application of cleaner production.

30.12 Industry should incorporate cleaner production policies in its operations and investments, taking also into account its influence on suppliers and consumers.

30.13 Industry and business associations should cooperate with workers and trade unions to continuously improve the knowledge and skills for implementing sustainable development operations.

30.14 Industry and business associations should encourage individual companies to undertake programmes for improved environmental awareness and responsibility at all levels to make these enterprises dedicated to the task of improving environmental performance based on internationally accepted management practices.

30.15 International organizations should increase education, training and awareness activities relating to cleaner production, in collaboration with industry, academia and relevant national and local authorities.

30.16 International and non-governmental organizations, including trade and scientific associations, should strengthen cleaner production information dissemination by expanding existing databases, such as the UNEP International Cleaner Production Clearing House (ICPIC), the UNIDO Industrial and Technological Information Bank (INTIB) and the ICC International Environment Bureau (IEB), and should forge networking of national and international information systems.

B) PROMOTING RESPONSIBLE ENTREPRENEURSHIP

BASIS FOR ACTION

30.17 Entrepreneurship is one of the most important driving forces for innovations, increasing market efficiencies and responding to challenges and opportunities. Small and medium-sized entrepreneurs, in particular, play a very important role in the social and economic development of a country. Often, they are the major means for rural development, increasing off-farm employment and providing the transitional means for improving the livelihoods of women. Responsible entrepreneurship can play a major role in improving the efficiency of resource use, reducing risks and hazards, minimizing wastes and safeguarding environmental qualities.

¹² See A/CONF.151/PC/125.

OBJECTIVES

30.18 The following objectives are proposed:

- (a) To encourage the concept of stewardship in the management and utilization of natural resources by entrepreneurs;
- (b) To increase the number of entrepreneurs engaged in enterprises that subscribe to and implement sustainable development policies.

ACTIVITIES

30.19 Governments should encourage the establishment and operations of sustainably managed enterprises. The mix would include regulatory measures, economic incentives and streamlining of administrative procedures to ensure maximum efficiency in dealing with applications for approval in order to facilitate investment decisions, advice and assistance with information, infrastructural support and stewardship responsibilities.

30.20 Governments should encourage, in cooperation with the private sector, the establishment of venture capital funds for sustainable development projects and programmes.

30.21 In collaboration with business, industry, academia and international organizations, Governments should support training in the environmental aspects of enterprise management. Attention should also be directed towards apprenticeship schemes for youth.

30.22 Business and industry, including transnational corporations, should be encouraged to establish world-wide corporate policies on sustainable development, arrange for environmentally sound technologies to be available to affiliates owned substantially by their parent company in developing countries without extra external charges, encourage overseas affiliates to modify procedures in order to reflect local ecological conditions and share experiences with local authorities, national Governments and international organizations.

30.23 Large business and industry, including transnational corporations, should consider establishing partnership schemes with small and medium-sized enterprises to help facilitate the exchange of experience in managerial skills, market development and technological know-how, where appropriate, with the assistance of international organizations.

30.24 Business and industry should establish national councils for sustainable development and help promote entrepreneurship in the formal and informal sectors. The inclusion of women entrepreneurs should be facilitated.

30.25 Business and industry, including transnational corporations, should increase research and development of environmentally sound technologies and environmental management systems, in collaboration with academia and the scientific/engineering establishment, drawing upon indigenous knowledge where appropriate.

30.26 Business and industry, including transnational corporations, should ensure responsible and ethical management of products and processes from the point of view of health, safety and environmental aspects. Toward this end, business and industry should increase self-regulation, guided by appropriate codes, charters and initiatives integrated into all elements of business planning and decision-making, and fostering openness and dialogue with employees and the public.

30.27 Multilateral and bilateral financial aid institutions should continue to encourage and support small- and medium-scale entrepreneurs engaged in sustainable development activities.

30.28 United Nations organizations and agencies should improve mechanisms for business and industry inputs, policy and strategy formulation processes, to ensure that environmental aspects are strengthened in foreign investment.

30.29 International organizations should increase support for research and development on improving the technological and managerial requirements for sustainable development, in particular for small and medium-sized enterprises in developing countries.

MEANS OF IMPLEMENTATION

FINANCING AND COST EVALUATION

30.30 The activities included under this programme area are mostly changes in the orientation of existing activities and additional costs are not expected to be significant. The cost of activities by Governments and international organizations are already included in other programme areas.

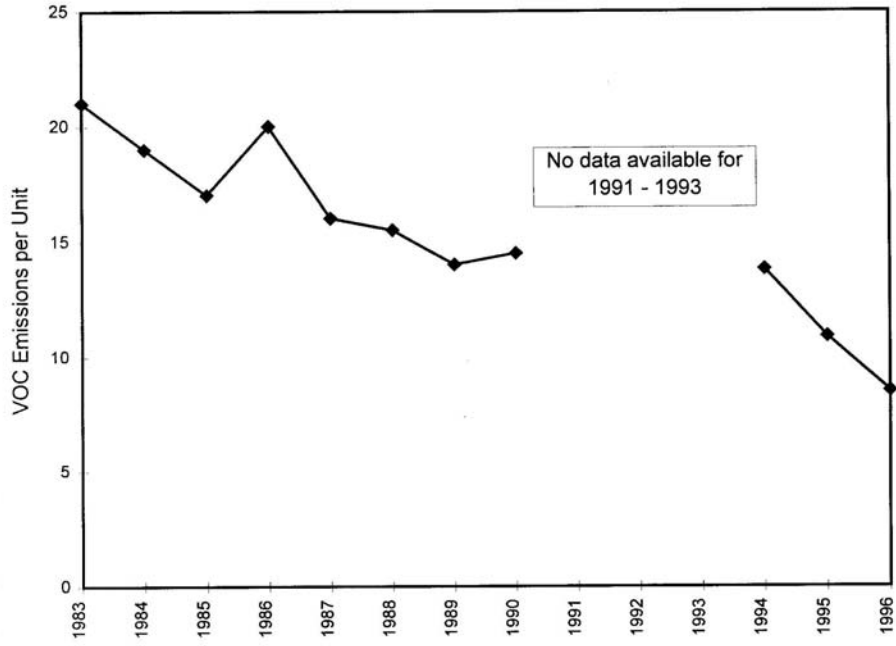
Attachment C

Ten Points Environmental Guidelines **For the Japanese Enterprises Operating Abroad**

1. Establish a constructive attitude toward environmental protection and try to raise complete awareness of the issues among those concerned.
2. Make environmental protection a priority at overseas sites and, as a minimum requirement, abide by the environmental standards of the host country. Apply Japanese standards concerning the management of harmful substances.
3. Conduct a full environmental assessment before starting overseas business operations. After the start of activities, try to collect data, and, if necessary, conduct an assessment.
4. Confer fully with the parties concerned at the operational site and cooperate with them in the transfer and local application of environment-related Japanese technologies and know-how.
5. Establish an environmental management system, including the appointment of staff responsible for environmental control. Also, try to improve qualifications for the necessary personnel.
6. Provide the local community with information on environmental measures on a regular basis.
7. Be sure that when environment-related issues arise, efforts are made to prevent them from developing into social and cultural frictions. Deal with them through scientific and rational discussions.
8. Cooperate in the promotion of the host country's scientific and rational environmental measures.
9. Actively publicize, both at home and abroad, the activities of overseas businesses that reflect our activities on the environmental consideration.
10. Ensure that the home offices of the corporations operating overseas understand the importance of the measures for dealing with environmental issues, as they effect their overseas affiliates. The head office must try to establish a support system that can, for instance, send specialists abroad whenever the need arises.

Attachment D

HONDA at Marysville
VOC Emissions per Unit



HONDA at East Liberty
VOC Emissions per Unit

