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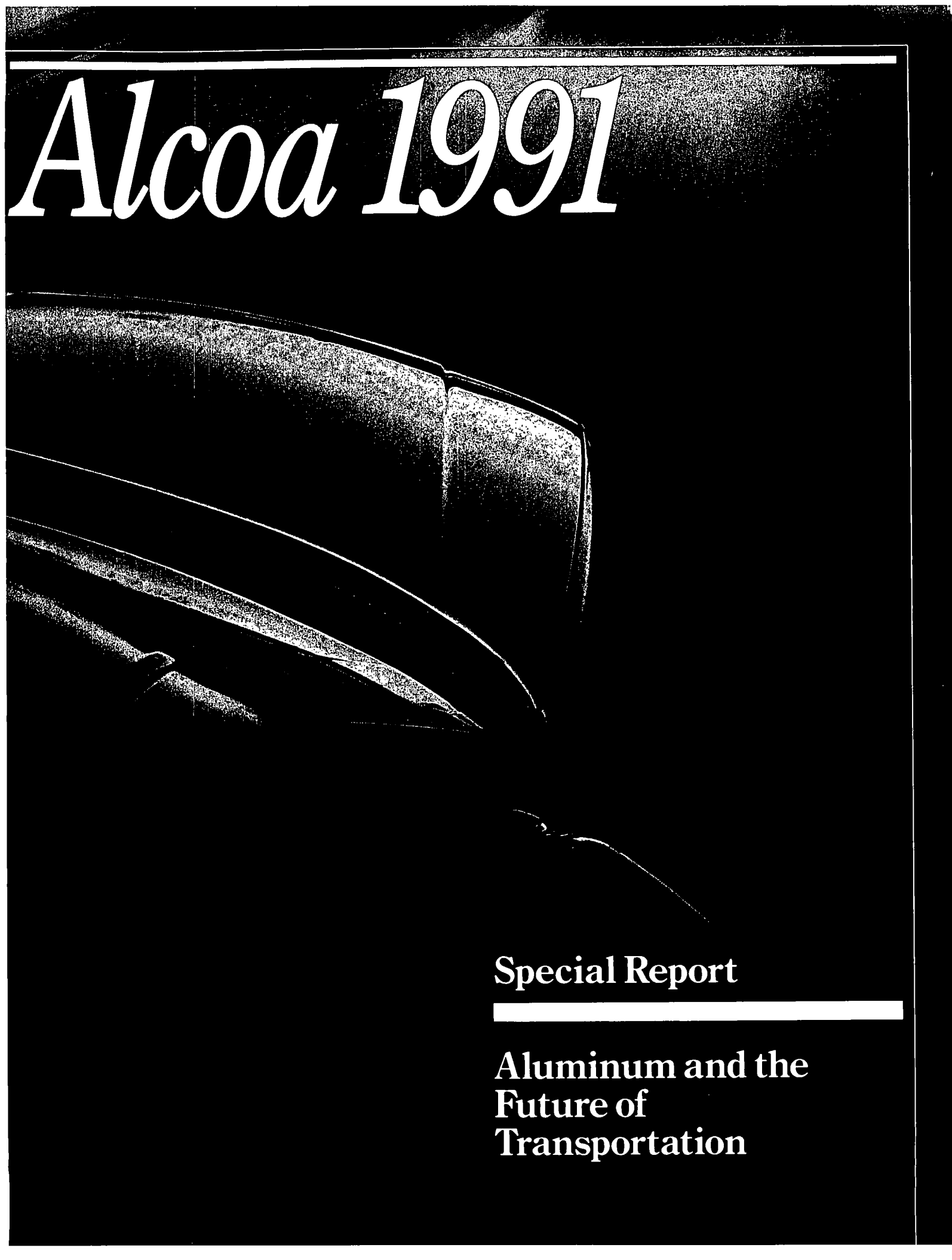
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Alcoa 1991



Special Report

Aluminum and the
Future of
Transportation

ELECTRICITY, EFFICIENCY
and the
ECONOMY

The Experience of Southern California Edison

November 1992

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I. INTRODUCTION

Southern California is facing unprecedented challenges in managing the transportation infrastructure, improving environmental quality, guiding the transition from a defense to a civilian economy, and coping with increasing global competition. New electric technologies are a key to addressing the region's problems. Electric vehicles and mass transit systems, conservation and energy efficiency technologies, electrotechnologies in new industrial applications, and environmental control technologies which reduce emissions and improve manufacturing efficiency can help Southern California meet these challenges. Southern California Edison's programs in these areas may provide a valuable model for energy policies that promote a healthy environment and a strong economy. Specific examples of these programs, their costs and benefits, are provided in Section III.

Edison's experience to date confirms that new electric technologies, such as thermal energy storage, ultraviolet curing, clean-air coatings, and energy-efficient lighting can improve energy efficiency, reduce emissions, and improve product quality, thereby enhancing the region's industrial base. For example, when the Sunshine Biscuit Company was considering an out-of-state move prompted by environmental regulations and increasing costs, Edison demonstrated two state-of-the-art radio frequency dryers on Sunshine's baking production lines, which enabled it to meet air quality regulations, improve product quality and increase shelf life. Operation and maintenance costs were reduced and productivity increased, and Sunshine stayed in Southern California.

During the 1980's, Edison was involved in over \$600 million of renewable energy projects, which set the stage for rapid advancement in wind, solar, biomass and geothermal technologies. Edison has the largest contribution from unconventional renewable resources -- 21 percent of its energy mix -- and more solar, wind, geothermal and biomass than any other utility in the world. The challenge is to continue to improve cost-effectiveness of renewable technologies so they are competitive. Edison has been testing innovative deployment methods such as "green pricing," in which customers voluntarily fund renewable technologies to accelerate their deployment.

At the national level, Edison supports greater public-private cooperation in taking technologies from laboratories to the marketplace in order to create jobs and enhance global competitiveness. For example, Edison supports the National Technology Initiative's (NTI) emphasis on energy-related technologies that focus on energy efficiency, conservation, renewable energy resources and the environment. Edison hopes NTI will forge new government-industry alliances that integrate technology, capital and manufacturing to help the United States regain leadership in science and technology.

Edison programs and technology initiatives include:

Customer Technology Application Center

State-of-the-art technology center providing our residential, commercial and industrial customers with energy-efficient technology solutions.

**Renewable Energy
Resources**

To improve cost effectiveness of solar thermal and photovoltaic, waste-to-energy, wind, and geothermal technologies and explore innovative means of technology deployment such as "green pricing," which would allow customer contributions to accelerate introduction of renewable technologies. Projects include Solar Two, Spheral Solar Photovoltaics, and Municipal Solid Waste Gasification.

Electric Transportation

Develop advanced transportation technologies and infrastructure to accelerate commercialization in our service area. This includes electric vehicles and electric mass transit. An example is CALSTART, which Edison co-founded to launch the electric transportation industry in Southern California.

**CO₂ Emissions
Reduction**

"No regrets" carbon dioxide reduction goal of 20 percent systemwide by 2010, through conservation, energy efficiency improvement, switching from oil to gas fuel, deployment of renewables, and advanced power generation technologies using gas fuel.

**Sustainable Economic
Development**

Identify and support key regional industries which will provide the foundation for achieving long-term economic, environmental, and social goals. Key industry clusters for Southern California include aerospace, electronics, international business services, transportation, apparel, and tourism/entertainment.

**Regional Recovery/
Rebuild L. A.**

Edison has invested \$35 million in Southern California to rebuild after damage caused by the Los Angeles civil disturbances and to help address the underlying causes of the unrest. Key initiatives include job retraining, skills development, and use of energy-efficient technologies in the rebuilding effort.

Energy Efficiency

Use new energy efficiency technologies to reduce consumption growth by 40 percent, or 10 billion kilowatt-hours, by the year 2000.

**Balanced Resource
Strategy**

Meet our resource plan objective of least cost, reliable service, environmental protection and resource diversity through a balanced selection of resources including conservation, renewables, and gas-fired advanced generation technologies.

It is becoming increasingly important for society to focus its resources on developing technologies and policies that benefit both the economy and the environment. Edison is taking swift, decisive action to foster an atmosphere in which prosperity and environmental quality are viewed as inseparable elements of a healthy economic climate, rather than as conflicting issues.

II. POLICY GOALS AND OBJECTIVES

In order to significantly advance goals for energy efficiency, conservation and the environment, we as a nation must make fundamental changes in the ways we produce and use energy. Technology will be the integrating force in realizing these changes. Today, we must foster the development of technologies needed for the next century, not only for use at home, but in developing countries where the most significant energy efficiency and environmental battles are to be fought.

Utilities can play an important role in pursuing public policy goals of energy efficiency, competitiveness in global economics, economic development and environmental improvement. Edison believes that it is important to achieve the following public policy goals:

- Least-cost integrated planning;
- Market approaches rather than command-and-control regulation;
- Broad-based approaches to internalize environmental costs which do not skew competitive relationships or fuel choices; and
- Incentives to encourage introduction of new technologies and infrastructure development.

New technologies are needed for energy efficiency, environmental cleanup, electric generation, and infrastructure for transportation, communications and information systems. These technologies will not only produce greater efficiencies, enhance competitiveness, and reduce environmental impacts, but will also create new industries, jobs, and greater economic vitality at home and abroad. Our challenge and opportunity is to lead the way with these technology changes.

Edison sees the challenge of leading technology change as integral to its business success. Three key principles drive our efforts to achieve these objectives.

- 1. Source fuel efficiency--using the least total amount of energy to perform a given task --is fundamental to competitiveness and economic development.**

Using energy as efficiently as possible is the cornerstone of competitiveness for Edison and its customers. Energy efficiency results in lower costs of doing business and reduced environmental impacts due to energy use. We believe the success of our business depends on the success of our customers. We see electricity as part of the solution to the competitive and environmental challenges our customers face. The source-fuel-efficient solutions we provide to our customers help them become more productive, lower costs, meet environmental regulations and contribute to a strong, growing regional economy. Edison's efforts to promote source-fuel efficiency include our Customer Technology Application Center, electrotechnologies research and development, customer conservation programs and electric transportation development.

2. Achieving environmentally sustainable development requires us to make the transition to cleaner, more efficient technologies.

Edison's service area is one of the world's strongest economic centers, but it faces serious environmental challenges. Balancing continued economic growth and development with environmental improvement requires Edison to make fundamental changes in the way we produce and use energy. The development of advanced energy technologies that can harness renewable resources cost-effectively, use fossil fuels cleanly and efficiently, and transform energy into products and services with minimal waste should be at the top of the nation's energy policy agenda. Edison's efforts in this transition include developing high-efficiency gas-fired repowering and renewable generation technologies, reducing power plant air emissions to Best Available Control Technology levels, adopting an "all-gas" strategy for power plants that can burn oil or gas, and promoting electric transportation.

3. Public-private partnerships offer the most efficient and cost-effective approach for promoting innovative, environmentally sustainable energy technologies.

Edison believes that government and the private sector should work together to set our nation's technological goals and collaboratively pursue those goals through joint funding and cooperative research, development and demonstration programs.

In the late 1970s and early 1980s, Edison worked with the Department of Energy (DOE) and others to develop the Cool Water Coal Gasification Project, which demonstrated how coal could be burned without major environmental consequences. A similar partnership invested in the nation's first solar central receiver power plant--Solar One. Joint efforts such as these point the way for the nation to meet its future energy needs in an environmentally acceptable manner.

Today, with traffic congestion and air quality ranking high on the list of regional quality-of-life concerns, Edison is working in a number of government-industry partnerships to solve these problems. As a founder of CALSTART, a consortium of electric utilities, industry, government, labor and environmental organizations, Edison is helping to establish an advanced electric transportation industry in California. Edison is also leading an industry consortium working with the DOE to develop advanced solar central receiver technology--the Solar Two project--to make solar energy more cost-effective.

Edison is committed to public-private partnerships as a means of developing clean, energy-efficient mass transportation infrastructure and non-polluting electrical-generation technologies that make environmental and economic sense for Southern California and the nation as a whole.

III. EDISON'S PROGRAMS

A. ENERGY EFFICIENCY AND CONSERVATION

1. Background

Edison's experience demonstrates that policies promoting energy efficiency can provide the foundation for progress toward a stronger economy and a healthier environment. Edison's energy-efficiency programs help our customers and the region we serve achieve goals related to conservation, load management, air quality and other environmental issues, and economic development and competitiveness.

Edison recognized the benefits of conservation as early as 1911 with our "Hydraulic Pump Test Program," which to this day helps customers improve pumping efficiency.

Since 1973, Edison has helped its customers save nearly 18 billion kilowatt-hours. At 10 cents per kilowatt-hour, that represents \$180 million dollars in energy savings for our customers. We have accomplished this through a mix of programs: energy audits to identify conservation improvements, incentive rebates to help customers make the investment in energy efficiency and to encourage efficiency in renovations, and education and assistance to the building community to ensure energy efficiency is built into new structures.

Edison's goal is to achieve a savings of 10 billion kilowatt-hours by the year 2000, while reducing carbon dioxide by 38 million tons and oxides of nitrogen by 34,000 tons. Achieving this goal will allow Edison to meet 2,300 of its 4,400 megawatts resource need, through demand side management, from now until the year 2000.

In addition to Edison's Customer Energy Technology research and development programs, the specific energy efficiency and conservation programs to achieve these goals are residential and non-residential new construction, commercial/industrial rebates, commercial/industrial surveys, and residential rebate programs. Energy efficiency is also the cornerstone for Edison's economic development programs. To promote economic recovery that can be sustained over the long term, Southern California must have the most efficient industrial and commercial facilities in the world.

2. Conservation Programs

Edison's 1992 programs for conservation cover a wide range of activities and are estimated to save customers more than 800 million kilowatt-hours annually. Many of these savings will last from 10 to 30 years.

To achieve these savings, Edison will spend \$87 million and customers will invest \$62 million in energy-efficient equipment. The life-cycle savings from these investments are estimated to be \$336 million, more than a 2:1 benefit-to-cost ratio.

Residential Programs

Edison provides residential conservation services to its customers through three primary vehicles: cash incentives to purchase energy-efficient appliances; cash incentives to developers and home builders for constructing homes that are more energy efficient than state standards; and home energy surveys to help customers identify ways to conserve energy.

Edison estimates that we will spend approximately \$37 million on these programs; customers will spend \$20 million to achieve more than 79 million kilowatt-hours of energy conservation per year. The life-cycle value of these energy savings is estimated to be more than \$65 million; they more than pay for themselves.

Commercial, Industrial, and Agricultural Programs

Edison provides three primary vehicles for its commercial, industrial, and agricultural customers: cash incentives for investing in new energy-efficiency equipment; cash incentives for new construction that exceeds state building standards; and audits of facilities that provide customers with recommendations about how to achieve greater energy savings.

Edison will spend approximately \$50 million on these activities; customers will spend an additional \$42 million to install new energy-efficient equipment. The life-cycle savings from incentive programs alone will be approximately \$271 million, nearly a 3:1 savings-to-cost ratio.

Innovative Marketing Approaches to Conservation

Edison is continually looking for new and innovative methods of achieving greater market penetration of new technologies.

Following are three new market approaches to conservation:

The Super Efficient Refrigerator Program, Inc.

The Super Efficient Refrigerator Program, Inc., is a non-profit corporation voluntarily formed and funded by 24 public and private utilities throughout the United States. The mission of the corporation is to advance the technology of super-efficient refrigerator/freezers and to use market forces to bring energy-efficient and environmentally friendly refrigerator/freezers to consumers years ahead of normal market expectations.

The program will award nearly \$30 million to a manufacturer who will design, develop, and distribute more than 300,000 refrigerator/freezers between 1994 and 1997 that are at least 25 percent more efficient than the 1993 federally mandated standards. The refrigerator/freezers will be free of chlorofluorocarbons. The program is anticipated to generate a \$500 million market for super-efficient refrigerator/freezers in North America.

Compact Fluorescent Bulbs

Compact fluorescent bulbs have been in the market for some time, but they haven't achieved any real degree of consumer acceptance. Edison has pioneered a new approach to marketing these bulbs that has dramatically reduced their cost to the consumer.

Edison's compact fluorescent bulb program employs direct manufacturers' incentives to stimulate residential customer demand for the bulbs to replace traditional incandescent light bulbs in homes. Our goal is to generate energy savings of 11 million kilowatt-hours a year from compact fluorescent bulbs.

Edison's program is designed to expand the number of retail locations selling compact fluorescent bulbs in its service territory as well as to widen the distribution of models and styles of these bulbs in the consumer retail distribution channel.

The \$5 manufacturers' incentive translates into retail price reductions of \$8, \$10, and even \$15, causing typical shelf prices to decrease from a range of \$12 to \$27 to a range of \$2.97 to \$11.90 a bulb.

Retail outlets in our territory stocking compact fluorescent bulbs have increased from between 100 and 150 to more than 700. Models and styles available in the marketplace have increased from 10 to 15 to more than 100. And the number of bulbs in the program has grown in the marketplace from our original goal of 150,000 to more than 800,000.

Green Lights

The Green Lights Program, created by the United States Environmental Protection Agency, is an excellent marketing tool to promote energy efficiency to utility customers. The first utility to join the Green Lights Program, Edison has installed energy-efficient lighting systems in our facilities to help demonstrate to our customers the energy-savings potential of today's lighting technologies.

To date, Edison has completed comprehensive lighting audits on 6.8 million square feet of our facilities and we've begun a \$9.6 million retrofit. We project a total

reduction of 22,000 tons of carbon dioxide emissions and 35 million kilowatt-hours annually, once all retrofits are completed in 1992.

The following are some examples of Edison's conservation programs:

a. Energy Management Audits

Edison's 20-year-old energy management audits program involves visits by energy auditors to customers' homes or businesses and provides customers with site-specific recommendations and energy practices.

During 1991, more than 70,000 nonresidential customer contacts resulted in a net energy savings of 250 million kilowatt-hours.

b. Design For Excellence

Design For Excellence offers incentives to builders who use energy-efficient equipment in their new nonresidential buildings, and a competition for architects and engineers who design new construction projects in Edison's service territory. The competition encourages incorporation of energy-efficient technologies into building design. It is cosponsored by the California Energy Commission.

c. Welcome Home

Welcome Home targets the residential construction industry, encouraging the building of homes, condominiums, and apartment buildings that surpass minimum state standards for energy efficiency. Edison pays participating builders an incentive based on the percentage (10, 20, or 30 percent) by which the new homes surpass state energy standards.

Customer Examples

- *A newly constructed, 20,000-square-foot commercial building in Victorville, California, uses state-of-the-art, two-stage evaporative coolers in place of traditional air conditioning. The building also uses daylighting technology and energy-efficient glass to reduce power consumption -- a prime consideration in this desert area prone to extreme temperatures. Edison and the California Energy Commission each played a role in helping design and construct a building that is a full 60 percent more energy-efficient than required by the state.*
- *Edison recommendations resulted in a \$734,219 rebate and an estimated annual savings of 15 million kilowatt-hours for an oil-pumping facility in Long Beach, California. Cross-piping and the removal of pressure restrictions optimized the operation of 18 water injection pumps used for secondary recovery of oil located in two pumping plants.*

- *Edison's lighting and air-conditioning recommendations amounted to lower monthly bills and 19,000 kilowatt-hours saved annually for a church in Whittier, California.*

3. Energy Efficiency Programs

Most of Edison's customers live and do business in the most heavily polluted air basin in the United States. Edison is uniquely positioned to help mitigate air emissions within the basin. By the year 2000, Edison's efforts will result in annual reductions of approximately 3,600 tons of oxides of nitrogen, 2,000 tons of sulfur dioxide, and 6.5 million tons of carbon dioxide.

Edison's customers reflect the diverse economy in Southern California -- our 400,000 commercial and industrial customers range from large manufacturing and aerospace firms such as Hughes Aircraft Company, to small manufacturing operations such as Fender Guitar Company, to independent businesses, such as the corner grocery store and neighborhood dry cleaners.

Our customers' business problems are as diverse as their businesses. And they can't solve all of these problems simply by conserving energy. Edison is identifying and developing innovative electrotechnologies through its Customer Energy Technologies research programs that address many of our customers' problems.

These energy solutions go beyond energy conservation to help customers become more source-fuel-efficient and comply with strict environmental regulations. And, as we solve these problems of energy efficiency and environmental compliance, we're demonstrating that our programs contribute additional benefits to our customers -- including improved product quality, more efficient production processes, and cost savings in labor and raw materials.

Energy efficiency is also an integral component of Edison's competitive performance strategy. Increasing our own system efficiency makes us more cost effective, conserves fuel, and minimizes the environmental impact of our own operations.

a. Foundries and the Metals Industry

When electricity, instead of fuels such as gas, coke, or coal, is used to melt metal, less metal is lost, costs are reduced, and air emissions are reduced.

In response to a fine for over-emitting carbon monoxide, an iron foundry installed two induction furnaces to melt gray and ductile iron. As a result, 2.1 tons per

year of nitrogen oxides were reduced, along with carbon monoxide, and 300 at-risk jobs were saved.

b. Clean Air Coating and the Wood, Metal and Printing Industries

New technologies that use electricity for coating and curing can help customers meet stringent environmental regulations.

When a company that produces carpet sample books changed its printing process to an ultraviolet process, eight tons of volatile organic compounds were eliminated, and 175 at-risk jobs were saved.

c. CFC Replacement Technology and Large Commercial/Industrial Customers

This program phases out use of chlorofluorocarbon (CFC) refrigerants to reduce air emissions, protect the ozone layer, and comply with national and local air quality laws.

Edison conducted a joint feasibility study with a large aerospace company to evaluate non-CFC technology. The study resulted in the company choosing an efficient electric chiller, which eliminated oxides of nitrogen. As a non-CFC chiller, the unit is not harmful to the ozone layer. This decision also resulted in a 40-percent increase in source-fuel efficiency.

d. Replacement of Chemical Water Treatment (Ozonation) and Large Commercial/Industrial Customers

When ozone is used in water treatment systems, water is conserved and energy efficiency is increased. Ozonation also helps companies comply with hazardous waste laws.

A local brewing company installed an ozone water treatment system at its process refrigeration plant, resulting in an energy savings of 119,000 kilowatt-hours a year and a water savings of 5.6 million gallons a year. The company also saved about \$30,000 annually.

e. Industrial Food Processing and the Food Processing Industry

Substitution of direct-fired gas equipment with state-of-the-art electrical food processing equipment is encouraged to reduce air emissions and improve product quality and productivity.

Working with a consumer food company, we helped install radio-frequency ovens on its bake line, which reduced oxides of nitrogen emissions by 640 pounds a year,

source-fuel consumption by 7.5 percent a year, and operation and maintenance costs by \$150,000 a year.

f. Industrial Microwave Applications and the Commercial Cooking Industry

This program facilitates the installment of energy-efficient electric cooking equipment to improve product quality and process control and to reduce air emissions.

When a local school district switched from gas equipment to steam and convection ovens, it eliminated most kitchen heat and reduced air-conditioning load, saving 162 million BTUs annually and reducing oxides of nitrogen by eight tons a year.

g. Energy-Efficient Resources

Edison is committed to developing a resource plan for our future energy needs that takes into consideration cost, energy efficiency, and environmental impact. The repowering of existing generating facilities provides significant benefits to the environment and the Edison system. Repowering is the modification of an existing generating plant, whereby the conventional oil or gas boiler is replaced with a new combustion turbine and heat-recovery steam generator. The result is a generating facility with increased capacity, improved efficiency, and reduced air emissions.

Edison's San Bernardino Repower project at its San Bernardino, California, plant include the following projected benefits:

- *Increase the capacity of the plant from 126 megawatts to 400 megawatts at a relatively low cost.*
- *Increase the efficiency of the existing plant approximately 20 percent while adding new capacity at the improved efficiency. Operating more efficiently will reduce the amount of fuel burned and therefore reduce fuel costs and emissions.*
- *Reduce the emissions of oxides of nitrogen by 700 pounds per day in the first year of operation.*
- *Reduce the emissions of carbon dioxide by about 250,000 tons per year.*
- *Existing plant equipment, land, and infrastructure will be used on the existing site.*

h. Generation Efficiency

In an effort to conserve fuel, reduce air emissions, and make our fossil-fuel-fired generating units as efficient as possible, Edison is always striving for improvement. Examples of two important areas include:

- *Aeroderivative Gas Turbines: The California utilities, with the support of the California Energy Commission, are conducting a project to develop and demonstrate the highest efficiency gas-fired advanced gas-turbine system for utility repowering and capacity expansion by the year 2000. The objective of this program is to accelerate the commercial availability of these environmentally preferred generation options, which hold the promise of cycle efficiencies in the 55 to 60 percent range. These units would use state-of-the-art aeroderivative gas turbine jet engine technology developed by the United States military and couple it with advanced, recuperative Brayton cycle features such as intercooling and reheating. Developing new higher efficiency technologies is costly and time consuming and will require broad support from the national research community and the federal government.*
- *Heat Rate Improvement: At one of our generating units, heat rate improvements were achieved with capital expenditures of \$5 million spread over five years resulting in a \$3 million annual fuel cost savings. Two coal-fired generating plants in which Edison has an interest also experienced heat rate improvements over 5 percent resulting in a fuel savings of \$5 million in 1992.*

i. Transmission and Distribution Efficiency

Similar to Edison's efforts to improve the efficiency of its generating units, Edison research is developing innovative technologies to increase the efficiency of our transmission and distribution system.

- *Network Communications: NetComm is an advanced communication, automation, and electronic metering system. Its backbone is a high-frequency packet radio network through which electronic meters, linked to utility computers, perform a variety of measuring, monitoring, diagnostic, and control functions. Goals through 1993 include cost-effective automation of specific components of the electrical distribution system. Gradually, as the radio network penetrates Edison's service territory, more and more customers can enjoy the benefits of this system. NetComm is also creating a new industry with its many applications in the utility and other industries.*
- *Satellite Communications: Edison is spearheading a joint industry/NASA effort to take advantage of the government's \$500 million Advanced Communications Technology Satellite program. Satellite technology being developed by NASA will triple the capacity of satellites for the same weight in*

orbit. Edison is pioneering the development of an ultra-small antenna satellite terminal for a variety of power-system monitoring and control applications. The technology should create a new \$1 billion United States market for advanced satellite communications. Edison's development of and applications for the new satellite technology will create high-technology jobs for satellite communications manufacturers in California. We believe the joint Edison/NASA program will also provide the United States with a technology lead over Europe and Japan for the next generation of satellites.

- *Composite Towers: A revolutionary new design concept for assembling transmission towers made of composite materials is being researched by Edison in cooperation with San Diego Gas & Electric and a California inventor. If the design proves successful, the traditional steel transmission tower, assembled with metal nuts and bolts and equipped with insulated lines, could eventually become obsolete. The transmission tower of the future could be lighter, easier to assemble, more efficient -- constructed from composite materials made by combining two or more materials that are custom-designed to obtain desired physical characteristics. The towers could be ready for commercial use by 1995 -- giving birth to a new industry, jobs, and opportunities for exporting this technology.*

4. Customer Technology Application Center

Edison created a unique technology application center to work with business and industry, providing education and information to help them become more energy-efficient, meet environmental standards, and remain competitive in Southern California.

Edison's three-year-old, 23,000-square-foot Customer Technology Application Center in Irwindale, California, is the largest, most comprehensive facility of its kind in the nation.

The Technology Center is specifically designed with five state-of-the-art centers designed to showcase energy efficiency and environmental technology, and provides customers the ability to test the technologies on their own products. Within the center we can help customers test various types of coating technologies, microwave and radio-frequency drying, electric and convection cooking, and ultraviolet curing. In addition, we have installed equipment demonstrating energy-efficient lighting, air conditioning, thermal energy storage, window glazing, and heat pumps. These demonstrations help customers, as well as architects and builders, see the energy-efficient technology at work and how it will fit into their operation or building.

Since opening in 1990, the Center has welcomed more than 70,000 visitors for seminars, technology demonstrations, meetings, hearings, and training.

Legislators, regulators, heads of state, foreign dignitaries, the media and other utilities have visited. But the most important visitors have always been our customers.

5. Economic Development Through Energy Efficiency

As a public utility, Edison is uniquely positioned between the public and private sectors, and we have a strong public-service commitment to the region we serve. This positioning has allowed us to be an effective catalyst to improve synergy among government agencies, businesses, academic institutions, community and environmental groups, and other organizations with a strong stake in the region's economic vitality. Through our efforts to promote sustainable economic development, enhance regional competitiveness, and help Los Angeles recover from the recent civil unrest, we have earned a reputation as a knowledgeable and effective participant in promoting a bright future for Southern California based on the integration of economic, environmental, and social goals.

Edison's economic development programs are highly cost-effective due to extensive leveraging of existing resources. Edison has access to valuable information about the regional economy which is largely unavailable elsewhere; experience forecasting the future and planning for it; broad technical expertise; and well-established relationships with community leaders, government agencies, educational institutions, and other key regional entities. Our role in economic development is largely that of an information broker: we provide access to information which improves the competitiveness of our business customers and brings diverse stakeholders together to focus on important regional issues.

a. Industry Development

Edison's economic development efforts are breaking new ground by developing innovative strategies to promote regional development which is sustainable over the long term. Our vision of sustainable economic development is much more sophisticated than conventional approaches to economic development, which often emphasize short-term benefits at the expense of long-term goals.

Edison's economic development strategy comprises a coordinated effort to identify and support industries which can provide a high quality of life for present and future generations of Southern California residents. Manufacturing and related industries are vital to the regional economy because they create much of the demand for the service industries and provide the majority of well-paying middle-class jobs. The low-value service jobs which have replaced many lost manufacturing jobs do not offer sufficient opportunity for economic and social advancement.

Two key principles underlie our strategy for sustainable economic development: efficiency and regional compatibility.

b. Efficiency

For Edison and our customers to prosper, Southern California must have the most efficient industrial and commercial facilities in the world. Edison's economic development programs support this goal.

In forums with the California Public Utilities Commission, environmental groups, economic development organizations, and other interested parties, we are working to expand the concept of energy efficiency. Edison is proposing that the true measure of energy efficiency is not simply the efficiency of the end-use application, nor even the source-fuel efficiency; rather, it is the societal value ultimately produced from each unit of energy consumed. According to this view, energy efficiency would be measured in terms of the economic value (in dollars) produced per kilowatt-hour or BTU.

As a consequence of our expanded view of energy efficiency, we see Edison's role going well beyond promoting high-efficiency lighting and machinery. We are working to encourage high efficiency in all stages of manufacturing and other commercial activities. To compete successfully in the emerging global economy, our service area must have truly world-class facilities and infrastructure.

There is an additional side benefit to the pursuit of greater levels of efficiency: new technologies are developed which not only improve the competitiveness of existing industries, but also support a growing export industry of environmentally- and economically-beneficial technologies and services.

However, efficiency is not sufficient to ensure the success of an industry in Southern California. The industry must also be compatible with the region's fundamental characteristics.

c. Regional Compatibility

Certain industry clusters -- groups of related industries -- have the potential to make significant and lasting contributions to the regional economy in the near future. These industry clusters are capable of providing long-term, high-quality employment opportunities compatible with the region's intrinsic strengths and weaknesses. These industry clusters also have relatively high economic multipliers which would

produce economic growth in many related industries, thereby geometrically increasing benefits such as job creation and tax revenue.

In conjunction with other organizations, Edison has conducted extensive research on the future of the regional economy. This research has identified several promising industry clusters: advanced transportation (which Edison is supporting through CALSTART, described both in section "f" below, and later in section D4); high-value-added apparel design and production; and environmentally-beneficial technologies and services.

d. Enhancing Competitiveness

Edison has developed the Business Retention Program to help our industrial and commercial customers remain competitive in the ever-changing business climate of Southern California. This program capitalizes on Edison's ability to provide the information, expertise, and support that businesses need to compete globally while complying with Southern California's stringent environmental regulations.

Through the Business Retention Program, Edison offers a broad range of services to help businesses remain competitive at their existing locations. These services include energy-efficiency rebates and incentives, alternative electric rates, technical feasibility studies, environmental counseling and technical evaluations, economic and demographic studies, assistance with required permits, industrial process studies, and new technology applications.

In recent years, Southern California has suffered from the loss of many important businesses and industries to other states and countries. The Business Retention Program has proved extremely successful in stemming the tide of industry migration. Some representative cases are described in section "f."

e. Regional Recovery/Rebuild L.A.

The civil disturbances in Los Angeles in April, 1992, severely affected the economy of greater Southern California. Edison's commitment of \$35 million to help the region recover from the damage, and to address the underlying causes of the unrest, powerfully illustrates our commitment as an active member of the community.

Economic development programs are a crucial part of our efforts to promote a strong and lasting recovery in the wake of the riots. Although similar in concept to our overall economic development strategies for the greater region, the Regional Recovery Program takes into account the

unique and urgent needs of the communities most affected by the riots. Through this program, Edison is working collaboratively with other stakeholders to create the kinds of lasting employment opportunities which will generate opportunities for upward social mobility where they are most desperately needed.

f. Economic Development Program Examples

- *Edison played a key role in the creation of CALSTART, a non-profit consortium of more than 40 public and private entities mobilized to create an advanced transportation industry in California. This industry will help solve Southern California's transportation problems, improve regional air quality, create a vital new industry with an emerging global market, create high-quality jobs, and facilitate the transformation of Southern California's defense/aerospace industries to a promising commercial arena. CALSTART has raised over \$20 million in funding from state, federal, and private sources -- representing a leveraging of 40:1 of Edison's early investment of \$500,000.*
- *In July of 1990 Hughes Aircraft Company announced that it was considering relocating its Electron Dynamics Division from Torrance, California to an out-of-state location. California's high-cost business environment was the stated reason for relocating the facility, which employs 1,200 aerospace workers. In mid-July Edison representatives met with Hughes officials to determine what Edison could do to help the firm remain competitive at its Torrance facility. Edison organized a second meeting, held in early August in the office of the mayor of Torrance. In addition to Hughes and Edison executives, participants included the mayor and city manager of Torrance; officials from the California Department of Commerce; and representatives of California State University Dominguez Hills and El Camino Community College. Following this meeting, several technical meetings were held to address specific concerns related to permitting, environmental regulations, energy costs, and employee training. These meetings produced the following results: the city of Torrance agreed to expedite local permitting assistance; Cal State Dominguez Hills and El Camino College agreed to address specific training needs; and the California Department of Commerce agreed to expedite state employee training funds and to provide assistance in resolving environmental permitting issues and acquiring South Coast Air Quality Management District resources to address the technical aspects of chlorofluorocarbon and volatile organic compound (VOC) emissions. Edison also provided technical counseling on VOC reduction and conducted a comprehensive energy survey and rate analysis for the Torrance facility. In October, Hughes held a press conference to announce it was canceling plans to relocate its Electron Dynamics facility. They cited the cooperative response received from the public and private sectors as one of the key factors convincing them to remain in Torrance.*

- *One of the greatest obstacles to addressing Southern California's economic problems is the lack of institutions focusing on issues at the regional level. With more than 90 cities in Los Angeles County alone, collaboration on important regional issues is rare. To help address this need, Edison has created the Team Cities program. This program educates communities about the nature of their similarities and differences to highlight common interests and to replace destructive economic competition with local economic development strategies which are complementary. Still in its early stages, Team Cities has already proven its ability to promote synergy among the diverse communities spread around the expansive region comprising Southern California.*

B. ENVIRONMENT

1. Background

Edison has long been a leader in protecting the environment. Many of our environmental contributions were made decades before the first Earth Day in 1970. Edison has programs to improve air quality, preserve natural resources, protect cultural and marine resources and wildlife habitats, and reduce hazardous wastes. Edison is recognized as a utility industry leader in dealing with the issue of electric and magnetic fields (EMF).

We have been actively engaged in controlling emissions from power plants since the mid-1950s, often setting the pace for the rest of the industry in our efforts to improve air quality. To date, we have expended more than \$3 billion to control air emissions and improve the air quality of the communities we serve.

The South Coast Air Basin, where 14 million people live and work, has the highest levels of air pollution in the nation and exceeds Federal ozone standards by a factor of three. Edison-developed technologies are helping to reduce the cost of compliance and we have made these innovative technologies available to some of our largest industrial customers, 6,000 of which are also affected by strict new air quality regulations.

2. Environmental Programs

a. Urban Air Quality Improvement

Edison is complying with the South Coast Air Quality Management District's (SCAQMD) regulations requiring us to reduce emission rates from natural gas-fired power plants by 85 percent by the end of the decade from levels that were already among the lowest in the country. We are also supporting the SCAQMD's proposal to create a market to

allow the trading of emission reduction credits in a system they call Regional Clean Air Incentive Markets (RECLAIM).

RECLAIM will lead to a phased reduction in stationary source emissions, achieving an overall reduction of 80 to 85 percent of oxides of nitrogen (NOx), oxides of sulfur (SOx), and reactive organic compounds in the Los Angeles Basin by the year 2010.

b. Climate Change Mitigation

Edison, which has pledged to reduce carbon dioxide (CO₂) emissions is convinced that it is possible to reduce CO₂ without increasing costs to our customers. Edison is the first investor-owned utility to include global warming concerns into its Resource Planning.

Edison plans to reduce CO₂ emissions from its power plants by 10 percent over the next decade, and another 10 percent by the year 2010. We will achieve these reductions with a three-pronged approach: cost-effective energy efficiency and conservation programs, greater use of alternative and renewable resources, and repowering of existing generating plants.

c. Natural Gas Fuel Strategy

Edison has adopted a natural gas fuel strategy to help improve the air quality in Southern California by taking measures to become an "all-gas" utility. This represents a proactive step toward complying with the SCAQMD's desire to eliminate oil burning in electric utility boilers in all but very extreme conditions.

Edison's overall strategy is to secure firm gas supply and storage capability to provide for 100 percent coverage during the summer peak period. Edison is participating in pipeline projects to provide access to 400 million cubic feet of gas per day; is negotiating with the Southern California Gas Company for access to storage fields; and signing private gas agreements with Canadian suppliers for 200 cubic feet per day.

d. Hazardous Waste Minimization

Edison has worked with state lawmakers to draft and enact legislation to require source-reduction audits and to reduce the generation of hazardous wastes wherever practicable. The U.S. EPA has established its own "Pollution Prevention" policy that encourages source reduction as part of its Resource Conservation and Recovery Act responsibilities.

Waste minimization options were prioritized and implemented, reducing Edison's volume of wastes by 80%--from 15,000 to 3,000 tons--from 1987 through 1992, saving about \$2.5 million annually.

e. Endangered Species Alert Program

Edison's Endangered Species Alert Program helps employees determine if they may be working within the habitat of an endangered species. It also provides guidance on preventing or minimizing damage or harm to protected plants and animals.

Edison is transferring its nationally recognized Endangered Species Alert Program to the State of California with publication of a book on endangered species for the entire state. Similar in format to Edison's Endangered Species Alert Program manual, this book will contain information on all of the endangered species in California. The book will be sold commercially with all net proceeds being donated to the Nature Conservancy for use in their efforts at endangered species habitat conservation.

f. EMF Programs

Edison has established a leadership role in health and engineering research, innovative public policy options, and a commitment to open and fair communication with Edison employees, customers and regulatory agencies. Edison's new EMF Education Center in Irwindale, California, provides a focal point for these activities.

Edison is a member of the state-wide California EMF Consensus Group which prepared recommendations on research, education and interim policy. We also strongly support the National EMF Program, which is being developed to maximize resources, ensure coordination and provide for independent research.

g. Marine Resource Protection

Edison's long-standing presence in marine sciences gives the company a credible foundation to address important issues that affect Edison operations and our marine environment. A large central data base acquired during past studies provides a valuable resource for both Edison and other researchers. Edison's laboratories continue to offer a unique resource for present and future research and guarantee Edison a say in future decisions on protection and use of ocean resources.

Edison's research scientists have monitored the kelp beds surrounding the San Onofre Nuclear Generating Station's water discharge diffusers for the past 15 years. Edison has worked with state agencies, and will continue to do so, to develop methods and programs to protect and enhance kelp resources.

C. RENEWABLE ENERGY RESOURCES

1. Background

In 1980, Edison became the nation's first electric utility to pledge a resource strategy based on accelerated development of renewable and alternative resources. Today, Edison is the leading purchaser of renewables, which represent 21 percent of our total energy supply. That's twice the national average. In fact, five of Edison's nine resource types are renewable--solar, wind, geothermal, biomass, and hydro. Edison is committed to furthering the environmental and fuel diversity benefits of renewable resources. By 1990, Edison had exceeded the goal it set in 1980 by two and a half times; and we now have more than 5,000 MW of renewable/alternative generation capacity.

Edison is focusing its efforts in the 1990s on driving down costs to make renewables more cost-competitive. This will be accomplished through joint partnerships with renewable technology developers, other utilities, and state/federal governments to advance the most promising renewable technologies.

As electric utilities plan to meet growing electricity demands in the next several decades, it is vitally important that federal funds be directed toward driving down the cost of renewables. Edison supports a national energy strategy that provides broad-based funding for renewables--funding that enables sustainable and cost-effective expansion of renewable technologies without hurting competitive relationships. While the United States has focused its financial resources on basic laboratory research, it has not traditionally followed through by moving the technology from the laboratory to the market. Commercial demonstration projects are expensive, and investment partners are essential to help reduce the economic risk for these projects. DOE funding can play an important role by helping reduce the economic risk assumed by private investors.

2. Renewable Programs

a. Solar Central Receivers

The Solar Two Project is an excellent example of how renewable energy research can work to drive down the cost of "green" technologies. Together with the DOE, Edison and several other project participants will transform and modify the Solar One plant in the Mojave Desert. Solar One, tested and evaluated for six years (1982 through 1988), demonstrated the technical feasibility of the solar central receiver concept.

Instead of collecting solar energy to heat water and produce steam, Solar Two will transfer heat to molten salt, which is easily stored, making the electric energy available at any time of the day. Solar Two will produce no air emissions and use no fossil fuels. Previous tests of the molten-salt technology indicate that it is efficient as well as safe.

Major site construction for the plant is scheduled to start in 1994. DOE is funding half of the \$39 million conversion cost; Edison personnel will manage the project with ten other participants providing financial and technical assistance. It is anticipated that the Solar Two six-year program will verify the molten salt technology as the most efficient and cost-effective utility-scale method of converting solar energy to dispatchable electric energy. This technology should be commercially available by the year 2000.

b. Photovoltaics

Edison has been involved in a series of efforts to accelerate the development of cost-effective and environmentally clean photovoltaic systems. In April of 1991, Edison and Texas Instruments (TI) jointly announced a patented breakthrough in making solar energy technology affordable to consumers. The new Edison/TI technology, known as spheral solar, surpasses existing photovoltaic processes by combining inexpensive materials with low-cost manufacturing equipment to reduce the cost of solar-cell energy by as much as 80 percent. The spheral solar technology's metallurgical-grade silicon--considered virtually unusable until now--costs about \$1 a pound.

Placing spheral solar cells atop homes and businesses in the utility's metropolitan areas will have lasting benefits to Edison's customers and to operations. A summer daytime-peaking utility like Edison can benefit from PVs by shaving the demand peak to reduce fossil-fuel consumption, and by reducing high marginal costs associated with running peak-time generation. PVs will also help reduce the need for new power plant construction. During the course of one year, 100 square feet of cells on the south-facing roof of a home can produce about 2,000 kilowatt hours of electricity. That's roughly one-third the annual energy consumption in an average Southern California residence. Also, summer is the worst time of year for air pollution in Southern California. Photovoltaics provide peak-time energy without producing any pollution.

In addition to being an emission-free source of generation, widespread PV deployment offers other benefits: reduced need for new transmission lines; reduced power losses associated with transmission and distribution, yielding greater energy efficiency for utilities and customers; and deferred utility distribution equipment changeouts, and lengthened equipment lifetimes.

Edison and TI hope to mass-produce spherical solar photovoltaics as early as 1994.

c. Municipal Solid Waste

Edison firmly believes that gasification technology is the best environmental and economic solution to municipal waste disposal in Southern California. Recycling and waste reduction are both required to diminish the problem, yet there will always be some waste requiring ultimate disposal. The waste gasification concept enhances recycling while converting the remainder of the waste into a clean fuel gas.

Edison began development of the first commercial-scale municipal waste gasification facility in the world in 1991. Construction could begin in 1994, with operation of the demonstration phase to begin in 1995. The demonstration project will be known as the AIR (Advanced Integrated Recycling) Project.

Fluidized bed gasification will provide an environmentally acceptable solution to other waste disposal alternatives in Southern California. The use of the product gas in electrical generation equipment will not increase air emissions. If a commercial gasification project can be sited adjacent to a utility boiler, the low-Btu gas can be used to displace natural gas and result in overall NO_x reduction.

d. Wind

Edison pioneered wind energy research and development and was the nation's first investor-owned utility to solicit proposals from private developers for commercial wind parks. Today, Edison uses more wind energy than any other utility, totaling 900 MW of installed generation capacity, producing 1.5 billion kilowatt hours of electricity annually.

Edison is collaborating with Pacific Gas & Electric and other utilities in a wind power project to develop a high-performance wind-turbine generator that will be built and tested over the next three years. The test program will focus on increasing reliability, while reducing installation, operation and maintenance costs.

e. Geothermal

Edison's geothermal efforts during the 1980s included developing geothermal resources in the Imperial Valley, Owens Valley, Dixie Valley and Mammoth Lakes areas of California. Edison's 10 MW Brawley geothermal plant in the Imperial Valley was the nation's first generating system to operate on steam produced from highly saline

fluids. Edison's contract with Mexico's Commission Federal de Electricidad, to purchase 70 MW of electricity generated at the Cerro Prieto geothermal fields in Mexico, marked the first international sale of geothermal power in North America. Today, Edison purchases geothermal power from 22 projects totaling 700 MW and producing 6.2 billion kilowatt-hours of electricity annually.

Geothermal research in the 1990s will concentrate on three areas: improving advanced turbine designs, processes and materials; expanding the utilization of more plentiful low-temperature geothermal resources; and increasing the span of operability so plants can run reliably and efficiently at varying levels of production.

D. ELECTRIC TRANSPORTATION

1. Background

Two of the most critical problems facing Southern California are air pollution and traffic congestion. Both threaten the quality of life and the economic vitality of the entire region. About two-thirds of smog-causing pollution in urban areas results from heavy dependence on gasoline-and diesel-powered automobiles, trucks and buses for moving people and goods on crowded freeways and streets. One of Edison's corporate goals -- to work with our customers, communities, and governments to achieve integrated solutions to our challenges of economic competitiveness, environmental quality and the overall quality of life in our service territory -- is exemplified in the Company's reputation as a national leader in electric transportation.

2. Environment

Electric vehicles (EVs) have no tailpipe emissions, and are 97 percent cleaner than gasoline-powered vehicles even considering emissions from power plants that provide the electricity used to fuel EVs, according to the California Air Resources Board. Edison can provide electricity for 1 to 2 million EVs, charging in off-peak hours, with excess generating capacity. Nationwide, utilities can power more than 40 million EVs with existing generating capacity.

Advanced inter- and intra-city transit options fueled by electricity also offer the opportunity to reduce air pollution generated by mobile sources by 98 percent. Magnetically levitated and other high-speed trains can reduce emissions from airplanes and ground transportation, without adding significantly to travel time, and while improving customer comfort and convenience. Diesel-powered freight and passenger rail systems are one of the most significant single sources of smog-causing pollutants in Southern California. The South Coast Air Quality Management District has a goal of reducing emissions from these heavy-rail systems 90 percent by 2010. Electrification is the only proven technology capable of achieving such reductions.

Edison has a number of programs aimed at helping customers comply with environmental regulations in the most cost-effective and efficient manner. By helping to commercialize electric transportation technologies, Edison is helping to ensure that the burden of compliance is shared by mobile and stationary sources. Edison conducts research on various electric transportation options and coordinates joint research efforts with other utilities, government agencies, universities and others; examines the impact electric transportation will have on the Edison system and develops programs to minimize those impacts; and communicates the benefits of electric transportation to policy makers, industry organizations, the media and our customers.

As the EV fuel supplier in the region where electric vehicles will see initial widespread commercial introduction, Edison is in a unique position to help bring about technological and life-style changes to ensure EVs are successful and well-received. With Edison's leadership and commitment, the benefits of ultra-clean, highly efficient, non-petroleum-powered electric transportation can be greatly facilitated.

3. Energy Efficiency/Energy Security

The primary focus of Edison's electric transportation efforts has been air quality. The energy efficiency and energy security benefits associated with electric transportation, however, are significant.

According to a recent study prepared for Edison by researchers at the University of California at Davis, first-generation EVs are about as energy efficient as a gasoline-powered car on a full fuel-cycle basis. As they move into commercial production volumes, EVs are expected to be 15 to 20 percent *more* energy efficient than gasoline-powered vehicles. EVs will also allow Edison to maximize the efficiency of its generating, transmission and distribution facilities by off-peak charging. Edison has an aggressive program to evaluate EV charging patterns and develop programs to encourage customers to charge their EVs in a way that minimizes impacts on the Edison system. As EVs become commercially successful, Edison will develop programs to encourage customers to purchase more energy-efficient EVs and drive their vehicles in a more efficient manner, much like traditional demand-side-management programs would treat any major electric appliance.

Electric transit options also provide tremendous promise for improvements in energy efficiency. According to the High Speed Rail Association, high-speed rail is twice as energy efficient as automobiles and four times more efficient than airplanes. Intra-city light-rail transit is 25 percent more efficient than automobiles.

Perhaps even more important are the energy security benefits of electric transportation technologies. Oil consumption in the transportation sector accounts for 63 percent of the total oil consumed in the United States, and oil imports from the Persian Gulf have tripled since 1983. Nationwide, only 4 percent of electricity is generated by oil, and that percentage is declining. Existing electric generating capacity within the United States is

sufficient to support more than 40 million EVs (roughly 22 percent of the vehicles registered). Replacing 22 percent of today's gasoline-powered cars with EVs could result in savings of nearly one million barrels of oil per day.

Electric transportation is the best option the United States has both to decrease reliance on foreign sources of energy and increase fuel diversity in the transportation sector. Because electricity can be produced by any number of primary sources of energy -- including renewables -- electric transportation options are the true "flex-fuel" technologies.

In May 1992, the United States Advanced Battery Consortium (USABC) announced the award of a three-year, \$18.5 million contract to Ovonic Battery Company for development of a nickel-metal hydride battery for electric vehicles. While still at a very early stage of development, this battery offers the potential of long life, high power, and at least twice the range of currently available lead-acid batteries. The contract calls for a full-size, 40-kilowatt-hour, production-ready EV battery by mid-1995. The USABC, of which Edison is a founding member, plans to announce additional battery development contracts in the near future.

4. Economic Development

EVs have been cited by a Congressionally mandated panel as one of 22 "National Critical Technologies" that should be pursued to achieve the country's economic and energy security goals. Several recent studies suggest that converting defense/aerospace industries to developing commercial-scale advanced electric-vehicle and transit industries would allow the United States to take advantage of a highly skilled workforce to establish new domestic industries and penetrate world markets. Edison is playing a key role in enlisting the necessary resources to assure a smooth transition from a largely defense-dependent economy to a thriving new manufacturing base for clean electric transportation technologies, through public-private partnerships such as CALSTART -- a consortium of more than 40 California-based companies and organizations aimed at developing an advanced electric transportation industry in California -- and Project California -- an effort initiated by the California Council on Science and Technology, which identified a California-based clean transportation industry as the most promising jobs opportunity of this decade.

A bid to make California a world center for electric vehicle research and manufacturing was formally launched on June 8, 1992, when CALSTART, a broad-based coalition of 41 public agencies and private businesses, opened its headquarters in a Lockheed-donated facility in Burbank. Edison's President is Chairman of CALSTART. Edison's main contributions will be in coordinating and building the infrastructure necessary to charge EVs, managing the CALSTART electric bus/mass transit program, and galvanizing community awareness of and support for clean transportation.

CALSTART is designed to enhance California's economy. By the end of 1993, CALSTART expects to employ over 1,000 California residents. CALSTART programs will contribute to the development of a major new industry in the state. Fifty-five thousand new jobs could be created

by the year 2000. Many of these jobs can be filled by aerospace workers who were particularly hard hit by defense spending cutbacks. CALSTART will also help the economy by enabling the incubation of new businesses.

IV. APPENDICES

Introduction	"Finding a Payoff in Environmentalism," <u>Fortune Magazine</u>
TAB A	Conservation Programs: Brochure entitled "Energy and You, For a Bright Tomorrow"
TAB B	Residential Conservation: Rebate flyers
TAB C	Super Efficient Refrigerator Program: Fact sheets.
TAB D	Compact Fluorescent Bulb: Fact sheet.
TAB E	Energy Management Audits: In-home audit brochure entitled "Energy Trivia."
TAB F	"Design for Excellence:" Information packet.
TAB G	"Welcome Home:" Information packet.
TAB H	Energy Efficiency: Brochure entitled "How to Reduce Your Energy Costs."
TAB I	Clean Air Coatings: Information packet.
TAB J	Commercial Food Industry: <i>Culinary Connections Newsletter</i> .
TAB K	Transmission and Distribution Efficiency: Research Briefs on NetComm, Satellite Communications and Composite Towers and <i>Research Newsletter</i> article on NetComm.
TAB L	Customer Technology Application Center: CTAC fact sheets.
TAB M	Economic Development: Regional Recovery press kit.
TAB N	Urban Air Quality Improvement: <i>Research Newsletter</i> article entitled "Research Contributes to South Coast Air Quality Improvement."
TAB O	Climate Change Mitigation: Edison's News Release and additional information on its "No Regrets" CO ₂ Policy.
TAB P	Hazardous Waste Minimization: Pamphlet describing Edison's program and <i>Research Newsletter</i> article on reducing hazardous wastes with electrotechnologies.

TAB Q	Endangered Species Alert Program: Trade magazine article on Edison's program, pamphlet and 1993 calendar entitled "Keeping an Eye on Endangered Species."
TAB R	EMF Programs: Research Brief on Electric and Magnetic Fields and EMF Education Center press kit.
TAB S	Marine Resource Protection: <i>Research Newsletter</i> entitled "San Onofre Kelp Beds: Monitoring an Important Marine Resource."
TAB T	Renewable Program: Edison brochure entitled "Renewable Energy: Technology Options for the Future," Renewable fact sheets and <i>Research Newsletter</i> article on PV Breakthrough.
TAB U	Electric Transportation: CALSTART and Electric Transportation press kits and four technology "White Papers."
TAB V	Research Brochure: "Research for Our Customers to Benefit People and the Environment," Research Project Briefs



News Release

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FOR IMMEDIATE RELEASE

**SOUTHERN CALIFORNIA EDISON INITIATES CO2 EMISSIONS REDUCTIONS;
"NO REGRETS" PLAN MAY HELP PREVENT POTENTIAL GLOBAL WARMING**

ROSEMEAD, Ca., May 20, 1991 -- Southern California Edison, the nation's second-largest utility, and the Los Angeles Department of Water and Power (LADWP), the largest municipal utility, today jointly announced they are adopting a resource strategy that will reduce their carbon-dioxide emissions (CO2) by 10 percent each over the next decade. They also announced the goal of an additional 10 percent reduction each by the year 2010.

A recent National Academy of Sciences report ("Policy Implications of Greenhouse Warming," 1991), released last month, reviews the current scientific information on greenhouse warming, and concludes that, "Despite the great uncertainties, greenhouse warming is a potential threat sufficient to justify action now."

Southern California Edison's plan acts upon this recommendation. "Taking prudent, reasonable economical steps to reduce CO2 emissions is warranted by current scientific understanding of the potential for global warming. Our actions are consistent with the recent policy recommendations of the National Academy of Sciences and we believe they make good environmental, scientific and business sense," said John E. Bryson, Edison chairman and CEO.

-more-

Edison plans to reduce CO2 emissions from its power plants from the current 31.8 million tons/year to about 28.3 million tons/year by the year 2000 and down to 25.9 million tons/year in 2010. These CO2 emission reductions will occur despite the fact that Edison will serve 12 million people in the year 2000 compared to the 10 million it serves today. Another 10 percent reduction in CO2 emissions is planned by 2010, even though the population Edison serves will grow by another two million by then.

Edison will achieve these reductions with a three-pronged approach: cost-effective energy efficiency and conservation programs, greater use of alternate and renewable generating resources, and repowering of existing generating plants. In the absence of taking these actions, Edison projects its CO2 emissions would rise from the base of nearly 32 to 35 million tons/year by 2000 and over 39 million tons/year by 2010.

Efficiency and Conservation Programs

Conservation efforts will account for at least 10 billion kwh of electricity being saved annually by the year 2000. That translates into about 4.6 million tons/year of reduced CO2 emissions on the Edison system. Examples of some of Edison's 55 conservation and energy efficiency programs include:

- Edison's Welcome Home program, which provides incentives to developers to build homes that surpass state energy-efficiency standards by up to 30 percent.

- Increased use of energy-efficient light bulbs. Edison offers a \$5 rebate to customers who purchase energy-efficient compact fluorescent light bulbs. By giving one million of these bulbs free to low-income customers, the company will save the equivalent of 500,000 barrels of oil over the life of the bulbs.

Renewable Energy

In 1980, Edison pioneered the development of alternate and renewable technologies. Last year, Edison received 14 percent of its power from non-polluting alternate and renewable energy sources such as hydro, solar, wind and geothermal energy, and the company uses nine different kinds of energy sources -- more than any other utility in the world. About 400 MW of additional renewable energy will be added to the Edison system in the next decade, reducing CO2 emissions by 1.1 million tons/yearly. While the specific alternate and renewable sources which will make up the 400 MW of new power depends on the outcome of the California bidding process, geothermal and solar technologies will probably make up the majority of the new resources.

In addition, if a recent Edison breakthrough in solar cell technology (co-developed with Texas Instruments), becomes commercially available in the next few years, as planned, this will contribute meaningfully to CO2 reductions.

Efficiency Improvements in Existing Power Plants

Edison plans to repower about 1500 MW of its generating capacity in the next decade by converting older, less efficient steam units into combined-cycle systems. These more efficient plants will save about 600,000 tons of CO2 yearly. The company will also phase out burning oil as a fuel, which will reduce CO2 emissions by another 400,000 tons annually.

"It is sound scientific, utility and business policy for us to take actions now that are not unreasonably costly to reduce CO2 emissions over the next two decades. This 'no regrets' approach means that, whether or not CO2 emissions are eventually determined to cause global warming, Edison will not be sorry it took early action," said Bryson.

Marcia B. Dalrymple

EXCELLENCE THROUGH QUALITY

To: Pam -

I'm sorry we don't have a single publication about our environmental programs at Alcoa, but I hope the enclosed will give you an idea of the breadth of our efforts. I've included some materials to describe our numerous environmental teams and some of the products of their work. I have provided our deskbook, which is a guide to all our facilities of the environmental laws and regs that affect us. You can send that back if it isn't useful - but you're welcome to keep it if you want.

Please call for any clarification you need or further information!



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Marcia — 956 5307

ORGANIZATIONAL EFFECTIVENESS TASK TEAMS

In November of 1990, the Management Committee Lead Team commissioned eight cross-functional Organizational Effectiveness (OE) Task Teams to:

- Develop worldwide boundaries of their process (relationship map).
- Flowchart (map) their process as it exists (process map).
- Provide clear documentation of the customer's requirements for the outputs of their process.
- Establish the primary objective (mission statement) for their process.
- Define the internal and external measures of process success.

Two of the original OE Teams, consisting of internal customers, internal suppliers, and representatives of other involved functions, were commissioned to study environmental and health and safety processes.

Environmental OE Team

P.R. Atkins, Pgh Office
M. Coleman, Consultant
M.B. Dalrymple, Washington Office
R. Glah, Englewood, CO
J.P. Hupy, Knoxville, TN
L.K. King (Team Leader), ATC
D.J. Moeslein (Facilitator), Pgh Office
G.O. Pratt, Jr., Davenport
A.C. Roemhild, Pgh Office
R.W. Waechter, Pgh Office

Employee Health OE Team

M.L. Ambrose, Pgh Office
H.D. Belk, Pgh Office
K.M. Burgess, Pgh Office
P.S. Catanzarite (Facilitator), Pgh Office
F.H. Cormia, TN
J. Dempsey, Cleveland
C.F. DiMascio, Pgh Office
R. Duchossois, Consultant
E.S. Ellis, TN
R.S. Hughes (Team Leader), Cleveland
L.D. Tanis, Pgh Office

From individual and focus group interviews, representing a cross-section of the company's activities, both OE teams ranked education and training as a high priority subprocess. The OE teams concluded that EHS education and training processes must be improved to meet business objectives and to satisfy company and government requirements.

One of the OE Teams' outputs was recommendations for how to improve performance in their respective areas. It was not their mission to implement these recommendations. Rick Kelson, Senior Vice President Environment, Health and Safety, commissioned two Improvement Lead Teams for this purpose. The next several pages describe the Lead Teams' activities

For more information about the OE Teams' results and recommendations for improving EHS education and training processes, see **Appendix A** which contains key pages from the Environmental OE Team *Executive Summary*, November 1991 and *Team Presentation*, October 8, 1991.

IMPROVEMENT LEAD TEAMS

In December of 1991, Rick Kelson commissioned two Improvement Lead Teams for the purpose of validating, prioritizing and implementing the OE Teams' recommendations. The mission elements and members of the Environmental Improvement Lead Team and Health and Safety Improvement Lead Team follow.

Environmental Improvement Lead Team Mission

An Environmental Management Process which facilitates the understanding and successful worldwide implementation of Alcoa's Environmental Policy is essential to the realization of Alcoa's Vision. The mission of the Environmental Improvement Lead Team is to provide processes which enable Alcoa to integrate environmental responsibilities with business objectives. These processes should ensure, with the necessary leadership and support, understanding and implementation of Alcoa's Environmental Policy.

To support the above, the Environmental Improvement Lead Team will:

- Use fact-based methodologies to validate and prioritize (based upon customer and business needs) the OE Task Team recommendations.
- Use cross-functional process improvement teams and task teams to identify/develop/integrate and pilot processes that will facilitate worldwide understanding, acceptance and implementation of Alcoa's Environmental Policy.
- Identify team missions along with recognition, reinforcement and monitoring systems.
- Define internal and external measures of success.
- Employ structured processes to communicate information (team priorities, process improvement activities, and environmental process performance) throughout the organization.
- Monitor, consult with and advise the Environmental organization to ensure activities are customer-focused and that roles and responsibilities are clearly defined.

Environmental Improvement Lead Team

P. R. Atkins, Pgh Office
L. C. Blayden, ATC
M. B. Dalrymple, Washington Office
R. H. Gatewood, Stolle
L. K. King, ATC
J. F. McMahon, Pgh Office
D. J. Moeslein, Pgh Office
G. O. Pratt, Jr., Davenport
M. J. Schreier, Charlotte
V. R. Scorsone, Pgh Office
R. W. Waechter, Pgh Office
R. B. Kelson (Sponsor), Pgh Office

Health & Safety Improvement Lead Team Mission

Alcoa's value states: "We will work safely in an environment that promotes the health and well-being of the individual."

Alcoa's 5-year milestone states: "We will achieve a 50% reduction in serious injury and lost work day incidence rates as we move toward our goal of an injury-free work place."

The Employee Health Organizational Effectiveness Team identified the following critical issue:

"We will work safely in an environment that promotes the health and well-being of the individual. We will have continuous improvement in processes which will result in:

- Elimination of Injuries
- Elimination of Fatalities
- Compliance with Regulations"

To support the above, the Improvement Lead Team will:

- Validate, prioritize and set up the recommendations of the OE Task Team.
- Monitor, consult with and advise the Health & Safety organization to insure the process is customer focused and the focus is on the process with clear roles and responsibilities.
- Ensure effective and efficient processes are in place to accomplish appropriate objectives.
- Define internal and external measures of success.
- Structure processes to communicate information throughout the organization should be employed.
- Plan the recognition, reinforcement and monitoring systems for teams initiated by the Lead Team.

Health & Safety Improvement Lead Team

T. C. Burger, Warrick
K. M. Burgess, Pgh Office
C. F. DiMascio, Pgh Office
J. F. Duderstadt, Pgh Office
R. S. Hughes, Cleveland
D. Jaffe, Pgh Office
R. M. James, Pgh Office
J. F. McMahon, Pgh Office
J. R. Michaud, Pgh Office
J. E. Powell, ATC
L. D. Tanis, Pgh Office
R. B. Kelson (Sponsor), Pgh Office

IMPROVEMENT LEAD TEAMS, Cont'd

In January of 1992, both Improvement Lead Teams asked a group of training professionals (Joan Karas and Janet Waryanka) and Improvement Lead Members (Larry Tanis and Don Moeslein) to benchmark Exxon to suggest an approach that would address the recommendations of the OE Teams, and to determine the feasibility of combining Environmental and Health and Safety training into one project. As part of this effort, the group along with BU and central resource personnel visited Exxon's Baytown, Texas facility to gain a better understanding of their Basic Chemicals Safe Operations Program (BCSOP) and their use of an information mapping methodology (see Appendix B-2 - B8).

From data gathered during this benchmarking visit and interviews with Business Unit representatives who also participated in the visit, the proposal group recommended that an Environment, Health and Safety cross-functional project team develop a company-wide EHS Education and Training System to:

- Facilitate understanding and compliance of:
(see Appendix B-9)
 - existing and near-term anticipated regulations
 - corporate policies and strategies
 - common business practices and procedures
- Identify EHS topics affecting a majority of locations.
- Identify knowledge/skill requirements by individual roles for each topic (see Appendix B-10).
- Identify/evaluate existing training or develop training for EHS topics.

In addition, develop standard procedures/guidelines for:

- Recordkeeping
- Testing/checking for understanding
- Refresher training
- New hires/transfers training
- Contractor training
- Initial and ongoing needs assessments
- Ongoing training maintenance and improvement
- Training design and delivery

This proposal group recommended a Development Structure (see Appendix B-11) and a Team Composition (see Appendix B-12) for addressing the above issues.

IMPROVEMENT LEAD TEAMS, Cont'd

In May of 1992, Rick Kelson submitted a quantum leap for the EHS Education and Training System. The Quantum Leap (see Appendix B-13 - B-15) indicates that the EHS Education and Training System will be developed and functioning by the end of 1993. More specifically, this means that EHS Education and Training System processes/guidelines will be established (e.g., needs assessment, evaluation, recordkeeping, course development) and that twenty courses will be developed in that time frame.

The Improvement Lead Teams endorsed the Quantum Leap and the recommendations of the proposal group. Rick Kelson subsequently named Joan Karas as Project Manager EHS Education and Training, effective June 1, 1992.

After the Project Manager was identified, the next step was to secure the appropriate staff for the project. The Project Management Team was identified as Joan Karas, Ken Martchek, Don Moeslein, Larry Tanis, and Janet Waryanka. They subsequently developed a mission for the overall project which follows.

EHS Education & Training System Mission

Character

The mission of the Environment, Health & Safety Education and Training System is to develop and implement processes to meet business unit needs for developing the necessary awareness, skills and knowledge in the environment, health and safety areas.

Scope/Customers

Business Unit, location and corporate management are key customers of the System. The large, diverse customer base and the many associated training needs necessitate a clearly defined and functioning System which includes processes and guidelines to address needs assessment, systems design issues, and training assessment/development.

All Alcoas worldwide, contract employees, contractor employees, Alcoa families, and community support groups are potential customers of the Environment, Health and Safety Education & Training System outputs. These outputs will allow recipients to acquire and maintain necessary skills, awareness, and understanding of existing and anticipated environment, health, and safety regulations and Alcoa policies, standards and common business practices.

Capabilities (How)

In 1991, the Environmental OE Task Team and the Employee Health OE Task Team identified and validated the need for a cross-functional effort to address Environment, Health and Safety education and training opportunities. The Health and Safety and Environmental Improvement Lead Teams subsequently commissioned the following cross-functional task teams Project Management, Needs Assessment (see Appendix D), Systems Design, and Training Assessment/Development as well as an Advisory Council to provide support and guidance to the project.

An EHS Education and Training System Project Structure diagram is located on the following page and an overall schedule for the EHS Education and Training System is located on page 10. More detailed information on each of the task teams and the Advisory Council is provided in Appendices C - G.

ENVIRONMENTAL MANAGEMENT, AS INTERNAL
CONTROL, IS NOT ONE EVENT OR CIRCUMSTANCE,
BUT RATHER A SERIES OF ACTIONS THAT
PERMEATES A BUSINESS' ACTIVITIES



ENVIRONMENTAL MANAGEMENT AS INTERNAL
CONTROL, NO MATTER HOW WELL DESIGNED
AND OPERATED, CAN ONLY PROVIDE
REASONABLE ASSURANCE THAT A BUSINESS'
OBJECTIVES WILL BE ACHIEVED



ENVIRONMENTAL MANAGEMENT TOOLS

- **POLICIES**
- **POLICIES, PROCEDURES AND GUIDELINES**
- **ROLES AND RESPONSIBILITIES (ENVIRONMENTAL PROFESSIONALS)**
- **PLANT ENVIRONMENTAL LEAD TEAM**
- **AUDIT PROGRAMS**
- **ENVIRONMENTAL IMPROVEMENT LEAD TEAM**
 - **EHS TRAINING TEAM**
 - **EHS COMMUNICATIONS TEAM**
 - **EHS REGULATION/LEGISLATION TEAM**



ENVIRONMENTAL MANAGEMENT TOOLS (CONTINUED)

- **ENVIRONMENTAL ADVISORY COUNCIL**
- **PCB ISSUES TEAM**
- **ENVIRONMENTAL STRATEGY TEAM**
- **ENVIRONMENTAL LIABILITY TEAM**



ENVIRONMENTAL, SAFETY AND HEALTH POLICIES

WORLDWIDE

ACCIDENT AND INJURY PREVENTION

ASBESTOS MANAGEMENT

**ENVIRONMENTAL ASSESSMENTS FOR ACQUISITIONS,
DIVESTITURES, AND LAND TRANSFERS**

ENVIRONMENTAL POLICY AND IMPLEMENTATION PLAN

FIRE BRIGADES AND EMERGENCY RESPONSE TEAMS

HEALTH POLICY

IMPLEMENTATION OF SAFETY STANDARDS AND PROCEDURES

LIFE-THREATENING AND TRANSMITTABLE DISEASES

MAJOR INCIDENT REPORT

MANAGEMENT OF PCBs

PRODUCT SAFETY AND RELIABILITY

SEAT BELTS

SMOKING

SUBSTANCE ABUSE AND DRUG-FREE WORKPLACE
ADDENDUM

USE AND DISPOSAL OF EMPTY CONTAINERS

SIGNING CONSENT DECREES

UNDERGROUND STORAGE TANKS



Environmental Policy, Procedures And Guidance Manual



Aluminum Company of America
Environmental Affairs Department

JUNE, 1992

GENERAL GUIDANCE

These General Guidance statements are designed to provide basic focus on issues that are faced by many operating locations. Deviations from these guidance objectives may occur, but plant and Business Unit Management should be made fully aware of these deviations.

PLANT ENVIRONMENTAL LEAD TEAM

AN APPROACH

OBJECTIVE: TO DRIVE OWNERSHIP OF ENVIRONMENTAL
MANAGEMENT ISSUES INTO THE LINE
ORGANIZATION AND INTEGRATE ENVIRON-
MENTAL MANAGEMENT WITH THE BUSINESS.

REPRESENTATION: PLANT MANAGER

OPERATIONS MANAGEMENT

ENGINEERING/MAINTENANCE

PROCUREMENT

HUMAN RESOURCES

**COMMUNICATIONS/COMMUNITY
RELATIONS**

ENVIRONMENTAL MANAGEMENT



ALCOA ENVIRONMENTAL AUDIT

- **ARTHUR D. LITTLE APPROACH**
 - **TRAINED TEAM MEMBERS**
 - **EMPHASIS ON MANAGEMENT SYSTEMS, INTERNAL CONTROLS AND VERIFICATION**
 - **EMPHASIS ON COMPLIANCE**
 - **ONE, NON-ALCOAN TEAM MEMBER**
- **IDENTIFY ISSUES**
 - **OBSERVATIONS**
 - **SPECIAL SITUATIONS**
- **WRAP-UP WITH PLANT MANAGER**
- **WRITTEN REPORT ON ISSUES**
 - **60-DAY RESPONSE REQUIRED**
 - **COPIES TO B.U. PRESIDENT AND SENIOR V.P. EHS**
- **RESPONSE REQUIRED TO B.U. PRESIDENT, EXECUTIVE V. P. CHAIRMAN'S COUNCIL AND SENIOR V.P. EHS**
- **COMPLIANCE PLANS REQUIRED**
- **FOLLOW-UP PROCESS ?**



ALCOA ENVIRONMENTAL AUDIT

CURRENT OBJECTIVES

- **IDENTIFY AREAS OF NON-COMPLIANCE OR POTENTIAL NON-COMPLIANCE**
- **EVALUATE MANAGEMENT SYSTEMS AND INTERNAL CONTROL**
- **IDENTIFY AREAS OF FUTURE CONCERN**
- **ENCOURAGE TECHNOLOGY TRANSFER**
- **EVALUATE TRAINING NEEDS**
- **EVALUATE RESOURCE AVAILABILITY**



ENVIRONMENTAL IMPROVEMENT LEAD TEAM

P. R. ATKINS

L. C. BLAYDEN

G. O. PRATT

M. B. DALRYMPLE

R. H. GATEWOOD

R. B. KELSON

L. K. KING

J. F. MC MAHON

D. J. MOESLEIN

V. R. SCORSONE

R. W. WAECHTER

M. J. SCHREIER

M. R. KINDLING

The mission of the Environmental Improvement Lead Team is to provide processes which enable Alcoa to integrate environmental responsibilities with business objectives. These processes should ensure, with the necessary leadership and support, understanding and implementation of Alcoa's Environmental Policy.



E/H/S EDUCATION AND TRAINING SYSTEM PROPOSAL TEAM

J. KARAS

D. MOESLEIN

L. TANIS

J. WARYANKA

The mission of the E/H/S Education and Training System Proposal Team is to develop a proposal for an education and training system to address the Environmental and Employee Health O.E. Team's training recommendations, and present that proposal to the Environmental and Health/Safety Improvement Lead Teams.

Effective June 1 -- JOAN KARAS has accepted responsibility for leadership of the E/H/S training effort. Staffing arrangements and team/subteam formation activities are underway.



E/H/S/COMMUNICATION PROPOSAL TEAM

K. L. LANG

J. F. MC MAHON

**(RESOURCES FROM THE INTERNAL AND EXTERNAL
COMMUNICATIONS TEAM)**

The mission of the E/H/S Communication Proposal Team is to present a proposal to the Environment and Health and Safety Improvement Lead Teams to improve the communication process that serves Alcoa's corporate business and location programs. A program that will satisfy the requirements of a fully developed communications strategy will be proposed.



E/H/S/ LEGISLATION/REGULATION TEAM

M. B. DALRYMPLE

B. BEAZLEY

L. C. BLAYDEN

R. M. JAMES

J. W. BRUST

The mission of the E/H/S Legislation/Regulation Team is to develop a proposal for initiating an E/H/S Legislation/Regulation System development effort in response to the Environmental and Employee Health O.E. Task Team recommendations and present the proposal to the proposal to Environmental and Health and Safety Improvement Lead Teams in early April 1992.



ENVIRONMENTAL ADVISORY COUNCIL

The mission of the Environmental Advisory Council is to provide oversight for the interpretation and implementation of Alcoa's Environmental Policy on a worldwide basis. A deeper, common understanding of environmental issues, and their effects on business units, will allow us to be more effective and efficient in formulating company positions.



ENVIRONMENTAL ADVISORY COUNCIL

G. E. BERGERON

P. R. BRIDENBAUGH

W. D. ECTON

R. A. GLAH

D. N. HARVEY

R. S. HUGHES

R. B. KELSON

J. KERKHOF

J. LOFTIN

K. R. MC ELHENY

T. S. MOCK

R. C. RAWE

A. C. ROEMHILD

M. J. SCHREIER

R. F. SLAGLE

L. J. SPIES

R. P. TOROK

M. B. VIANNA

P. W. WEHRLE

O. E. WILKINSON



ENVIRONMENTAL ADVISORY COUNCIL

WORKING COMMITTEE

P. R. ATKINS

P. R. BRIDENBAUGH

G. HAYWARD

J. P. HUPY

R. B. KELSON

J. KERKHOF

L. J. SPIES

M. B. VIANNA

The mission of the Environmental Advisory Council Working Committee is to be responsible for advising Environmental Affairs on the design of long-term international environmental programs for Alcoa. It will assist in developing action plans to implement these programs, including the drafting of position and policy statements. In addition, the committee will identify international organizations and issues that are appropriate for our involvement.



ENVIRONMENTAL LIABILITY TEAM

A. W. BURBA

C. T. JANTOS

N. J. MERRICK

P. LEROY

T. A. WILSON

M. E. KOMMER (LEADER)

The mission of the Environmental Liability Team is to develop and apply a consistent methodology for estimating the remediation liabilities at Alcoa's operating locations. Innovative remediation technologies and effective construction techniques will be evaluated and recommended to achieve the desired cleanup goals at the lowest costs.



ENVIRONMENTAL STRATEGY TEAM

P. R. ATKINS

L. C. BLAYDEN

M. B. DALRYMPLE

E. S. FISHER

J. E. POWELL

J. Y. MARKS (LEADER)

The mission of the Environmental Strategy Team is to identify, understand, and deal with environmental issues before they become major economic or political liabilities by incorporating the problem and its solution into corporate and business unit strategic and R&D plans.



PCB ISSUES TEAM

M. B. DALRYMPLE

J. EYLES

S. W. HARVEY

W. C. SLEPPY

R. M. JAMES

J. F. MC MAHON

J. A. MILLETT

D. R. PEINECKE

R. G. TAYLOR

C. G. RITZERT (LEADER)



PCB ISSUES TEAM MISSION

PCBs represent a significant current and future liability for Alcoa in the cost of cleanup and regulatory compliance. Uncertainty around regulatory actions, environmental and health hazard potential, cleanup and public/employee fear create opportunities for improvement within Alcoa.

Recommend a data based PCB policy and provide supporting implementation/action plans:

- to improve the management and accessibility of validated PCB information and data.
- to provide a consistent interpretation of PCB regulations and corresponding consistent internal standards of practice for health, environmental control, cleanup and remediation of PCBs.
- to provide communication and education for both internal and external target groups to increase awareness and understanding.
- to influence regulators, law makers and the public to provide science based regulations with priorities and resource allocations aligned with risk.
- to make available best practice remediation technologies to all Alcoa locations and identify priority opportunities for further research and development.
- to provide the Business Unit leaders with information to integrate the PCB policy and action plans into their business and operating plans.

ENVIRONMENT, HEALTH AND SAFETY MIS "STRATEGIC COUNCIL"

C. F. DI MASCIO (LEADER)

R. M. JAMES

G. C. HEISE

M. A. GLOVER

N. B. SUSSMAN

R. S. DANCHIK

J. S. BOYT

L. W. TITLEY

K. L. CRANDALL

PLANT LOCATION MEMBER (PENDING)

**The mission of the E/H/S MIS "Strategic Council" (Revised 4/23/92)
is to:**

**Establish information system strategies within the Environmental
Affairs, Health and Safety departments and with external customers
and suppliers.**

**Coordinate priorities, both immediate and long term, to be
compatible with division goals/strategy and enhance management
understanding of processes involved in the life cycle of a system.**

**Assure that new software and hardware are evaluated with
cognizance of the long-term strategy and interrelated needs of
Environmental Affairs, Health and Safety.**



ENVIRONMENT, HEALTH AND SAFETY MIS "TACTICAL" TEAM

L. W. TITLEY (LEADER)

L. E. LANG

M. A. GLOVER

L. A. LIGOURI

C. H. KRAPP

The original mission statement of the E/H/S MIS "Tactical" Team is to:

Develop and implement systems integration techniques to allow departments and customers to benefit from the combined information resources of the division.

Establish an "open" network which will facilitate data exchange between division, corporate and customer information systems.

Assure timely implementation of products, software/hardware tools, processes, procedures, services and end-user systems.

Interface with external data/technology suppliers to assure that the smartest tools and technologies are pursued.



AD HOC GROUP - MUD LAKES

G. SLESSAR

D. GLENISTER (LEADER)

R. COSTA/I. LIPPI

M. B. VIANNA

J. COOKE

S. von LIEROP

F. WILLIAMS

J. HARPER

D. G. APPLGATE

P. R. ATKINS

The mission of the Ad Hoc Group - Mud Lakes is to share lake status, share plans for future lake construction, share rehabilitation techniques (including: densification, TA reduction, sealing, dust control, run-off control/treatment, vegetation, water balance) and discuss trends in legal/government requirements.



FLUORIDE EMISSION MEASUREMENT STUDY TEAM

B. L. CLARK (LEADER)

J. GIBB

C. A. CARTER

J. R. ENGSTROM

S. HOHMAN

H. F. HILLEGASS

C. T. NIENABER

W. L. YOUNG

The mission of the Fluoride Emission Measurement Study Team is to develop near term (1 yr.) and longer term (3-5 yr.) Primary Metals Divisional standards and implementation plan for a fluoride emission and impact measurement program, equipment and practices for domestic locations.



ENVIRONMENTAL PROGRESS RECOGNITION TEAM

C. M. BENHART

D. ERNST

E. LALONDE

K. A. LOCKWOOD (LEADER)

D. W. RAY

J. H. VAN DEVENDER

The mission of the Environmental Progress Recognition Team is to recommend a program within Alcoa to provide recognition for operating locations, groups or individuals achieving significant environmental success. The program should contain components that will stimulate the environmental commitment and awareness of ALL Alcoa employees.



ROLLING MILL EMISSION MANAGEMENT TEAM

P. R. ATKINS (LEADER)

K. L. ADAMS

G. BIRESAW

J. S. BOYT

S. M. DARLING

J. N. HALLER

J. P. HUPY

G. L. IDEKER

J. K. MACKAY

R. L. POOLE

T. J. ROBARE

H. G. SAKOIAN

M. W. WEI

E. R. WERNER

The Rolling Mill Emission Management Team will evaluate emission management technologies and provide recommendations to Alcoa locations on control strategies to achieve environmental policy compliance and maintain Alcoa's values. The team will provide comments and assist in the development of Federal (U.S.) legislation and regulations on rolling mill emissions and provide support and guidance for individual plants worldwide as they interface with state, national or international regulatory organizations. The team objective is to complete this mission in three years (November, 1994).



MISSION STATEMENT

ENVIRONMENTAL AFFAIRS DEPARTMENT

Alcoa's Environmental Affairs Department will provide leadership by developing and deploying environmental policies, processes, guiding principles and operating practices by which corporate and business management can satisfy the company's Environmental Policy and its Vision and Values.

Although line managers are accountable for assuring conformance with Alcoa's Environmental Policy, Environmental Affairs believes that it shares that accountability and will help to ensure that the company's worldwide environmental programs are designed, maintained, staffed and operated in a manner that will achieve the company's environmental goals. Environmental regulatory and legislative issues will be monitored and addressed in conjunction with other groups. Auditing, data management, technology transfer, specialized consulting and technology development services will be provided for use by corporate and business unit management. Training programs and professional development tools will be provided for environmental personnel. Training and communication for achieving a high level of awareness of environmental issues will be made available for all employees.

91/12/27



Clinton Presidential Records Digital Records Marker

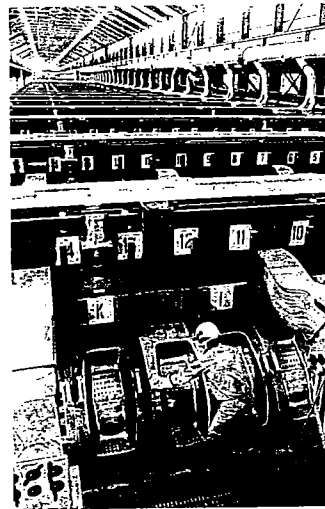
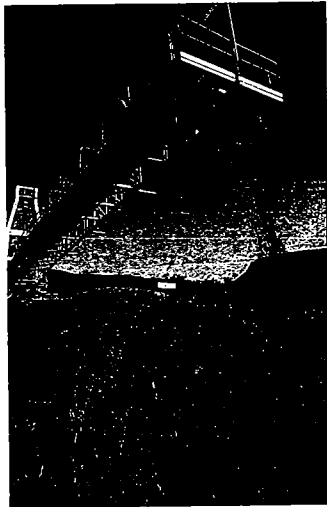
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A Brief Story Of Aluminum And Alcoa



file - Econ Summit

12.8.92

George Foy:

Here is some general info on
pollution reduction. The source is
the draft report of the President's
Commission on Environmental Quality.
The report is almost final and should
be published before Jan 20, 1993.

Please be circumspect in your
use of this material.

Call me at (202) 395-5750 if you
have further questions.

John Fox

PRESIDENT'S COMMISSION ON ENVIRONMENTAL QUALITY
Subcommittee
on
Quality Environmental Management

QUALITY ENVIRONMENTAL MANAGEMENT INITIATIVE

Through twelve voluntary, demonstration projects, the PCEQ's Subcommittee on Quality Environmental Management (QEM) has clearly shown that Total Quality Management (TQM) principles and tools are as effective in reducing or eliminating "environmental inefficiencies" as they have been in cutting "product or process defects" in manufacturing operations throughout the world.

Project Overview

The Quality Environmental Management (QEM) Initiative was designed to test the hypothesis that the same principles and tools which underpin the Total Quality Management (TQM) process are equally relevant and fully applicable for effective environmental management. The QEM Subcommittee strongly believed that the systems analysis approach of TQM, by which product defects or process inefficiencies are methodically analyzed for prevention opportunities, was also appropriate for identifying situations in which pollution could be reduced or prevented.

To validate this premise, eleven large, but very different, corporations volunteered to participate in the project by generously committing a total of twelve facilities across the country to the experiment. In addition, each participating company agreed to assign a Project Manager to the task of facilitating and coordinating the individual demonstration projects. The initiative was officially launched in March, 1992 through a workshop designed to provide a clear and common understanding of the overall project, as well as familiarization with the key concepts of Total Quality Management and Pollution Prevention. Participants included the Project Managers, QEM Task Force Members, Pollution Prevention experts, state regulators, EPA officials and representatives of environmental organizations. Project Managers then returned to their respective facilities to align their individual efforts with the objectives of the overall QEM project.

Throughout the summer and fall, Project Managers and QEM Task Force Members met periodically to discuss each facility's experience and to collect data in three important areas:

- **Process** - Among the 12 diverse projects, what were the common elements with respect to management approaches, data collection, systems analysis, identification of improvement opportunities, decision making, etc.
- **Metrics** - Approaches used to document environmental improvements and experiences with communications of results to interested stakeholders.
- **Incentives & Barriers** - Identification of issues that either facilitated or hindered the goal of pollution prevention.

Individual Projects

The diversity of the projects (in terms of scope, geographic location, industry, size, corporate, culture, etc.) provided the kind of variety needed to adequately test the QEM hypothesis and to prove, beyond a doubt, the universal applicability of TQM for achieving pollution prevention. The following are brief description of the twelve demonstration projects:

- **AT&T Network Systems Columbus Works**, in *Columbus, OH*, has utilized quality principles to reduce toxic air emissions which will result in the elimination of a toxic chemical (1,1,1-trichloroethane) from their manufacturing processes by mid-1993.
- **Chevron's Perth Amboy Refinery**, in *Perth Amboy, NJ*, has developed a facility-wide pollution prevention project to reduce environmental operating costs and improve competitiveness.
- **Dow Chemical's Glycol II Plant**, in *Plaquemine, LA*, developed an internal benchmarking project which resulted in a 29% reduction in fugitive emissions of ethylene oxide, and the plant will strive to be "leak free by '93". By using simple tools of Quality Performance, Dow also reduced their lab waste by 67%.
- **DuPont's Acrylonitrile Operations**, in *Beaumont, TX*, made process modifications that reduced ammonium sulfate emissions from more than 100 million lb/yr. to less than 40 million lb/yr. and saved over \$1 million a year in manufacturing costs.
- **Ford's Sheldon Road Plant**, in *Phymouth, MI*, successfully conducted a pilot project to replace a toxic chemical, trichloroethylene (TCE), with an aqueous detergent in the manufacturing of aluminum heat exchangers. Other benefits from the project included the creation of a model for incorporating QEM into product design and manufacturing processes, a superior product, reduced costs and environmental impacts and improved health and safety conditions.
- **GE Medical Systems, Florence, SC**, challenged a self-directed workforce to integrate environmental concerns into their existing continuous improvement processes, which resulted in a variety of projects that have improved both their environmental and economic performance.
- **International Paper's Androscoggin Mill**, in *Jay, ME*, is working with various environmental and governmental organizations to design and implement a quality environmental management program, resulting in improved stakeholder relations and reduced environmental impacts.
- **Merck's Rahway Manufacturing Facility**, *Rahway, NJ* focused on the reduction of SARA TRI emissions, with a projected 1.5 million pound reduction in these releases in 1992.

- **3M's Medical Products Division Facility**, in *Brookings, SD*, integrated pollution prevention throughout their entire operation, engaging every employee in pollution prevention activities, resulting in a 10.1% reduction in waste generated.
- **Procter & Gambles's Manufacturing Facility**, in *Lima, OH*, utilized a quality approach working with outside organizations to identify and reduce wastewater effluent with an ultimate goal of "zero discharge."
- **Procter & Gamble's Paper Products Facility**, *Mehoopany, PA*. A quality improvement process team identified priority wastestreams within all media and developed a comprehensive strategy to reduce these wastes. Savings of \$500,000 are projected for the pollution prevention projects currently underway.
- **US Generating's Indiantown Facility** (A Partnership of Bechtel Group, Inc. and Pacific Gas & Electric), in *Martin County, FL*, demonstrated the impact of utilizing quality principles to incorporate environmental considerations into the siting, development, construction, and operation of a clean-coal facility. U.S. Generating's proactive efforts resulted in a streamlined permitting process; thus, expediting financing and allowing for a prompt construction start.

In the aggregate, the above listed projects have resulted in the following accomplishments:

- Reduced or eliminated millions of pounds of pollutants.
- Saved companies substantial sums of money.
- Improved the efficiency or effectiveness of the production process.
- Enhanced the quality of the product or service.
- Increased the public's image of the company or its products.
- Contributed towards the improvement of employee morale.

If these projects are any indication of the power of TQM to reduce or prevent pollution, then the QEM Subcommittee is confident in stating that, if widely applied and if given the proper incentives and flexibility to innovate, private-sector voluntary programs are the most cost-effective and expeditious routes to improving the quality of the environment.

Key Findings

Based on the real world experiences of these twelve projects, the QEM Subcommittee has drawn the following conclusions:

- **Total Quality Management (TQM) and Pollution Prevention are complementary concepts.** The heart of TQM is the systematic analysis of processes or services by empowered, cross-functional, multi-disciplinary teams. The same is true regarding Pollution Prevention. Emission or waste reduction and elimination opportunities are most successful when groups of employees with diverse skills and experiences are fully empowered to identify sources of pollution and to make innovative, but cost effective, recommendations for their reduction/elimination. In addition, TQM tools are especially useful at every step in the process.
- **Successful Pollution Prevention efforts, while dependent on a systematic and rigorous analysis, rely heavily on flexibility in actual application.** Experience gained through these projects has shown that a disciplined approach is clearly a prerequisite for success, however, because of the uniqueness of the facility, people's familiarity with TQM, type of business, corporate culture, etc., a flexible approach (number of steps, sequencing, tools utilized, etc.) must be employed to encourage innovative thinking.
- **Pollution Prevention can often be achieved without large capital investments.** Small and large organizations alike are equally able to benefit from the skillful application of TQM in pursuit of pollution prevention opportunities. Success depends more on the creativity and energy of the employees involved, rather than on the amount of capital invested.
- **There is no universal metric for tracking performance.** The diversity of industrial processes, products and services, preclude the creation of a single, uniform standard by which all pollution prevention programs can be measured and compared. However, metrics that are credible (based on documentable performance data) and practical (not overly scientific and easily understood) are essential qualities for effectively communicating pollution prevention progress to interested stakeholders.
- **Consultation and collaboration with stakeholders interested in emission or waste reductions is critical in developing credible progress reports.** Early involvement of interested parties in pollution reduction and prevention activities helps facilitate the communication process. An understanding of the goals and objectives of the various stakeholders is absolutely essential for putting information into terms that they can accept and endorse. Secondly, time is not wasted on gathering data and producing information based on speculation of stakeholder interest or concerns, rather on more constructive tasks, such as discussions regarding what is and is not possible.
- **Currently, there are both barriers and incentives to Pollution Prevention.** Reduced management costs, enhanced public image, and competitive opportunities are a few of the tangible benefits associated with the TQM route to Pollution Prevention. However, there are also numerous real-

world obstacles that range from limited resources (both people and dollars) to a compliance-only mindset (why do anything extra?)

The Challenge Ahead

The experience and knowledge gained through these twelve projects have been incorporated into a report titled *"Total Quality Management: A Framework for Pollution Prevention"*. It is intended that this report will provide practical guidance and realistic insights into the process for other companies contemplating Pollution Prevention programs of their own. The report includes information on three important topics:

- **A Proven Step-By-Step Approach:** An 8-step generic model based on TQM and designed to serve as a guide for exploring pollution prevention opportunities in any industrial setting.
- **Hints on Developing Credible Measures of Performance:** A menu of different, but practical metrics that will help any company to develop appropriate information for communicating pollution prevention efforts.
- **Incentives & Barriers Likely to be Encountered:** Insights into the motivation for and resistance to Pollution Prevention programs.

The "Report" will become available through the Council on Environmental Quality in January, 1992.

Our challenge as participants in the Quality Environmental Management Initiative is to build on this endeavor by actively marketing the report, and the wisdom that it contains, to companies that have not yet harnessed the power of TQM nor realized the full benefits of Pollution Prevention.

WORKPLACE WASTE REDUCTION INITIATIVE

President's Commission on Environmental Quality
Solid Waste Subcommittee

OVERVIEW

The Workplace Waste Reduction Project has produced a material and solid waste reduction guide for the administrative and commercial sectors. The Workplace Waste Reduction Guide promotes more efficient materials use through source reduction, reuse, recycling and composting based on a thorough examination of procurement and operating practices. During the summer and fall, the guide was tested in several diverse organizational settings to identify its strengths and weaknesses and evaluate its overall usefulness.

The demonstration projects provided the participating organizations direction on how to improve their waste reduction programs and the Solid Waste Task Force important feedback on how to make the guide more user-friendly and effective. The revised guide will be circulated through Commission members and trade associations to promote waste reduction by a wide range of American businesses and institutions.

PROJECT DEVELOPMENT

Representatives from the Browning Ferris Inc., Environmental Defense Fund, International Paper, Procter and Gamble and Waste Management Inc. comprised the Solid Waste Task Force. They agreed that three of the top issues presently facing the nation in solid waste are: design for recyclability, source reduction and demand for recyclables. The Task Force developed the Workplace Waste Reduction Initiative because it addressed two of the three issues -- source reduction and the procurement of products that contain recycled material.

The initiative consisted of: the development of a waste reduction guide; the testing of the guide in diverse organizational settings; revision of the guide based on demonstration project results; and circulation of the finished product to Commission members and trade associations. The project was approved by the Commission last Spring and has progressed on schedule.

INDIVIDUAL PROJECT SUMMARIES

Ace Hardware: Ace Hardware participating facility's included a regional distribution center in Hartford, CT and an independently owned retail store, Tag's Hardware, in Cambridge, MA.

Bechtel Inc.: Bechtel is using the guide in a few of their administrative offices in San Francisco.

Browning Ferris Inc.: BFI will use the guide in several of their operating districts to identify cost-effective waste reduction opportunities for their vehicle maintenance programs. In October of 1993, BFI will prepare a written report containing project results and share this information among its 625 BFI districts.

Council on Environmental Quality: CEQ set up the "Green Team" to identify waste

reduction opportunities and develop programs to encourage each employee to be more active in the waste reduction program.

Environmental Defense Fund: EDF surveyed the materials use and waste reduction practices of their Washington, DC office to identify priority waste streams as well as new waste reduction opportunities.

Pacific Gas & Electric: PG&E's recycling coordinator recruited six divisions to participate in this initiative, ranging from a line maintenance unit to administrative offices.

Procter & Gamble: A cross-functional team has focused on a product development area to identify process changes that would reduce raw material costs, warehouse rental fees, inventory management, and disposal costs. These process changes and the guide will be shared with other product development groups.

Waste Management, Inc.: WMI pilot tested the guide at two locations -- its Chemical Waste Management (CWM) subsidiary's Geneva, IL complex and its Washington, DC Office. Both locations established teams to document existing practices, test the guide and identify and implement improvements.

Yosemite National Park: Several organizations within the Park including the National Park Service, Yosemite Park & Curry Company, Yosemite Institute and the Ansel Adams Gallery participated in this initiative. A comprehensive waste reduction plan for Yosemite National Park will be completed in January. Ideally, this project will serve as a model for national, state and local parks throughout the nation.

LESSONS LEARNED

- A majority of waste reduction options involve simple, common sense changes in purchasing and operating practices.
- Waste reduction programs require a strong advocate. Ideally, the advocate can secure a strong commitment from management and effective communication of this commitment to environmental quality to all employees involved .
- The potential for waste reduction, lower waste disposal costs, a decrease in the demand for raw materials, revenues from recyclable materials and an improved public image provided organizations the incentive to voluntarily test the guide.
- Because the guide emphasizes employee involvement in waste reduction, it promotes an environmental ethic. Employees who care about the environment are the best source for practical and creative waste reduction options.
- A primary barrier to waste reduction is organizational inertia, which can be attributed to a "business as usual" type attitude.
- The lack of data supporting the premise that "waste reduction pays" is another barrier to waste reduction. This is especially prevalent where economic incentives are weak, e.g. for smaller businesses affected by poor economies of scale or where

the benefits of waste reduction accrue to customers rather than the business itself.

- Without the assistance of a consultant, many organizations had trouble moving beyond recycling in their waste reduction programs. Education and training, in many cases, is necessary to foster source reduction and reuse.

NEXT STEPS

The revised guide is being disseminated to Commission members, trade associations and public agencies. The goal of the outreach program is to encourage each recipient of the guide to enthusiastically participate in this "grass-roots" waste reduction effort.

A separate report highlighting the Yosemite National Park Waste Reduction Plan was recently completed. It provides a fine example of how source reduction, reuse and recycling can be integrated into organizational management and operations. This plan should demonstrate the effectiveness of the guide and provide a conceptual framework that should help other organizations develop waste reduction programs of their own.

11/20/92

Energy Efficiency Initiatives - Summary Report

The energy efficiency initiatives developed by the President's Commission on Environmental Quality demonstrates that sound environmental policy can go hand-in-hand with sound economic policy. By using energy more efficiently, organizations and their employees reduce operating costs while lessening the adverse environmental impacts associated with energy production and use.

Efficiency opportunities abound in both gas and electric energy end-uses. For example, about 80% of electric use in the United States is associated with motor drives, lighting, space heating and cooling, and water heating. A conservative estimate by the Electric Power Research Institute indicates potential electricity savings by the year 2010 equivalent to 16% of 1990 consumption, with resultant reductions in CO2 emissions equivalent to 18% of 1990 emissions and annual customer savings of \$32 billion by the year 2010. Various estimates of the total technical potential for cost effective electric efficiency are even higher and range between 30% and 75% of total electric use.

The energy Task Force (list of members attached) developed a comprehensive list of cost effective measures to reduce energy consumption. That list was reduced to the five measures offering

the best hope for significant market and environmental impacts, specifically:

♦ **Invest In Energy Efficiency**

Cost-effective investments in energy efficiency reduce pollution while making U.S. business more competitive in the global economy. PCEQ is supporting participating organizations by providing case studies; a comprehensive directory of utility energy efficiency programs; and models for analyzing potential investments in such improvements as high efficiency lighting, insulation, motors and control systems.

♦ **Encourage Employee Involvement in Energy Efficiency**

Employee energy efficiency education can lead to reduced home energy bills, carry over to the workplace, increased employee loyalty and can contribute to healthier home and work environments, PCEQ is supplying participating organizations with educational materials as well as technical assistance to inform employees about energy saving opportunities.

♦ **Encourage Energy Efficient Commercial Lease Practices**

The structure of most commercial leases currently provides little incentive for tenants or landlords to improve the energy efficiency of the individual space they occupy or the building as a whole. Innovative leasing practices can enable both the tenant and landlord to benefit from the money savings realized by investing in energy efficiency.

PCEQ has developed and is distributing lease negotiation guidelines that ensure equitable allocation of costs and savings of energy efficiency improvements between landlords and tenants.

♦ **Charitable Contributions: A New Perspective**

The U.S. nonprofit sector's energy consumption comprises 1.5% of the nation's energy bill. By increasing its efficiency 20-30%, the nonprofit sector could benefit the environment by burning less coal, oil and gas, and freeing over \$1.5 billion annually. These funds could be redirected toward those institutions' charitable missions.

PCEQ is providing language to be included in donation agreements to encourage recipients to consider making their facilities more energy efficient.

♦ **Accelerate Utility Involvement in Energy Efficiency**

Active and innovative involvement of gas and electric utilities is essential to achieving the environmental benefits of increased energy efficiency. Currently a number of disincentives exist creating barriers to utility involvement in promoting energy efficiency in certain states. As an example, standard rate-setting practices for public utilities typically reduce net revenues as sales drop, even if the reduction is due to customers' improvement in energy efficiency. In addition, utility earnings are not typically linked to performance standards for efficiency measures.

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PCEQ has identified examples of successful regulatory reforms and is providing them to participating organizations to facilitate greater understanding of the problems and their solutions.

The work of the Energy Efficiency Implementation Team was made possible by the donation of loaned executives and other support by Honeywell, Inc. and Pacific Gas and Electric Company. Financial support was given by the American Gas Association, Edison Electric Institute, Electric Power Research Institute, the Energy Foundation, the Gas Research Institute, and the U.S. Department of Energy.

Participating organizations represent a broad cross section of business and non-governmental organizations. The attached list identifies those organizations that have signed up or otherwise indicated interest in undertaking one or more of the PCEQ's energy initiatives. Currently, 42 organizations have expressed interest in the energy initiatives, and the loaned executives have completed the support activities committed to participating organizations.

The PCEQ initiatives are expected to have a significant impact in opening up new market opportunities for energy efficiency, particularly commercial leases and the nonprofit sector, and in leveraging existing energy efficiency programs through expanded information dissemination. Because of the inherent value of the initiatives, and of the materials prepared to support the initiatives, the Alliance to Save Energy, Electric Power Research Institute, and the American Gas Association will continue to utilize their communications channels to publicize the availability of the resources and to make relevant PCEQ materials available to their members. The Alliance to Save Energy will convene a transition working group in early 1993 to carry forward the outreach efforts for these initiatives.

The bottom line results of these PCEQ initiatives--energy savings and the associated air quality and other environmental improvements--will not be known for some time. The Alliance will conduct surveys of participants to determine activities and savings from these initiatives. A survey will be conducted at the end of 1993.

President's Commission on Environmental Quality Delaware Vehicle Retirement Program

Summary Overview:

Market-based scrappage programs, or "clunkers programs," will not only improve the air quality, but also provide for safer roads. The Delaware Vehicle Retirement Program, the PCEQ pilot program, demonstrates that accelerated removal of older, high-emitting vehicles benefits all parties including consumers, regulators, industry, and the environment. As EPA emissions models indicate, older vehicles, in particular pre-1980 models, pollute in a disproportionate amount relative to their population size and vehicle miles traveled. The large contribution of older vehicles to overall vehicle air emissions has prompted interest from President Bush, EPA, and numerous state air quality agencies in accelerated vehicle retirement (AVR) programs, which have the potential to achieve significant reductions in those emissions. At the outset of the project, the DVRP/PCEQ team recognized that to be successful, AVR programs will need to generate quantifiable reductions in vehicle emissions that would be acceptable to regulators for determining emission reduction credits. To achieve this goal, the project developed the following operational objectives:

- demonstrate a method for quantifying reductions from AVR programs
- analyze the cost-effectiveness of targeted AVR programs
- share information generated with businesses and regulatory agencies considering AVR

Background and Milestones:

U.S. Generating, a non-utility based in Bethesda, Maryland, is building a clean-coal cogeneration facility in southern New Jersey. In response to increased air emissions that could affect air

quality in neighboring Delaware, U.S. Generating voluntarily developed the Delaware Vehicle Retirement Program to scrap 125 high emitting vehicles from Delaware.

After two months of working closely with the state of Delaware, Governor William Castle announced the Delaware Vehicle Retirement Program to launch Clean Air Week. On July 1, DRVP accepted its first vehicle to be tested and scrapped. With no formal rules on scrappage program, the DVRP/PCEQ team was in a unique position to understand, as well as, influence emerging guidelines. Indeed, the implementation team was invited by the US EPA, the Office of Mobile Sources, to explain its strategy to the EPA Workshop on "Calculating Emission Reductions from Vehicle Scrappage Programs" and to assist in addressing a variety of outstanding issues.

Project Description:

The PCEQ team, led by U.S. Generating and Resources for the Future (RFF), includes the Environmental Defense Fund, Ford Motor Company, General Motors, and Texaco. The implementation team built a AVR strategy combining elements from the UNOCAL SCRAP program with input from Commission members, environmental groups, industry, regulators, and the EPA. Details of the program strategy include:

- Identifying old, high-emitting vehicles

The PCEQ/USGen effort is linked to the state vehicle inspection and maintenance (I&M)

program. In contrast to the UNOCAI program which advertised generally for pre-1971 vehicles, cars initially eligible for purchase by DVRP were those that have failed the state inspection and have received waivers. (Waivers are given to cars whose owners have spent at least \$75 without successfully repairing the vehicle.) To allow for comparison of these cars with the general population, a pool of pre-1980 vehicles were also selected to better understand emissions data, behavioral responses, and pricing sensitivity.

- Obtaining both high emissions and "control" vehicles* (need to explain)

Owner of waiver vehicles and randomly selected vehicles were sent direct mail solicitations with a listing of criteria and a offer of \$500. Applicants were screened through a 800 number. Over 1000 letter were sent to owners of waiver vehicles. 3600 letters were mailed to owners of pre-1980 vehicles randomly generated by the Department of Motor Vehicles.

- Extensive Emissions Testing

Air Testing Services, located in Lansdale, PA., handled the IM240 testing. The DVRP project test xxx vehicles. No FTP test were conducted, because.... (see table)

- Determining Net Emissions Reductions

To the extent possible, data on replacement vehicles was obtained in the owner survey at the time of vehicle scrappage. Followup survey will occur 6 months and 1 year from purchase. Analysis

- **Scrapping Purchased Vehicles**

After an exhaustive selection process, Danvir/NeCastro Auto Salvage was selected on their willingness to dismantle and destroy the vehicles in an environmentally sensitive manner.

- **Program Analysis and Reporting**

(Salient findings?)

- **Publicity and Outreach**

Articles about the Delaware Vehicle Retirement Program appeared in local press and throughout the nation. DVRP was featured or appeared in stories in the Delaware News Journal, Delaware State News, San Francisco Chronicle, Washington Post, Environment Today, and Inside EPA's: Clean Air Report.

Table:

(will include later)

Facts:

(will include later)

U.S. Environmental Training Institute

PCEQ recognizes that training for environmental professionals from developing countries will promote sustainable development and facilitate the transfer of cleaner technologies. Turning this idea into action, PCEQ endorsed and is contributing to the U.S. Environmental Training Institute (USETI). USETI brings participants from developing countries to the United States for training at U.S. Companies and institutions.

PCEQ members are supporting USETI in a variety of ways. Scholarships for participants are being offered by Chevron and Procter & Gamble. The Bechtel Group, The Conservation Fund, Resources for the Future, 3M, Browning-Ferris Industries, Pacific Gas & Electric Company, and the World Wildlife Fund/Resolve are providing training. Waste Management, Inc. and The Dow Chemical Company are sponsoring courses and contributing to the Institute.

[Insert quote from trainee at November 3-15 course similar to: Ernesto Balay, a geologist from Puerto Rico, said "I made new friends and I learned many things about U.S. technology that will interest my colleagues and supervisors."] In 1992, USETI offered training courses to environmental professionals from Thailand, India, Hong Kong, Morocco, Brazil, South Korea, Taiwan, Mexico, Indonesia, the Philippines and Puerto Rico

A Technology Cooperation Demonstration Project in Indonesia

To further demonstrate the viability of technology cooperation, PCEQ participant organizations Waste Management, Inc. and AT&T have joined with USETI, the U.S.-Asia Environmental Partnership (US-AEP) and the U.S. Environmental Protection Agency (EPA) to conduct a technology cooperation demonstration project in the Republic of Indonesia. This project is intended to explore and demonstrate one of several ways that private sector organizations can work with local business and NGOs to take action on environment and development needs in developing countries.

Indonesian facility managers will be trained March 20-26, 1993 on a wide range of environmentally sound industrial waste management practices by U.S. experts. After the training, efforts will be made to build technical cooperation partnerships through "mentoring" between U.S. and Indonesian businesses and NGOs.

Training will be conducted by USETI in Jakarta in partnership with Waste Management, Inc., AT&T, the US-AEP and potentially U.S. NGOs. Training will take place over six days, hosted by the Waste Management, Inc. office in Jakarta. The training will be directed primarily toward Indonesian industrial facility managers and focus on two major areas: environmental management and industrial waste management.

Training: General training topics will include environmental policy, pollution prevention and total quality environmental management (TQEM). TQEM training could be provided by AT&T and other U.S. experts and focus on quality improvement methods to eliminate inefficiencies that waste resources and cause pollution. Instructors and participants will share their insights about incentives, barriers, management processes, and metrics that contribute to successful quality environmental management. The course will focus on industrial waste management practices, including industrial waste handling methods and technology, solvent alternatives, and prevention of air and water pollution. Visits to local industrial facilities will help focus the training on existing technology and potential improvements.

Technology Cooperation: Combined with industrial waste management training and site visits, participants will develop action plans for implementation of techniques, processes and technology about which they were educated. Participants will develop their action plans with the help of USETI staff, trainers/experts from U.S. business, government and possibly NGOs. U.S. trainers could also attempt to establish technical cooperation relationships to help participants implement their action plans through "mentoring." USETI staff would help facilitate follow-up to action plans with assistance the "mentors."

To promote implementation of action plans, mentors would make themselves available to trainees after the training. During the next several months after the training, mentors would make the effort to check in with selected trainees on a regular basis. As part of maintaining their contact with trainees, mentors might go so far as to facilitate domestic training, fellowships, business arrangements, and project assistance. Such activities arising from the mentoring relationship would attempt to embody the principles of sustainable development: capacity building; use of appropriate technology; attention to net capital flows; consideration of cross-sector collaborative efforts; and awareness of environmental, economic, cultural and social impacts.

----- **Box** -----
For 1993, USETI is offering a variety of environmental management courses to professionals from developing countries:

- **Pollution Prevention;** sponsored by 3M, CH2M Hill
- **Environmental Remediation of Nuclear Sites;** sponsored by Battelle, Westinghouse, and the U.S. Department of Energy
- **Industrial Waste Management;** sponsored by AT&T, Waste Management Inc. and taught in Jakarta, Indonesia
- **Materials Recovery Facility;** sponsored by Waste Management Inc.
- **Industrial Waste Water Treatment;** sponsored by SEC Donahue
- **Pollution Prevention - Waste Minimization;** sponsored by Merck & Co. and Sharpe & Dohme and taught in Puerto Rico

- **Demand Side Management (Energy Efficiency);** sponsored by Pacific Gas & Electric Company and Lawrence Berkeley Labs
 - **Industrial Hazardous Waste Treatment;** sponsored by Browning-Ferris Corp.
 - **Municipal Solid Waste Disposal;** sponsored by the Puerto Rico Solid Waste Management Authority and taught in Puerto Rico.
 - **Industrial Air Pollution Treatment;** sponsored by Air and Water Technologies, Inc.
 - **Solid Waste Disposal Management (Landfills);** sponsored by Waste Management, Inc.
-

----- **Graphic** -----
Picture from November 1992 Course of trainees at a facility

International Survey of Nongovernmental Organizations

NOTE: This project description is serving as a "place holder" until the results of the NGO survey are analyzed and compared with the 1991 McKinsey international survey of business.

PCEQ believes that nongovernmental organizations and business can build common ground for effective sustainable development through better understanding of each other's priorities and perceptions. To promote more knowledgeable and constructive action on sustainable development between nongovernmental groups and business, PCEQ conducted an international survey of nongovernmental organizations (NGOs) and businesses within and outside the United States.

PCEQ contacted NGOs during the summer of 1992, and the responses of NGOs to the survey were compared against the results of a similar international survey of business executives conducted by McKinsey and Company during 1991. The survey sought to establish information of a representative and qualitative nature; not quantitative. The analysis allowed PCEQ to draw comparative impressions of consensus and disagreement between business and NGO respondents in three major areas:

- Recognition of environmental challenges: Priorities, attitudes and outlooks.
- Appropriate response: Policy preferences, tools and effectiveness of approach.
- Barriers: Attitudes about barriers to progress, each other's sector, roles and responsibilities.

Major areas of consensus and disagreement between business and NGOs include:

Recognition of environmental challenges

RESULTS

Appropriate response

RESULTS

Barriers

RESULTS

The analysis of businesses and NGOs was the result of two separate surveys in 1991 and 1992. In 1991 McKinsey & Company surveyed 400 business executives in 48 countries. That survey asked corporate respondents about their priorities on environmental challenges. During the summer of 1992, PCEQ sent a total of 180 surveys to governmental ministries and NGOs in 25 countries. 35 surveys were returned from NGOs in 18 of the 25 countries PCEQ contacted. The survey was also sent to the governments of those same 25 countries. The number of surveys from governmental ministries was below the critical number needed for an effective analysis. The MacArthur Foundation, the National Audubon Society, the U.S. State Department, U.S. Missions abroad and McKinsey & Company helped distribute the survey. McKinsey & Company developed the survey instrument with the PCEQ International task force as part of their pro bono work for the Commission.

The survey highlights the need for business and NGOs to make a stronger effort to understand each other's perspective. The survey illustrates that insights can be gained when organizations move beyond assumptions to dialogue. Understanding and dialogue helps build trust and establish common ground from which to pursue sustainable development. PCEQ intends that the results of this survey will spur business and NGOs to find out more about each other as they join forces on sustainable development.

----- Box -----

Countries from which non-governmental organizations responded to PCEQ's Survey:

United States	United Kingdom	Nigeria
Mexico	Germany	Philippines
Costa Rica	Sweden	Japan
Brazil	Hungary	Indonesia
Venezuela	Poland	Malaysia
Chile	South Africa	India

----- Graphics -----

Selected pie charts and bar & ladder graphs that compare 1991 business and 1992 NGO responses

International Environmental Partnership Study

Environmental partnerships between business and environmental groups are moving former adversaries beyond conflict toward resolution and leadership. The urgency of creating new approaches to global sustainable development needs was underscored by the recent United Nations Conference on Environment and Development (UNCED). Responding to UNCED's international call for action, PCEQ decided to determine how partnerships between business, non-governmental organizations (NGOs) and government can contribute to more effective environmental management. PCEQ intended that the insights gained from this effort will both help those who are already engaged in or are considering creation of partnerships, and identify opportunities to create new partnerships address sustainable development issues.

At the request of PCEQ's International Committee, McKinsey & Company, an international consulting firm, prepared a study on environmental partnerships in the United States and other countries. The study identified areas of opportunity for further collaborative action on sustainable development; illustrated different kinds of partnerships and factors critical to their success; and showed how partnerships can enhance the existing array of domestic and foreign public policy tools. Major findings of the study are:

- Environmental partnerships offer increasingly important opportunities to overcome barriers and achieve more effective, efficient, and equitable solutions to environmental problems. Partnerships can establish common ground and move those affected beyond conflict and compliance toward resolution and leadership.
- Voluntary initiatives offer the greatest opportunity to define problems, set priorities, and undertake solutions. Action in tandem with dialogue is a critical element for sustainable development.
- There is both need and opportunity to create national and international cross-sectoral partnerships to address critical sustainable development issues.
- Environmental partnerships increase the effectiveness of policy approaches such as command and control, market-based incentives, and self-regulation.

The study findings are the result of a six-month examination of more than 40 partnerships worldwide. Of these, twelve partnerships were examined in depth with interviews of individuals from all the participating organizations. In addition, the McKinsey study team discussed the concept of cross-sectoral partnering, as well as specific partnerships, with over

50 leading thinkers and practitioners, including environmentalists, academics, businesspeople, government and international organization officials and negotiating mediators. The study is organized into three sections entitled: "Why partnerships are necessary," "How to make partnerships work," and "Implications for Action."

Why environmental partnerships are necessary: Environmental partnerships can play an important role in developing solutions to increasingly complex environmental problems -- improving the chances that solutions are as efficient, effective and equitable as possible. Environmental partnerships can:

Enhance effectiveness by speeding the development and implementation of solutions, addressing problems in a more comprehensive and integrated fashion, and leveraging pooled skills and information

Enhance efficiency by pooling resources, creating economies of scale, eliminating duplication of effort, reducing transaction costs (e.g., litigation, costs of delay), and generating more flexible and tailored responses

Enhance equitability by facilitating burden sharing and creating more mutually advantageous actions and compromises.

Making environmental partnerships work: Success may require participants to adopt nontraditional behaviors, heed basic success factors, and exercise discipline in applying an appropriate partnership approach to specific issues. Basic success factors include:

Define aspirations. Agreeing on a common purpose, including agreed definition of the problem to be addressed; setting a realistic objective; and creating accountability all are essential to ensuring a common work focus and commitment to the process.

Select the "right" set of partners. The right organizations and the right level of participation must be agreed upon. Including all potential "deal killers" (i.e. those who could disrupt implementation if not included) maximizes the probability that results will be carried out, even if it slows down initial signs of progress.

Agree on structure and operating approach. Establishing a clear decision-making process (including a dispute-resolution mechanism), installing explicit funding arrangements, establishing clear rules about external communications, and developing enough of a common fact base to establish priorities are all critical to the smooth functioning of the processes of the partnership.

----- Graphic -----

Heading: Six Different Kinds of Environmental Partnership Opportunity

FRAMEWORK GRAPHIC

Text: The diagram illustrates six types of environmental partnerships according to where they fit into the solution development process and the public policy process. To maximize success, partners must identify the appropriate type of partnership for the issue addressed. As can be seen in the diagram above, the more proactive the effort, the greater the degree of freedom for that effort to develop creative solutions. PCEQ has operated in the "proactive stage."

Implications for action: McKinsey recommended that the private sector should create new, ongoing partnerships to provide a cross-sectoral perspective to environmental solutions. McKinsey's study recommends four specific initiatives:

- An ongoing national forum of business, environmental groups and government to help the U.S. set its "environmental agenda"
- Specific partnerships to address urgent, high profile issues
- A cross-sectoral "assessment center" to develop a common fact base on the science and economics of environmental issues
- A centralized organization to stimulate greater partnerships

It is increasingly apparent to businesspeople, environmentalists and government officials that environmental issues are becoming far more difficult and complex, as the sources of pollution, diversity of stakeholders, number of substances, and irreversibility of impact increases. Likewise there is an emerging understanding that heightened collaborative efforts will be required to address these complex issues in a manner that is effective, efficient and equitable. While there is great excitement about partnerships, there is also a clear need to develop a better understanding of how to maximize the chances of partnership success, so that the current momentum toward collaborative problem-solving continues.

**Natural Resources Partnerships
President's Commission on Environmental Quality
Natural Resources Partnership Subcommittee**

Most leaders in business, government and non-profit organizations agree that collaborative efforts are needed to resolve many of today's environmental problems.

The concept of voluntary partnership is increasingly emerging as one of many effective environmental management tools because they combine the financial and technical resources of the private sector, the environmental expertise and credibility of non-governmental organizations and the authority of government to proactively address environmental issues. By focusing on issues of mutual interest such as clean air, habitat protection or economic growth, partnerships can foster environmental and economic benefits where confrontation, litigation and regulation may fail or may be more costly and less effective. Through partnerships, organizations can accomplish internal goals more efficiently and improve environmental quality.

Project Overview

Partnership has emerged as a central theme of the Commission. However, for a variety of reasons, a majority of businesses, NGOs and public agencies are neither advocates nor practitioners of environmental partnership. While the concept of partnerships is gaining acceptance among key environmental stakeholders, there is limited experience and/or understanding of how to structure and maintain a successful partnership. The Natural Resources Partnership Subcommittee developed this initiative to expand the understanding of the partnership process and promote the use of partnership among the business, non-profit and public sectors.

To understand the partnership process, its strengths and limitations, the staff of the Natural Resources Partnership Subcommittee selected a diverse group of individuals representing business, government and non-profit organizations to oversee The Natural Resources Partnership Initiative. The Natural Resources Partnership Task Force consisted of twenty-two individuals with experience in or a working knowledge of natural resource partnership. This task force of natural resources experts worked with the Management Institute for Environment and Business (MEB) to develop partnership case studies, sponsor the Natural Resources Partnership Symposium and identify the circumstances that facilitate partnerships, barriers to partnership and ways to overcome these barriers.

Tools for Analysis

I. Case Studies

MEB researched several natural resources case studies to provide the Natural Resources Task Force insights into the partnership process, emphasizing partnership formation, process and results. These case studies provided the Natural Resources Task Force and MEB empirical data for drawing some conclusions with regard to the dynamics and structure of successful and unsuccessful partnerships. Three partnership case studies were used as background material for

the symposium discussion: Boise Front Coalition, Cooper River Wildlife Management Corridor Initiative, and Growth Management in the State of Oregon.

II. Natural Resources Partnership Symposium

The task force invited over 65 individuals, the majority with partnership experience, from business, non-profit organizations and government to participate in the Natural Resources Partnership Symposium. At this interactive session, the participants were divided into eight groups to discuss the elements important to the formation, function and success of voluntary collaborations. Outcomes from the symposium are to include: a published *Summary of Findings*, analysis of MEB case studies, input into the Natural Resources Partnership Report and a growing network of partnership experts to promote the concept at the national, regional and local level. For example, the participants identified the major elements of success in partnership:

- Shared vision and individual leadership;

Leadership was proven to be the most critical ingredient to the success of a partnership effort. Distinction was drawn between the management and leadership of a partnership. To be effective, a partnership should involve senior-level people in positions of power within their own organizations, or a chosen facilitator.

- Identification of common interests and avoidance of issues where mutual interests don't exist and no compromise can be found;

Interest based discussions and negotiations let people take the time necessary to explain their point of view, explicate their concerns, and establish the legitimacy of their interests in the eyes of others. People learn from each other's perspectives of a problem. If a solution has to involve directional shifts or significant changes in organization, this can be encouraged through interaction over time. Time to work through issues to a position of mutual respect and trust is essential.

- Stakeholders have something tangible to gain from partnership;

A variety of benefits can be derived from partnerships including enhanced credibility, additional knowledge, solutions to problems or a more efficient solution.

- Involvement of key stakeholders as equal parties in partnership.

Equity issues can be addressed even when participants have an unequal power base. Negotiations take place between individuals, providing a basis for legitimate concerns to be shared. Since other public policy approaches to addressing equity questions objectively through regulatory and legislative activity are recognized as limited, this contribution from partnerships is particularly important.

The symposium was sponsored with funding from Consumer's Power, The Conservation Fund and the Non-Profit Commissioners' Staff.

III. Natural Resources Partnership Report

The Management Institute for Environment and Business case study analysis and the symposium findings have been synthesized into the Natural Resources Partnership Report. The first-hand experiences of the symposium participants and the results of case study research have produced an informative and timely report on the status of natural resources partnerships. The report describes the *partnership life-cycle*, organizational incentives for partnerships, successful elements of partnerships, barriers to partnership, ways to overcome these barriers and recommends outreach strategies for promoting the use of partnerships.

Future Directions\Recommendations

Partnership can facilitate cost-effective, credible environmental solutions while building relationships between historical adversaries. The PCEQ will communicate this message to American businesses, non-governmental organizations and government agencies through its report to the President and its two partnership studies. Besides this general communication effort, MEB will publish a book of case studies and analyses of the partnership process. MEB will also publish a series of how to handbooks targeting corporations, public agencies and non-profit NGO's as well as hosting a series of regional workshops in 1993 to promote the use of partnerships. While partnerships are not a cure all, they can offer lasting environmental and economic solutions to complex environmental problems.

Biodiversity on Private Lands

Commission members identified conservation of biological diversity as a major environmental issue. Biological diversity, or biodiversity, is a basic property of nature that sustains humanity and provides food, fiber, health, recreational, aesthetic, and other benefits.

Approximately 60 percent of the United States is private property, and is managed for diverse uses including agriculture, forestry, housing and commercial activities. These lands are home to many plants, animals, and natural communities. Conservation efforts maintain the benefits derived from this biodiversity, reduce the need for difficult and costly efforts to save individual species, and can complement conservation efforts on public lands.

Participants in the *Biodiversity on Private Lands Initiative* agreed on the need to evaluate options for systematically integrating biodiversity conservation into private sector decision making. Through demonstration projects, the Commission assessed ways to promote ecological values in the course of land use decisions also accomodating any basic economic objectives.

The Action Agenda

The challenge was to relate conservation concepts to the realities of private decision making.

Six commission members and ten additional cooperators established demonstration projects involving more than 60 sites; each project demonstrated one or more key aspects of biodiversity conservation. More than 100 individuals and institutions, including project sponsors, scientists and conservation advocates, collaborated in overseeing the projects and synthesizing the "best practices" summarized here.

Participants represent a range of industries: forest products, utilities, energy, chemical, waste management, and pharmaceutical. Projects range in size from small sites around company facilities—just over one hundred acres in suburban Philadelphia—to the 680,000 acre Willapa watershed in Washington state, and involve activities as diverse as converting lawn to native vegetation, conserving endangered species, and participating in watershed planning. Some projects involve core business assets and activities; others do not. Several include strong outreach and education aspects, key to a broader understanding of biodiversity and conservation.

Lessons Learned

Some process-related lessons are clear:

Collaboration is a key element of success. Using the biodiversity expertise of conservation and academic organizations makes for better projects.

Opportunities abound on most property sizes and within most businesses, and can build upon existing activities and cooperative projects. However, there is often real or perceived conflict between biodiversity conservation and the historic pattern of use of core assets.

Momentum can come from the top or from the grassroots. Projects highlighted both overall corporate policies, as well as employee- or facility-initiated efforts.

Resistance to change is an important factor affecting success. Constraints may include lack of understanding of biodiversity, concern over costs, and cultural inertia.

A general framework for a successful project emerged:

- Develop partnerships to focus expertise and community support;
- Assess the biological, regulatory, and corporate situation;
- Plan for action using the best available scientific guidance;
- Implement the actions; and
- Monitor and communicate results.

Several "best practices" also emerged:

Remember that no property exists in biological isolation. Regional patterns are of enormous significance in maintaining natural communities, and collaborative management of larger areas can sustain these patterns. Consider the relationship between your property and those surrounding it, and coordinate management where possible with neighboring properties.

Maintain viable populations of native plants and animals as well as natural communities and processes such as succession. Emphasize sensitive and unique habitats and species. Viable native communities will lose fewer species; nonetheless, rare species and communities still require careful management.

Where management focuses on individual species, identify and protect the entire ecological complex—habitat, predator/prey requirements and the like—upon which the species depends.

Match activity levels to the specific conditions of a site; some areas are more sensitive, while others can tolerate greater manipulation. Be circumspect about disturbing or fragmenting natural habitat, and consider establishing or protecting habitat corridors. Breaking natural populations of plants and animals into isolated groups can seriously threaten their survival.

Balance unavoidable loss with enhancement or restoration elsewhere. In restoring or enhancing, consider both historical losses and the surrounding region when selecting species, communities or habitat patterns.

Incentives and Constraints

A key benefit of innovative action is public recognition of leadership in addressing—not avoiding—important environmental issues. Demonstrated commitment can help improve relations with employees, government, community leaders, and the public generally with obvious benefits for the firm. Property values may be increased or tax advantages gained, and contributions made to scientific knowledge and public education. Positive conservation action may create an atmosphere of trust and cooperation on regulatory matters.

Constraints may be substantial and will likely be faced by most firms. Not surprisingly, most are economic. Profitable land uses or activities may be affected. Transition costs, which include costs of implementation as well as biological inventories and monitoring, may have no obvious financial payback. Finally, simple resistance to change may be compounded by difficulty in achieving measurable results, lack of sufficient expertise or knowledge about biodiversity, conflict with existing regulations, and the potential for voluntary efforts to become codified as regulatory requirements, sometimes called “elevating the baseline.”

Finally, cooperation with others—despite its enormous benefits—is not always easy. Disparate perspectives on goals and options among partners can require substantial time to resolve before trust is established and consensus developed. Progress can be limited by real (or perceived) failure to understand that risks are greater for those whose core business practices may have to change.

Carrying the Process Forward

The Commission is preparing two reports aimed at private landowners, governmental and non-governmental organizations, and those directly responsible for land management (such as engineers, landscape architects, consultants, ecologists, and environmental managers). Our goals are to raise awareness of land management practices that enable economic uses of land and conserve biodiversity; describe incentives and barriers to incorporating biodiversity into land management decision making; explain the value of partnerships in conserving biodiversity; and hopefully spur new partnerships conserve biodiversity on private lands.

The Fresh Water Initiative

Project Overview

The National Geographic Society and The Conservation Fund recognized the emerging problems regarding Fresh Water and sponsored a series of panels on fresh water issues among business, non-governmental and governmental representatives. At the recommendation of the participants, the National Geographic Society and The Conservation Fund formulated a three-point fresh water plan to survey and build upon existing research, to educate America's youth -- tomorrow's leaders --and to raise public awareness. Because freshwater management and protection are chronic environmental problems directly affected by individual behavior, research, education and communication are the most effective tools for improving freshwater quality and quantity in the United States.

Water Education and Conservation Partnership

Active partners in research, education and communication were needed to make this effort a success. The United States Geological Survey joined the partnership to provide the National Geographic Society and The Conservation Fund information and guidance on critical research efforts around the country. The President's Commission on Environmental Quality (PCEQ) endorsed the project, which helped strengthen the outreach components of the effort.

Research

The National Geographic Society, through its Committee for Research and Exploration (CRE) and in partnership with The Conservation Fund, the United States Geological Survey, the PCEQ and other organizations, launched a major research program addressing the quality, quantity and availability of fresh water in the United States. With the support of The Seaver Institute, ten grants were awarded for state-of-the-art assessments in three major areas of research: the socio-economic costs of water from extraction to treatment and disposal; the public's perception of risks to fresh water; and emerging technologies for water cleanup.

In 1993, the CRE will continue its research on fresh water, focusing in part on three critical areas: innovative land-use practices and groundwater management, emerging technologies for water re-use and the interaction of water pricing and water management. To support this effort, the CRE will continue to explore ways to work in complementary fashion with the Geological Survey's projected 10-year, \$80 million National Water Quality Assessment Program and the EPA's many water protection efforts.

Youth Education

The National Geographic Society and The Conservation Fund sponsored two freshwater education programs in 1992 and will continue to support these types of programs in the years to come.

Workshop on Water (WOW)

In partnership with Kraft General Foods, Chevron and the W.K. Kellogg Foundation, the National Geographic Society and The Conservation Fund sponsored the Workshop on Water (WOW) for top social studies teachers from across the country. This workshop brought together two K-12 social studies teachers and a water policy specialist from every state to learn about fresh water, learn how to teach fresh water and to develop plans for **Geography Awareness Week**. This Congressionally mandated week, which falls in November this year, will bring the subject of water to 160,000 schools across the country.

Water Week

In April, The Conservation Fund's Freshwater Institute worked in partnership with teachers from Jefferson County, West Virginia, and the Claude Worthington Benedum Foundation to pilot-test *Water Week*, the first week long water education program for elementary school children in the nation. Classroom lectures, water experiments and field trips to local springs made the week a thought-provoking experience for all involved. *Water Week* will be expanded throughout West Virginia next year and, potentially, throughout the nation with the help of additional partners.

Communication

The National Geographic Society's Fresh Water Initiative Committee and The Conservation Fund are developing a communications plan that will involve the Society's members and television audience in raising public awareness of freshwater issues. A wide variety of projects will make up this extraordinary initiative, including a special 13th issue of National Geographic and a PBS television Special devoted to water. Gilbert Grosvenor, president of the National Geographic Society, will announce these plans and others in the January National Geographic.

Challenges for the Future

This partnership has already proven successful in addressing the critical issues of fresh water. Over the next few years, the National Geographic Society and The Conservation Fund, in partnership with other organizations, will continue to lead this effort in the hopes of elevating freshwater protection and conservation as a priority issue for all Americans.

NATIONAL LEAD POISONING EDUCATION PROJECT DRAFT PROJECT SUMMARY

Lead poisoning is the most widespread environmental disease affecting the nation's children. It can take an enormous toll on children before and during their school years and later in life in the workplace. Yet lead poisoning is preventable. Simple, inexpensive precautions can help parents reduce their children's exposure to lead.

The problem of lead poisoning

Roughly one in six children under the age of six -- some three million preschool -- have unacceptably high levels of lead (>10 ug/dl) in their blood. Public health officials have identified lead poisoning as the most prevalent environmental health threat to children at all socioeconomic levels. Moderately elevated blood lead levels result in subtle but significant and often irreversible impairment of neurological functioning. At higher doses, the consequences include markedly higher rates of reading disabilities and failure to complete high school. Learning impairments contribute to reduced productivity in the classroom and in the workplace.

The social costs of lead poisoning are immense. The Centers for Disease Control has calculated that the average present value (i.e., time-discounted) benefits of preventing a single child's blood-lead levels from rising above 25 ug/dl include \$1,300 in avoided medical costs and \$3,331 in avoided special education costs. In addition, avoiding every 1 ug/dl increase in blood lead level, regardless of starting blood-lead level, yields increased lifetime earnings of \$1,147. (These figures do not reflect numerous benefits for adult health of reducing lead exposure and also disregard any contribution of lead to juvenile delinquency caused by a child's inability to concentrate and succeed in school.) Even using these limited estimates, the overall costs of lead poisoning are remarkable. Allowing a single child to develop a chronic blood-lead level of 25 ug/dl costs our society well over \$30,000.

In general, public awareness of lead hazards and exposure-reduction steps is low. Indeed, many people erroneously believe that lead poisoning problems were "solved" years ago by the phasing out of lead from gasoline and paint. Unfortunately, millions of tons of lead from these earlier uses remain in our environment, causing exposure today. Lead poisoning is preventable, but parents need up-to-date information about lead and how to reduce children's exposure.

Project results

The national lead poisoning education project is an ongoing effort to provide widespread education on this critical issue. The project centers around a powerful public service advertising campaign for all major media - television, radio, newspaper, and magazine -- in top media markets across the country. The public service announcements (PSAs) are targeted to parents and potential parents at all socioeconomic levels. Equally important are efforts to mobilize community resources in a dozens target cities to help reach high-risk families.

Education materials were distributed to the media in December 1992 and first quarter 1993. The public service announcements are expected to generate media exposure over five to 10 months, and community mobilizing will continue to build in the coming months.

In the meantime, the project has demonstrated the following:

- Innovative partnership projects can be extremely effective in addressing a widespread issue by combining resources and expertise. Public-private initiatives can develop a synergy through which goals are achieved that would not be attained either through government action alone or private sector action alone.
- Voluntary efforts can fill specific niches without displacing other approaches. However, all approaches are necessary to solve a problem of this nature, which is widespread and highly complex.
- Clearly, lead poisoning is an issue for parents who want to protect their children. But business also needs to be aware of the problems posed by lead poisoning, since it keeps our future workforce from achieving its highest potential. The PCEQ project will help confront this preventable disease.
- The project has also illuminated issues regarding education of the public on sensitive public health issue.

Project goals

Project PSAs will raise awareness about lead poisoning and provide the toll-free number of the lead information hotline administered by the EPA. Callers will receive the new EPA brochure answering the most-asked questions about lead, recommending testing, and offering simple steps families can take to reduce lead exposure. Other materials will also be available.

The project is giving special attention to people at greatest risk, including low-income, minority, and low-literacy audiences. In a special targeted effort to reach at-risk audiences, a local strategy has been developed for a dozen target cities which have a high percentage of children with blood lead levels exceeding 10 ug/dl. The targeted campaign will work with grass-roots groups, local officials, and local offices of national organizations to reach at-risk families. It will also include posters for buses and subways to convey simple steps to reduce lead exposure.

Development of messages

Federal agency lead experts and the project task force agreed that the level of awareness about lead poisoning among the general public is low. On the recommendation of PCEQ member Dow Chemical, the project consulted Dr. Peter Sandman, a risk communications specialist who works with government, industry, and non-profit groups.

Dr. Sandman identified stages of awareness for the education campaign:

Stage one	"Lead poisoning is a problem."
Stage two	"Lead poisoning is <u>my</u> problem."
Stage three	"I must do something about this."

Focus group testing confirmed the need for clear, strong language and arresting advertising in order to motivate response. The ad concepts, in coordination with a new EPA lead brochure, underwent extensive focus group testing across the country. Focus groups demonstrated the need for two messages: 1) strong, awareness-building messages for people who unaware that lead poisoning is still a problem and that it can affect them); and 2) separate messages for audiences at stage three which include more detailed information on how to help reduce children's exposure to lead.

Project core team and advisors

The project's core team consists of representatives from the Council on Environmental Quality, the Environmental Defense Fund, and the Alliance to End Childhood Lead Poisoning. The core team formed a Task Force comprised of individuals representing federal, state and local governments, pediatricians, realtors, the paint industry, and others knowledgeable about this problem to help design and implement the project. The project also coordinates closely with the Federal Inter-Agency Task Force on Lead-based Paint, which includes experts from the Department of Health and Human Services, including the Centers for Disease Control, as well as the Environmental Protection Agency (EPA), the Department of Housing and Urban Development, and other federal agencies, as well as local health officials and community groups.

Young & Rubicam, the project's pro bono advertising agency, developed the campaign in consultation with the project's core team and task force. Time Warner, Kraft General Foods, Burson-Marsteller, Johnson & Johnson, the National Environmental Education and Training Foundation and others have provided advice, funding, and in-kind services to the project.