Steel and the Great Lakes States
A Policy Statement for the Region

Final Report
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PREFACE

The eight state Great Lakes region has long enjoyed a proud heritage as the nation's pre-eminent producer of steel. Access to abundant natural resources, a skilled labor force, an unequaled transportation system and proximity to markets are but a few of the factors that made steel production a centerpiece of North America's industrial heartland. Despite the vagaries of domestic and international forces, the Great Lakes states continue to account for 70% of domestic steel production, almost all iron ore mining and taconite pellet production, and half of all steel usage.

Steel production is an integral part of the Great Lakes heritage and a vital component of the regional and national economy. To compromise its short and long term viability is to compromise the very foundation upon which any regional and national industrial policy must be based.

For thirty-five years, the Great Lakes Commission has served as an unrelenting advocate for a strong regional economy - an economy that not only provides a bright future and quality of life for its citizenry, but for the nation as a whole. The Commission has not - and will not - stand idly by as this sector of the region's industrial base confronts its greatest challenges.

The preparation and unanimous endorsement of this steel policy statement is a significant milestone in Commission history. State members of the Steel Policy Task Force, with the unwavering dedication typical of all Commission endeavors, worked for over a year, with no shortage of policy debate, to generate a consensus statement. The product is more than a piece of paper. It is a blueprint - an action strategy - to ensure that the region's best interests are served as federal legislation and policies are devised and responses to problems and opportunities are formulated. It is truly an expression of regional unity and commonality of purpose.

A sincere note of thanks is due to every member of the Steel Policy Task Force and, in particular, Fred Hoffman and (later) Jim Callow, who represented the State of Michigan and served as Task Force chairmen. Special appreciation is also extended to Steve Thorp of the Commissions staff, the project manager and principal author of *Steel and the Great Lakes States: A Policy Statement for the Region.*

As with any Commission endeavor, a policy statement is not an end, but a beginning. We urge our member states to make fullest possible use of this statement in advancing the current and future prospects of the Great Lakes steel industry.

Sincerely,

Michael J. Donahue

Michael J. Donahue, Ph.D.
Executive Director

TABLE OF CONTENTS

GREAT LAKES COMMISSION
STEEL POLICY TASK FORCE

Illinois
Lawrence Msall
Assistant to the Director
Illinois Dept. of Commerce
and Community Affairs
100 W. Randolph, Suite 3-400
Chicago, IL 60601

Indiana
Baker Lupton,
Deputy Director
Business Dev. Marketing Group
Indiana Dept. of Commerce
One Capitol, Suite 700
Indianapolis, IN 46204

Michigan
Jim Callow (Task Force Chairman)
Michigan State Office
Hall of the States Building
444 N. Capitol
Washington, D.C. 20001

Fred Hoffman
Government Affairs
Chrysler Corporation
12000 Chrysler Drive
Highland Park, MI 48288-1919

Minnesota
Robert de la Vega
Deputy Commissioner
Minnesota Department of Trade
and Economic Development
900 American Center
150 East Kellogg Boulevard
St. Paul, MN 55101-1421

New York
Lee Smith
Executive Director
Industrial Cooperation Council
1515 Broadway
New York, NY 10036

Ohio
Wendy Patton
Director's Office
Ohio Dept. Development
P.O. Box 1001
Columbus, OH 43266-0101

Pennsylvania
Ms. Mary Bender
Director
Bureau of Econ. Policy,
Analysis & Development
4th Floor-Forum Building
Harrisburg, PA 17120

Wisconsin
Randy Wade
Administrator
Division of Research & Planning
Wisconsin Dept. of Development
123 West Washington Avenue
P.O. Box 7970
Madison, WI 53707

Other Individuals Who Provided Task Force Assistance

Thomas D. Martin (Ex Officio)
Michigan DNR
P.O. Box 30028
Lansing, MI 48909

Jeff McCourt
Governor's Office
State Capitol
Columbus, OH 43215

James T. Jarvis
Minnesota Trade Office
1000 World Trade Center
30 E. Seventh St.
St. Paul, MN 55101

Catherine Roberson
Auto and Steel Division
Manufacturing Development
Group
Michigan Dept. of Commerce
1200 Sixth Street
Detroit, MI 48226

Deborah Tegtmeyer
Ohio Dept. of Development
P.O. Box 1001
Columbus, OH 43266-1001

David Terrell
Deputy Director
Business Expansion Division
Indiana Department of Commerce
One Capitol, Suite 700
Indianapolis, IN 46204

Ron Visness
Minerals Division
Minnesota Department of Natural
Resources
500 Lafayette Road
St. Paul, MN 55155-4045

Tim Wendt
Industrial Cooperation Council
1515 Boradway
New York, NY 10036

Norm Wolf
Division of Water Resources
Illinois Dept. of Transportation
310 S. Michigan Ave., Room 1606
Chicago, IL 60604

Elaine Lewis
Bureau of Econ. Policy,
Analysis & Development
4th Floor-Forum Building
Harrisburg, PA 17120

John Bilotti
Administrator
Divison of Energy &
Intergovernmental Relations
101 S. Webster St. - 6th Floor
P.O. Box 7868
Madison, WI 53707

Great Lakes Commission Staff
Steve Thorp
Transportation & Economic
Development Specialist

EXECUTIVE SUMMARY

Steel and the Great Lakes States: A Policy Statement for the Region is the product of the Great Lakes Commission's Steel Policy Task Force. The Task Force was created in 1988 to develop a regional steel policy position to guide advocacy efforts relative to federal legislation and Commission involvement in related state actions.

The policy statement will be useful as a reference tool for policymakers and industry researchers. The policy section contains six topic areas that encompass public policy as it relates to the integrated steel industry. The identified policy positions will assist the Great lakes Commission and its member states in responding to and devising federal legislation as well as anticipating steel issue opportunities and problems. Implementation procedures are also addressed in the policy position section.

Steel is an ubiquitous material in modern society. The construction, transportation and farm sectors along with the spectrum of durable consumer goods would all be shadows of their current economic presence without steel.

Like no other industry sector, the integrated steel industry and its customers are concentrated in the Great Lakes region. The steel and related iron ore industries are a vital component of the Great Lakes region's durable goods manufacturing cluster and are important to the national economy. In recent years, the Great Lakes states have accounted for 70 percent of domestic steel production, almost all of the iron ore mining and taconite pellet production, and 50 percent of steel usage.

The region's steel industry, particularly the integrated plant sector, has been buffeted by domestic and international forces. These forces have a bearing on the industry's short-term viability and future prospects. Penetration of traditional markets by foreign producers and U.S. minimills, coupled with increasing obsolescence of physical plant and the pressing needs for continued large-scale reinvestment for modernization, have placed the industry in a pivotal historic position.

During the five year period, 1982-1986, the U.S. steel industry was in a depressed condition, the result of economic forces in the U.S. and overseas. The domestic industry sustained losses of nearly $12 billion over that period. As the U.S. economy suffered the effects of a recession from early 1982 through late 1984, the steel industry struggled with reduced demand for steel by traditional steel-consuming industries and a rising level of imports.

In September 1984 the Voluntary Restraint Arrangement program was initiated. The new policy was aimed at reducing the steel import share of the market through a series of bilateral negotiations with major steel exporting countries. During this period of upheaval and uncertainty, the domestic steel industry began to reorganize. The industry's principal objective was to regain profitability and in 1987, breakeven was achieved. 1988 was a profitable year.

This remarkable turnaround for the industry has changed the industry significantly. Since 1982, 42 million tons of capacity have been shut down and the reduction has resulted in the loss of more than 100,000 jobs. The impact of plant closures, particularly on mining and mill towns, has been dramatic. New plant and equipment expenditures, much of it funded by new debt, has improved production efficiencies. Such targeted capital investment, along with reduced employment, wages and benefits, have commbined to lower U.S. producer costs per-net-ton shipped. U.S. costs are now

competitive with those of other major steel-producing countries. Still, the current improving status of the U.S. steel industry is vulnerable to the future threat of imports and other factors that would lessen profitability and dampen capital investment.

TRADE POLICY

Trade policy with regard to steel should be coupled with domestic policies to address these basic goals:

- o to help restore the U.S. industry to sustained, long-term profitability.
- o to provide U.S. steel customers with a sufficient supply of steel of competitive quality at competitive prices.
- o to minimize the nation's steel trade deficit.
- o to help steelworkers and their communities adjust to structural changes in the industry.

The U.S. steel industry requires a trade policy designed to help it withstand the predatory international competitive pressures arising from worldwide steel-making overcapacity, especially during periods of weak steel demand worldwide. Returning world steel trade to market conditions can better be accomplished through multilateral negotiations to restore balance to world steel capacity and demand than through prevailing competitive forces.

Policy Positions

National policy should seek an internationally negotiated solution to the conditions that give rise to predatory trade practices in steel and should promote continued revitalization of the U.S. industry.

Toward these ends the Great Lakes States urge the federal government to:

1. Extend the Voluntary Restraint Arrangement (VRA) program in order to provide effective negotiating leverage with foreign trade partners and to assist the domestic industry to adjust in the meanwhile. The extended program (or any subsequent program) should be linked to the success of international negotiations and to committed adjustment measures by the industry that are consistent with the region's economic interests and the interests of domestic steel users.

   Federal trade policy as reflected in an extended VRA program and international negotiations should be refined to address the following provisions:

   - o Link foreign producers' access to the U.S. market to an agreement to join multilateral negotiations that seek to restore balance to world steel demand and capacity and end predatory trade competition.
   - o Tie import relief to an industry adjustment plan and revitalization strategy prepared in consultation with labor, the relevant federal agencies, steel consumers, and the major steel-producing states. A consultative group of representatives from these sectors should be established to facilitate such discussion.

- o Where predatory trade practices exist, extend the import relief program and international negotiations to important foreign producers not now covered by the VRA program.

- o Prohibit circumvention of the program by covered countries that ship products to the U.S. through third countries.

- o Use import levels as a tap (such as through the short supply provisions) to prevent uncompetitive pricing in the U.S. market.

- o Consider allocating quotas based on strategic trade considerations rather than simply on current share.

- o Consider assigning quotas through auctions in order to capture quota rents.

- o Discourage trading up in steel products by restricted countries.

2. Pursue an active strategy to enhance export opportunities and reduce predatory import competition.

   - o Where foreign trade barriers exist, link access to the U.S. market to reciprocal market openings for high-value U.S. steel products and steel-containing goods.

   - o Adopt an affirmative role in resolving the third world debt crisis.

3. Discourage international finance agencies and foreign governments from supporting construction of additional export steel facilities while steel remains in over supply worldwide.

4. Where appropriate, link access to the U.S. market to efforts in trade surplus countries to stimulate domestic demand.

5. Where appropriate, link access to the U.S. market to efforts by developing countries to raise labor standards, such as wages, benefits, and health and safety standards, in their export steel industries.

6. Make the establishment of comparable environmental standards for foreign industries which export to the United States a major goal of U.S. trade and foreign policy. This is particularly critical for world steel trade, in which U.S. steel companies compete with foreign companies subject to little or no environmental regulation.

ADJUSTMENT ASSISTANCE POLICY

The competitive pressures of our dynamic economy require development of a strategy to manage change and facilitate adjustment by the integrated steel industry, the workers and communities dependent upon that industry.

Policy Positions

The Great Lakes states agree that an adjustment assistance strategy must be developed to help workers and communities respond to and manage change flowing from the competitive realities facing the integrated steel industry.

1. Assessment and Planning

   A. An assessment of the competitive and technological forces affecting the industry and individual facilities in the region should be undertaken. The assessment should focus on the competitive position of individual facilities within the industry, and identify the skill level of employees at those facilities. The goal is to develop an understanding of each facility to allow for the development of programs to upgrade the skills of employees and the competitiveness of those facilities.

   B. A process should be initiated to realistically assess the economic position of communities having integrated steel facilities. The goal is to identify assets and liabilities, strengths and weaknesses, in order to develop a strategy that will achieve economic diversification and long-term prosperity.

2. Restructuring

   A. Alternatives facing a troubled facility should be explored, with special consideration given to ways of restructuring operations in order to begin the process of becoming competitive. The goal is to determine whether steps can be taken that might "buy time" for changes to be implemented. These could include job restructuring, retraining, retooling, reorganizing production, developing new steel products, finding new markets, and employee ownership.

   B. A program or mechanism should be established within each state to coordinate the response of the state to the existence of a troubled facility. The goal is to have in place a responsible person or program to coordinate the resources of the state to assist with the restructuring of a facility.

   C. A comprehensive and coordinated set of services for workers who face displacement should be developed. The goal is to minimize unemployment caused by restructuring. These services could include skills assessment, counseling, job search techniques, vocational training, remedial education and job development.

3. Closure

   A. Workers displaced as a result of a facility closure should have access to the same services as workers displaced as a result of restructuring.

   B. The adaptive reuse of abandoned facilities should be facilitated, consistent with health, safety and environmental standards. The goal is to provide communities with facilities and land which may be useful in its recovery.

   C. The trigger for extended benefit eligibility should be revised in order to permit substate regions to become eligible in the event of a major facility closure. The goal is to better target assistance to areas of critical need.

TAX AND INVESTMENT POLICY

In recognition of the fact that the steel industry is capital intensive, tax policies at the federal, state and local levels should promote the capital formation and investment required by the domestic steel industry to be a competitively viable entity in the global marketplace. A profitable domestic steel industry will provide a tax

base from which tax revenues will be generated to support governmental services.

Policy Positions

The Great Lakes states endorse and support the following policies:

1. Federal tax proposals to encourage capital formation:

   A. National tax and monetary policies which effectively address the federal budget and trade deficits, thereby promoting a healthy investment climate.

   B. A stabilized tax policy which allows for effective tax and investment planning over the long run.

   C. Encourage tax legislation and public policy that is sensitive to the position of domestic steel in the international marketplace.

2. Research and Development - Federal tax policy should be designed to provide appropriate incentives for R & D that enhance international competitiveness.

3. State and local tax policies should be designed to encourage the capital investment and modernization programs which are needed to close the competitive gap which exists between domestic steel producers and foreign producers. Changes in tax policy should be designed to improve the economic climate within the locality or state, thereby improving an already existing tax base.

RESEARCH POLICY

As the American steel industry has strained to adjust to the competitive global marketplace, private research and development expenditures have declined sharply. Federal and state governments may play an important role in stimulating new research efforts crucial to the survival of the American steel industry.

Policy Positions

1. The Great Lakes Commission shall urge Congress and the Administration to continue funding the Steel Industry Initiative and increase funding for iron and steel research at U.S. Bureau of Mines Laboratories. The Great Lakes states should work to maximize the impact of those federal funds through coordination of state, industry and university resources.

2. The Great Lakes states should work together to identify and access a pool of patient capital needed for larger, more capital intensive steel research projects.

3. The Great Lakes states, through their own economic development efforts, should identify strengths (and weaknesses) of their respective steel industries that present opportunities for research and design public/private partnerships to facilitate such research.

4. The Great Lakes states should provide support and technical assistance as appropriate to encourage the creation of steel industry research institutes and activities at universities throughout the region.

5. The Great Lakes states should work together to redirect the interests of the

nation's most qualified engineers from defense-related research activities to commercial applications. An important part of this effort must be to redirect a share of the research support from defense sectors to commercial sectors.

6. The Great Lakes states should work closely with the National Bureau of Standards and Technology to ensure that research in basic manufacturing sectors such as steel be paramount in any national technology agenda.

7. The Great Lakes states should encourage engineering education at the graduate level to provide the qualified research and development specialists vital to the steel industry's renewed research efforts.

8. At present, much federal and industry research effort is being directed at developing more efficient and direct casting techniques. The states can play an important role in expanding the industry's research agenda, particularly in areas that promote the use of Great Lakes area iron ore and coal. Projects that focus on "clean coal" technology and direct smelting of ore are particularly appropriate.

9. The Great Lakes states shall continue to work collectively and individually to create appropriate public sector financial incentives that encourage the steel industry to make investments in research and development. Such incentives may include targeted appropriations for research efforts or educational activities, or tax credits (with adequate performance standards) specific to the steel industry's research and development programs.

REGULATORY POLICY

The air, water, and land of the Great Lakes region are its most precious resources. Every effort must be made to protect them and, if possible, restore their condition to as clean a state as possible when and where environmental resource deterioration has occurred. The future of the Region's quality of life, as well as its economic future, depend upon the protection of the natural environment.

In recent years, many steel companies have installed new environmental control equipment, modified production practices to reduce pollution, and sought ways to use energy sources more efficiently. The Great Lakes States have helped steel companies comply with environmental standards, sometimes permitting delays or exemptions from full compliance for some steel facilities. Future regulatory efforts on the part of the federal and state governments will likely involve the adoption of stricter environmental standards, particularly in the areas of air and waterborne contaminants. As the steel industry attempts to meet stricter standards, additional capital and managerial talent will be necessary. Development of new waste minimization and pollution control technologies will be increasingly important.

Policy Positions

The Great Lakes states agree that it is important for states to continue monitoring impacts on the environment and to continue prosecuting violators of existing environmental regulations. However, more must be done to ensure the long-term viability of both the environmental systems and the industrial infrastructure (particularly the steel industry). The recommended state efforts are:

1. Establish a process to minimize enforcement and regulatory policy discrepancies and promote the cooperative functioning between U.S. EPA, state environmental regulatory

agencies and industry.

2. Promote the concept of waste minimization and recycling and encourage its implementation wherever possible.

3. In conjunction with consistent enforcement policies, the Great Lakes states should endeavor to provide more and better technical assistance to those companies interested in improving their waste management practices.

4. Develop funding strategies to assist in defraying the cost of pollution control and pollution reduction equipment and technologies.

5. Encourage the use of energy efficient technologies in steelmaking and processing practices wherever and whenever possible.

6. Aggressively promote and support the expansion of the existing knowledge base in the areas of ecology, waste management, waste minimization, and the basic sciences. States should encourage cooperation research to maximize the leveraging of available federal and institutional dollars.

INTERSTATE COOPERATION

As the states with the greatest concentration of steel making, iron ore mining, and related industries, the Great Lakes states have a stake in the industry's success that exceeds that of other states. Because the federal government's agenda contains so many other issues, that level of government will not be able to develop a full and complete agenda for the steel industry. The Great Lakes states are in a unique position to develop cooperative actions to assist the industry. Moreover, integrated action by the states will reduce inefficiency and produce consensus faster than independent actions by the various states.

Policy Positions

Besides the issues of common interest identified in other sections of this document, the Great Lakes states agree to pursue a common agenda in the following areas:

1. Washington agenda. Each of the states maintains a representative or office in Washington to keep states informed of federal legislative and executive branch matters. The representatives often lobby on behalf of state interests or work with state congressional delegations on matters of common interest.

   These individuals should work together to keep the states fully informed of federal trade and tax policy changes that will have an impact on the development of the steel industry. Following major tax revisions and the new trade bill, major overhaul of these laws is unlikely. But as time passes, the Congress will inevitably make alterations to the laws as circumstances demand.

   Collective state action to insure that any changes in these or other laws conform to the best interests of the industry can have an important impact on industry growth. Collective action by the Washington representatives can keep states informed, and also allow for coordinated congressional delegation action on specific matters.

2. Development of an agenda of federal legislation. Opportunities exist for the steel industry to increase efficiency through a variety of measures that involve federal regulation or legislation. The states should help the industry by forging cooperative lobbying and information gathering on these topics. Specifically, the Washington representatives should explore relaxation of anti-trust provisions for exporting, research and development and particular industry restructuring activities. In the recent trade bill, Congress allowed limited anti-trust exemption for cooperative overseas marketing of electronics products, signaling a potential opportunity for the steel industry.

3. State issues and initiatives. Besides federal legislative changes, there are several issues that the states can work on together that will allow greater efficiency in the industry. The states can identify industries that are large users of steel and review regulatory or other barriers to their growth in the Great Lakes region. The states can look for ways for the steel industry and steel users to increase market share in the region, in the nation, and in world markets. The states can work on a reduction of input costs -- such as transportation, power, and other major cost items -- to the steel industry.

Section I

The Steel Industry in the Great Lakes States

INTRODUCTION

The steel and associated iron ore industries are a vital component of the Great Lakes region's durable goods manufacturing cluster and are important to the national economy. The region's steel industry, particularly the integrated plant sector, has been buffeted by recent domestic and international forces. These forces have a bearing on the industry's short-term viability and future prospects. Penetration of traditional markets by foreign producers and U.S. minimills and the growth of alternate materials coupled with increasing obsolescence of physical plant and the pressing need for continued large-scale reinvestment for modernization have placed the industry in a pivotal historic position.

During the five year period, 1982-1986, the U.S. steel industry was in a depressed condition, the result of economic forces in the U.S. and overseas. The domestic industry sustained losses of nearly $12 billion over that period. As the U.S. economy suffered the effects of a recession from early 1982 through late 1984, the steel industry struggled with reduced demand for steel by traditional steel-consuming industries and a rising level of imports.

In September 1984 the Voluntary Restraint Arrangement (VRA) program was initiated. The new policy was aimed at reducing the steel import share of the market through a series of bilateral negotiations with major steel exporting countries. During this period of upheaval and uncertainty, the domestic steel industry began to reorganize. The industry's principal objective was to regain profitability and in 1987, breakeven was achieved. In 1988, a profitable year is expected.

This remarkable turnaround for the industry has changed the industry significantly. Since 1982, 42 million tons of capacity have been shut down and the reduction has resulted in the loss of more than 100,000 jobs. The impact of plant closures, particularly on mining and mill towns, has been catastrophic. New plant and equipment expenditures, much of it funded by new debt, has improved production efficiencies. Such targeted capital investment, along with reduced employment, wages and benefits, have combined to lower U.S. producer costs per-net-ton shipped. U.S. costs are now competitive with those of major steel-producing countries. Still, the current improving status of the U.S. steel industry is vulnerable to the future threat of imports and other factors that would lessen profitability and dampen capital investment.

STEEL PRODUCTION, SHIPMENTS AND IMPORTS

Steel is a ubiquitous material in modern society. The construction, transportation and farm sectors along with the spectrum of durable consumer goods would all be shadows of their current economic presence without steel. One example of the steel industry's contribution is revealed in a recent Congressional Research Service study. The study concluded that an increase of one million tons in steel mill product shipments stimulates output from all sectors of about $636 million (constant 1977 dollars) and generates over 6,000 jobs throughout the economy.

Nationally, U.S. steel production fell from 117 million tons (MT) in 1975 to 88 MT in 1985, a 24.8% decline. In 1987, production increased to 89 MT and for the first nine months of 1988, production was more than 75 MT or 11 million tons over the corresponding period for 1987.

During pre-recession years, steel mill shipments totaled 100.3 MT in 1979, 83.9 MT in 1980 and 88.5 MT in 1981. With the downturn in the U.S. economy, steel mill shipments fell to 61.6 MT in 1982, and then increased to 67.6 MT in 1983, to 73.7 MT in 1984,

declined slightly to 73.0 MT in 1985, declined sharply to 69.9 million in 1986, (USX strike was a factor) and increased sharply to 76.7 million tons in 1987. During this past nine-year period, imported steel increased its share of the U.S. market from 15.2% in 1979 to 26.4% in 1984, before falling to 25.2% in 1985, to 23.1% in 1986 and to 21.3% in 1987. Table I indicates annual steel mill shipments since 1978.

Table I

Net Steel Mill Shipments: 1978-1987
(Thousand Tons)

1978	97,935	1983	67,583
1979	100,262	1984	73,739
1980	83,853	1985	73,043
1981	88,450	1986	69,948
1982	61,567	1987	76,654

Source: American Iron and Steel Institute

Like no other major U.S. industry, the steel industry and iron ore industry are concentrated in the Great Lakes region. In recent years, steel mills in the eight Great Lakes states have produced nearly 70% of the nation's steel and Minnesota and Michigan account for nearly all of the domestically produced iron ore and taconite pellets. In comparison, auto plants in the Great Lakes states produced 54.1% of the U.S. autos in 1984. Table II indicates the total amount of steel produced in each of the Great Lakes states in 1985 and 1987 by all methods and companies and percent of the national total.

Table II

Total Great Lakes State Steel Production and Percent of U.S.: 1985 and 1987
(Thousand Tons)

	1985		1987	
Indiana	19,687	22.3%	19,290	21.6%
Ohio	14,094	16.0%	16,267	18.3%
Pennsylvania	12,034	13.6%	11,609	13 %
Michigan	7,297	8.3%	7,699	8.6%
Illinois	6,479	7.3%	7,141	8.0%
New York	456	0.5%	375	0.5%
Minnesota	-	-	420	0.4%
Wisconsin	0	0	0	0
Great Lakes	60,047	68.0%	62,802	70.4%
U.S.	88,259		89,151	

Note: 1985 data for Minnesota is not disclosed for reason of confidentiality. Figures are rounded to nearest thousand.

Source: American Iron and Steel Institute

According to the American Iron and Steel Institute, 55 percent of total domestic shipments of steel mill products in 1985 were directed to markets in the eight-state Great Lakes region. When shipment data for the 24.3 million tons of imported steel is considered, the Great Lakes states accounted for about 50 percent of all steel used in the United States in 1985. These figures clearly depict a steel-intensive regional economy compared to the rest of the country.

The depressed condition of the steel industry has severely affected the Great Lakes region which has traditionally been both the major steel producing area of the country and the source of iron ore, coal and limestone used in the steel production process. The high level of steel imports and the decline in domestic production forced steel mills and mines to close, and this resulted in a sharp loss of jobs in the steel sector and related industries. The downturn in steel exacerbated the severity of the 1982-84 recession and slowed economic recovery in the Great Lakes region relative to other parts of the U.S.

STRUCTURE OF THE STEEL INDUSTRY

The steel industry in the U.S. is comprised of three distinct sectors, each characterized by different steel producing technology, products and structural organization. These sectors are: the integrated producers, minimills and specialty steel producers.

Integrated Producers

Integrated producers, which comprise the traditional core of the steel industry and account for most employment in the sector, typically have ownership control of the steel mills, the mines and the taconite pellet plants that produce the iron ore/taconite, limestone, and coal used to produce the steel. Also, several of these companies have Great Lakes vessel and rail subsidiaries or, at least, a substantial capital investment in such equipment. Several foreign iron ore companies (including Canada) entail U.S. investment and partial ownership. Some integrated steel companies own more than one large steel mill, and the majority of the integrated operations are located in the Great Lakes states. Table III lists the integrated companies and mill locations for the Great Lakes region.

Table III

Great Lakes Region Integrated Steel Producers

Acme, Inc.	Illinois
Allegheny Ludlum Steel Corp.	Pennsylvania
Armco, Inc.	Ohio
Bethlehem Steel Corp.	Indiana, Pennsylvania
Inland Steel Co.	Indiana
LTV Steel Co.	Ohio, Indiana, Illinois
McLouth Steel Products Corp.	Michigan
National Steel Corp.	Michigan, Illinois
Rouge Steel Co.	Michigan
Sharon Steel Corp.	Pennsylvania
USX Corp.	Indiana, Ohio, Pennsylvania
Wheeling-Pittsburgh Steel Corp.	Ohio

The market share of the eight largest steel producers fell from 82% of the market in 1950 to 54% in 1983. The two largest integrated producers, U.S. Steel (now USX) and Bethlehem Steel, experienced a loss in combined market share from 45.7% in 1950 to

23.6% in 1983. Because of excessive unused capacity, loss of markets and heavy financial losses, the integrated sector has been forced in recent years to shut down existing plants and several smaller producers have merged. The number of integrated producers is down from 23 independent companies in 1968 to 14 firms with 23 plants in 1985. The combination of reduced output and plant closings has had a severe impact on employment in the steel industry. Average annual employment fell from 453,000 workers in 1979 to 163,000 in 1987, a 64% decline. However, average employment for the first eight months of 1988 has increased to 170,000. Table IV indicates annual total employment (salaried and production workers) in the steel industry since 1978.

Table IV

Total Steel Industry Employment: 1978-1987

1978	449,197	1983	242,745
1979	453,181	1984	236,002
1980	398,829	1985	208,168
1981	390,914	1986	175,000
1982	289,437	1987	163,338

Source: American Iron and Steel Institute

Steel production at an integrated mill has several major steps including the preparation of raw materials, production of molten steel, production of semi-finished shapes and production of mill products such as bars, plates, rods and sheets. Preparation of iron ore actually begins after it is mined but before being shipped to the mill. Most taconite (iron ore) is processed into taconite pellets (two-thirds iron content) to remove physical impurities and facilitate transportation. At the mill, preparation of raw materials involves the production of coke from metallurgical coal for use as a fuel in blast furnaces and as a reducing agent. Iron ore, in its natural state, is the oxidized form of iron, and before the iron can be used to produce steel, the oxygen is removed by the process of reduction. The iron ore is reduced and transformed to molten iron in a blast furnace, and the molten iron is poured into a steelmaking furnace, along with inputs of scrap steel, limestone and alloying agents, where it is transformed into molten steel. The molten steel is poured into an ingot (block) mold, and the steel is cooled before being rolled into semi-finished shapes. These shapes are then heated and are used in the production of final mill products. Each rolling stage causes some loss of product, reducing the overall yield of the steelmaking process.

In response to technological advances in steelmaking, integrated producers have been installing continuous casters in the mills, which allow the molten steel to be poured directly into semi-finished shapes. This eliminates the need to pour the molten steel into ingots and then reheat the ingots before rolling the steel into semi-finished shapes. Introduction of continuous casters has enabled the mills to increase worker output, reduce energy needs, increase the yield of the production process and increase the quality of the product.

Twenty-four continuous casters were installed in U.S. mills from 1982 to 1987. By the end of the decade, around 60% of the U.S. steel production will be from continuous casters, a figure still low relative to Japan's 85% of steel currently produced by casters. The U.S. percentage will represent about 70 million tons of capacity and already the new casting technology to date has resulted in a 6% improvement in product yield and a significant 37% increase in mill energy efficiency from 1982 levels. Other capital investments by the U.S. steel industry in recent years have been for improved rolling facilities, computerized operations, energy conservation and pollution control equipment.

Minimills

Minimills or nonintegrated operations are independently owned companies and generally confine their production to low cost, simple steel products such as bars, rods and wire. These products are made from scrap steel. While the integrated steel producers are concentrated in the Great Lakes region, minimills are more geographically dispersed with greater representation in the South and West regions, where they typically employ non-union workers and rely on local markets for scrap material and for sale of their products.

Almost all minimills have continuous casters and minimills use electric furnaces to produce steel from scrap. This eliminates the need for the mill to have large inventories of coal and iron ore and blast furnaces, and enables the entire steelmaking process to take place in a relatively small mill - usually with a capacity of less than one million tons. Innovations by two minimill companies, Nucor and Chaparral, have broadened traditional product lines to include medium-wide sheets and wide-flange beams.

Specialty-Steel Producers

Specialty-steel involves the production of higher-valued products such as alloy and stainless steel. Such steel is used extensively in tools, instrument and aircraft production and in components for power plants. Many manufacturing processes use this kind of steel to a smaller extent. The producers of specialty-steel include the integrated steel companies and a large number of small, specialized companies. Like minimills, specialty producers use scrap steel as the raw material for electric furnaces.

Steel Sector Production Trends

From 1975 to 1985, integrated mills experienced a production decline of 109 to 70 million tons or 35.8%, while minimills increased their output from 8 million tons to 18 million tons, a 125% increase. In 1975, 93.2% of the U.S. steel production was by integrated mills, but this fell to 78.7% in 1985. Today, minimills have around 22% share of the market. In terms of steelmaking capacity, the U.S. steel industry operated at 74.5% of capacity in 1975 and at only 66.1% in 1985, which was below the breakeven production level. For the first nine months of 1988, the capability utilization rate has been near 90 percent.

The integrated steel producers face continued decline and further loss of market share through the year 2000. According to Robert Crandall, Senior Fellow at the Brookings Institution, in a 1986 speech titled "Future of America's Steel Industry," overall U.S. steel production is forecast to fall to 84 million tons in the year 2000, of which integrated producers will have only a 64.3% share with 54 million tons while minimills will capture 34.5% of the market with 29 million tons of production. Thus, according to Crandall, while the integrated sector will experience a further 22.9% decline in production by the year 2000, minimills will increase their output by 61.1% over 1985 levels. While the integrated steel sector faces severe competitive pressures during the next dozen years, Crandall forecasts that the minimill sector will experience sustained growth. He attributes this to investments in modern equipment, lower labor costs, relatively low imports in steel products produced by minimills, and continued development of new technologies and associated new product lines.

William T. Hogan, S.J., a Fordham University professor and acknowledged steel industry expert, is less optimistic about minimill production and products. In his recent book, Minimills and Integrated Mills: A Comparison of Steelmaking in the United States,

Hogan indicates that the two sectors are likely to become more firmly established in their existing niches. He believes increased competition among minimills will dampen growth in new small mill facilities and plant-specific production limitations will lessen the tonnage impact of new flat-rolled and structural products.

STEEL INDUSTRY CHANGE: GREAT LAKES EXAMPLES

For the United States, steel employment was more than twice the current level ten years ago. Much of this attrition in steel workers ranks has been in the Great Lakes region. Both production and salaried workers have been dismissed or furloughed. In the last several years, major mills have been closed in Pennsylvania, New York and Illinois. Perhaps the area most representative and symbolic of this change is the Monongahela River Valley upriver of Pittsburgh. This is where steelmaking got its start in 1872 and over time, 12 plants were built. Today, only 3 remain completely open, employing 22,000. However, 30,000 steel workers in the area have lost jobs since 1980. In October 1983, all basic steelmaking at Bethlehem's Lackawanna, N.Y. plant was terminated. 3,900 workers were laid off and 3,400 workers on furlough will never be called back. A decade earlier, Bethlehem had 11,700 workers. A bar mill and galvanizing line were left operating (for more detail on New York's steel industry, see Section III). U.S. Steel (USX Corp.) announced in late 1983 that it would shut down plants and certain operations at twelve locations throughout the country, thereby reducing employment by 15,430 people. USX's South Works facility in Chicago, once a large steel complex, closed after the company decided not to build a new rail mill there. The mill had lost 6,000 workers since 1980 and 9,000 over the last 15 years. The Republic-J&L merger involved some consolidation of Midwest operations. The target facilities were old and were in need of substantial renovation. Because cash flow for the industry had declined to precarious levels, an argument can be made that imports had exacerbated the loss of revenues which, in turn, made it very difficult to reinvest in new plant and equipment. It should be pointed out that not all shutdowns have coincided with the high steel import period. A major U.S. Steel plant in Duluth, Minnesota was ostensibly closed because of the cost of environmental regulation compliance in the 1960s.

Not all of the recent steel industry history of the Great Lakes region is discouraging. It was in this region that the last "greenfield" U.S. integrated plant was built (Burns Harbor, Indiana - Bethlehem). Particular plants and companies depending on product lines are less subject to steel import competition. For example, the Ford Motor Company's Rouge Steel operation has 35 to 40 percent of its output dedicated to Ford vehicle production. With wage concessions from its workers and a $100 million capital investment program, Ford has improved the financial fortunes of its subsidiary and helped to insulate Rouge from the competitive inroads of foreign steel. McLouth Steel, another Detroit-based steelmaker, has resurrected itself from bankruptcy through a major state-assisted restructuring with two employee stock ownership plans which entail 87% control of corporate stock (for more detail see Section III). McLouth's product line is also tied in with the local auto industry and a principal customer, General Motors, helps to reduce the threat from foreign steel through large contract purchases. General Motors, for its part, has supported domestic suppliers not only through large purchases but through insistence on quality control and special contract terms such as volume discounts and guarantees of no work stoppages. General Motors and Ford, together, account for about 10 percent of U.S. steel shipments. Domestic suppliers find themselves in competitive bidding situations with each other for the auto business and, as a result, are more attentive to holding down costs and improving quality. The Armco mill in Middletown, Ohio has become more cooperative with G.M. in tailoring production to the automaker's needs. With nearly 50 percent of its output shipped to G.M., it is apparent why. Inland Steel's only plant at Indiana Harbor is a major

supplier to the auto industry and thus production is related to vehicle demand. However, Inland's principal products are sheet and strip (70%), a category heavily represented by imports. In this case, vehicle demand and the national import penetration percentage are both important in affecting the plant's steel output. If imported steel were significantly cut back from current tonnage levels, Great Lakes production would likely increase, but higher production levels would vary among the companies and individual mills.

As the integrated steel industry in the Great Lakes region restructures and plants are shut down, new opportunities present themselves. At Lackawanna, N.Y. a square mile economic development zone encompasses part of the Bethlehem plant site. This zone is one of ten such zones established by the state in 1987 to encourage new business development and expansion through a comprehensive package of financial incentives including tax abatements and credits, utility breaks, and wage credits. So far, eight businesses have taken advantage of the program at Lackawanna. In the depressed West Pennsylvania steel town of McKeesport, the largest U.S. transfer of industrial property to local government for redevelopment was made in 1988. The agreement between USX Corp. and Allegheny County will permit 360 acres of former steel plant land to be sold with the two parties essentially dividing the proceeds. USX will continue to pay taxes until a sale, and the county will be responsible for preparing the land for development. In Pittsburgh, city-owned development parcels at a former mill site were conveyed to local universities for new building sites. In Pennsylvania and Ohio the conversion of old mills into museums has been proposed to showcase the region's industrial heritage.

U.S. RESPONSE TO STEEL IMPORTS

Since the late-1960s, the U.S. steel industry has sought restraints on imports of steel as a means to revitalize the domestic steel industry. The various programs that have been initiated on behalf of the steel industry have included voluntary restraint agreements with Japan and European producers from 1969-1974, quotas on specialty-steel imports from 1976-1980 and the Trigger Price Mechanism from 1978-1982.

In 1984, in a case filed under Section 201 of the Trade Act of 1974, the U.S. International Trade Commission (ITC) ruled that steel imports in five steel product categories had been "a substantial cause of injury to the domestic industry," and the ITC recommended imposition of higher tariffs and quotas to relieve the U.S. steel industry. This led to introduction in both the Senate and House of the "Fair Trade in Steel Act of 1984," that would have limited steel imports to 15% of the U.S. market for a five-year period.

A Congressional Budget Office study concluded that a 15% quota would have increased the average price of steel in the U.S. by 10%, increased domestic steel industry employment by 6% to 8% and decreased overall U.S. steel consumption by 4% to 5%. Rather than imposing quotas, which might have caused foreign countries to retaliate against products exported by the U.S., the President, in September 1984, initiated a program that involved the bilateral negotiation of voluntary restraint arrangements (VRAs) with major foreign steel suppliers. The goal of the VRA program is to negotiate agreements with major foreign steel producing countries to reduce annual imports of finished steel products to 18.5 percent of the U.S. market for a five year period and to reduce annual imports of semi-finished steel to 1.7 million tons. Overall, the goal of the VRA program is to limit steel imports to roughly 20.2 percent of the U.S. market. Table V shows the recent tonnage history of iron and steel imports to the U.S.

Table V

U.S. Iron and Steel Imports: 1977-1987

Year	Imports (Thousands of Tons)	Imports as a Percent of U.S. Supply
1977	19,307	17.8
1978	21,135	18.1
1979	17,518	15.2
1980	15,495	16.3
1981	19,898	18.9
1982	16,663	21.8
1983	17,070	20.5
1984	26,163	26.4
1985	24,256	25.2
1986	20,692	23.1
1987	20,414	21.3

The Steel VRA Program will expire in September 1989 unless it is extended. The unfair trade practices of steel exporting countries which prompted the VRA program have not been eliminated. Excess foreign capacity in steel production, a principal factor in spurring the rise in imports remains, although some countries have begun to rationalize their industries. The twenty-nine current VRAs have been successful in reversing the import trend but because of a slow program start-up and no agreements with certain key export countries, import volumes for the 1985 - 1989 period will be higher than expected. The American Iron and Steel Institute (AISI), the steel industry's trade and lobbying organization, is advocating expeditious Congressional action for a five-year extension of the current VRA Program. AISI asserts that the domestic industry is still vulnerable to an uncontrolled influx of foreign steel and the current steel recovery with its vast modernization and reinvestment schedule would be jeopardized without VRA program continuation.

Implementation of the steel import restraint program, that would limit imports to about 20.2 percent of the U.S. market, should provide for increased purchases of domestic steel, increased profitability for steel producers, additional funds for capital investments by steel producers and stabilized employment in the steel industry. However, some steel-consuming firms are concerned about the impact of import restraints on their material costs. Caterpillar, Inc., based in Peoria, Illinois, is a leading opponent of steel import controls citing the fact that steel represents 20% of the material costs for a typical piece of earth-moving equipment, and flexibility in shopping for the best price should not be constrained. A 1988 Congressional Research Service study, "Steel Prices and Import Restraints," concluded that the increase in domestic steel prices in 1987 should be attributed to the change in the value of the U.S. dollar and not the import restraint program.

The Great Lakes Commission conducted an analysis of the economic impacts of a steel import restraint program for calendar year 1986 which involved a determination of the economic benefits to the steel industry and of the economic costs to steel purchasers. The study indicates that annual cash flow to domestic steel producers would increase by $1.14 billion, and prices paid by domestic companies that use steel would increase by $116 million which represents less than 3/10 of 1 percent of their annual steel material costs. In addition, the economic impacts would be felt within other sectors of the U.S. economy, such as from higher prices paid by consumers for cars and home appliances and by farms for farm equipment and machinery, but the analysis does not

attempt to predict these impacts. The analysis of the economic impacts of a steel import restraint program that would limit imports to 20.2 percent of the U.S. market is presented in the Appendix.

IRON ORE IMPORTS AND INDUSTRY SITUATION

U.S. iron ore imports have ranged between a quarter and a third of domestic supply in recent years. In 1987, the 16,079,000 gross tons of imported ore represented about 27 percent of total ore consumed at U.S. furnaces. Canada is the chief supplier to U.S. steel firms accounting for about two-thirds of all ore imports. The other leading iron ore exporters to the U.S. are: Liberia, Venezuela and Brazil.

Of the three basic raw materials used by U.S. integrated mills, iron ore is the most dependent on foreign sources. For all Great Lakes area steel mills, U.S. and Canadian ore dominate receipts. Occasional rail shipments and a rare vessel delivery of overseas ore come to lakeside mills for test purposes, but most of this ore is used on the Gulf and East Coasts including interior Appalachian plants. The Lake Superior ore district has been relatively insulated from the direct competitive threat of overseas iron ore. Even though the specter of overseas ore looms for the region, its future presence is not assured.

Overseas ore does have a significant production cost advantage over North American ore. Labrador and Quebec iron ore costs less to mine and process than does U.S. ore but some transportation costs are slightly higher and as a result, the delivered price of the Canadian and U.S. ore at U.S. Great Lakes mills is relatively similar. Another possible factor in equalizing delivered price is the joint U.S.-Canadian ownership of certain ore companies. Pricing decisions are presumably made in light of fixed cost considerations thereby minimizing intracompany dislocations attributable to ore production and transportation cost differences.

Overseas ore production costs, on the other hand, may be as much as a one-third to one-half less than North American costs. Certainly, one cost differential factor is that North American ore is mostly pelletized compared with the higher grade ore from Australia, Africa and South America. Transportation costs for some overseas ore may be absolutely higher for the combined ocean and U.S. inland routes than comparable U.S. and Canada transportation but the usual delivered cost is much less. In 1983, it was reported that South American ore could be brought into Chicago for $12.00 less a ton than Great Lakes-Canada ore. However, major changes in the North American iron ore industry have nearly eliminated any competitive advantage for foreign ore. In fact, one recent study has indicated a rough equivalency between the world price and the North American spot price at Pittsburgh. These changes include a reduction in excess pellet capacity to 55 million tons from 90 million tons in 1982, improved pellet quality and reduced labor and energy costs. U.S. steel plants located near the Great Lakes are unlikely to significantly switch to overseas ore for blast furnace feed. The U.S. Bureau of Mines estimates that the Lake Superior iron ore district has at least a 100-year or more supply of ore based on current production levels. This reserve, along with continual maintenance and replacement of taconite processing facilities, indicates no need to secure additional ore supplies from overseas sources to cover a production shortfall. The fixed investment in ore mining, taconite processing and transportation facilities and Canadian operations will also likely militate against any major change in source of ore supply for the Great Lakes area. Furthermore, long-term foreign supply contracts would contain escalator clauses to adjust for inland transportation cost increases as well as other business variables and, therefore, a certain ore price could not be guaranteed.

For the Minnesota and Michigan iron ranges, the current upswing in steel production is welcome news after several years of near depression conditions. However, the changes that occurred with restructuring will leave a lasting imprint on the regional economy, similar to the open pits that mark the landscape. In northern Minnesota, the Mesabi Range had eight mines and taconite plants with 14,000 workers in 1980; today there are six facilities with 5,500 workers. During this period, 19,000 people have permanently left the area for brighter horizons elsewhere. Taconite production for 1988 is expected to be 40 million tons or a 33% increase from 1987. Mainstreet merchants are feeling the rebound and local unemployment is down to single digits. The wrenching process of adjustment has spawned a significant effort by business and local and state government to promote a more diversified economic base. Electronics and forest products companies are putting down roots. Nevertheless, the taconite industry still accounts for 40 percent of the region's economy and the natural boom - bust mining cycle may again show its dark side.

Carajas Ore Project

Steel and iron ore industry officials have continually registered concern about overseas steel and ore production projects and their potential impact on North American operations. One such project is the world's largest mining development in Northern Brazil. The Carajas iron ore project, operated by Companhia do Vale do Rio Doce (CVRD), consists of the development of an iron ore mining complex, a deep water port near the city of Sao Luis in the Northeastern State of Maranhao, and a connecting railroad approximately 890 kilometers long. It also includes the development of a town at Carajas to accommodate an initial population of about 10,000, new housing and supporting facilities along the railway line, environmental and Amerindian protection components, and a staff training program. The project began production in 1985. It is expected to reach its planned maximum production level of 30 to 35 million tons of iron ore annually by 1990, and to maintain that level of production for at least thirty years. In 1987, iron ore shipments amounted to 22.5 million metric tons. At full production, the Carajas project will account for 7.5 percent of the total potential volume of iron ore traded in the world. Most of the ore will be sold under long-term contracts to Japan and East Germany at a price nearly 25 percent below current world prices. Even so, the project is expected to contribute over $20 billion to Brazil's foreign exchange earnings over the 30-year life of the project.

Financing for the $3.2 billion project came from both domestic and foreign sources. Domestic sources include CVRD internal cash generation, new capital subscriptions, and local loans. Foreign financing is from Japan, European Coal and Steel Community, the German development aid agency, The World Bank, European and Japanese export credits, and the U.S. Export-Import Bank. Commercial bank loans make up the balance of the total foreign commitment. It was the World Bank loan ($305 million) and the fact that the U.S. was contributing funds to the World Bank which were used to provide a "subsidized" loan to Brazilian iron ore producers that raised concern in the U.S. The World Bank does not raise its loan funds through annual member-nation contributions. Rather, it raises funds on the world's private capital markets much as any large private international bank might. It is not clear that the actual loan to CVRD was subsidized. The Bank's agreement with the company for the 15-year, $305 million loan, specifies an interest rate of 11.6 percent and a one-time 1.2 percent guarantee charge. This was comparable to the cost of long-term funds experienced by other similarly-rated major borrowers at the time. Nevertheless, the U.S. with its 23% of total World Bank votes (voting is linked to the size of the member's subscription) was criticized for approving the Carajas loan because it was an action that would indirectly exacerbate the world's oversupply of steel. Cheaper Brazilian ore has the potential to enhance the competitive position of foreign steel producers.

ROLE OF GREAT LAKES SHIPPING

The Great Lakes navigation system provides a low-cost, efficient mode of transportation for U.S. steel mills to receive shipments of iron ore, coal and limestone -- the raw materials of the steelmaking process. A specialized fleet of self-unloading bulk vessels has been built to serve the needs of the steel industry and to ensure a continuous supply of these raw materials to the mills. In addition, because of its proximity to the industrial heartland of the nation, the St. Lawrence Seaway has historically been an important route for foreign imports of iron and steel to the U.S. For example, in 1977 25.9% of U.S. steel imports were shipped via the Seaway to Great Lakes ports. The figure was 16.2% in 1984 and 15.9% in 1986.

From the perspective of Great Lakes ports, steel imports via the Seaway are vital cargoes that comprise a major category of general cargo handled in overseas shipping. Vessels carrying inbound steel are available to carry outbound cargoes. The 4.2 million tons of Seaway steel imports in 1984, assuming an average load of 10,000 tons per vessel, generated 420 vessel sailings into the Lakes, and many of these vessels carried grain and other cargoes on outbound voyages to foreign countries. As the current VRA program developed, less imported steel arrived at Great Lakes docks and port officials expressed concern. However, deliveries continue, but future tonnage levels at individual ports are less predictable. For 1988 (through September) steel imports to Great Lakes ports have amounted to 3 million tons, up nearly 20 percent from the same period the previous year.

The mid-1980s downturn in U.S. steel production and subsequent demand for iron ore caused problems throughout the Great Lakes fleet and created particular difficulties for certain carriers. In August 1986, midway through the navigation season, only 44 vessels or 51 percent of the operational fleet were moving. Since then, the fleet has been downsized through scrapping and now sixty-nine vessels remain. The current increase in ore demand has resulted in the present operation of sixty-two of these vessels. The Lake Carriers' Association (LCA), which represents the U.S. flag fleets operating in domestic commerce on the Great Lakes, supports measures to limit steel imports. Recent LCA Annual Reports state that unfair competition by subsidized foreign steel producers had "led to severe depression in the U.S. iron ore, steel and Great Lakes shipping industries and jeopardized the nation's defense capabilities." Iron ore shipments from U.S. and Canadian ports on the Great Lakes fell from 105.9 million short tons in 1973 to 51.0 million short tons in 1986, a 52% decline. An increase to 60.3 million tons in 1987 was recorded and in 1988 68.3 million tons were shipped.

RESEARCH ON STEEL AND IRON ORE

In recent years, the majority of steel industry research in the U.S. has been product oriented. Such applied research has been dictated by the current financial circumstances of the steel companies. The need for near-term return on investment coupled with large capital outlays for plant modernization has resulted in research budget constraints and little sustained movement toward new "leapfrog" technologies. Research and development spending for the integrated steel sector is estimated to be presently running at one-half percent of sales, considerably less than that for many other manufacturing industries.

The new technologies pertain to process improvements through which the conventional steelmaking process can be shortened, simplified and made much less capital intensive. Two general goals for advanced technology are a coal-based process with a one-step reduction of iron ore directly to steel and a moldless process for continuous casting

of near-net shapes such as through electromagnetic containment instead of traditional rolling and shaping.

U.S. steel companies have not operated in a research vacuum. Steelmaking research is conducted around the world and related information transfer has accelerated. Co-operative research ventures among particular companies, and at times, with a federal government role have been undertaken. A new federal role was approved by Congress in 1985 with passage of a continuing resolution that included a $7.5 million appropriation for what is now referred to as the Steel Industry/Federal Labs (Keyworth) Initiative. The Initiative entails a plan whereby the Department of Energy's National Laboratories in Tennessee (Oak Ridge) and in Illinois (Argonne) would conduct research and development on advanced technologies for steelmaking. The plan also provides for a steel industry cash or in-kind contribution equal to 30 percent of the federal obligation and a comprehensive repayment provision after commercial application of new technology. Thirteen million dollars have been appropriated to date with approximately two-thirds of it going to the Argonne facility. The Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 (P.L. 100-680) is intended to extend the Steel Initiative Program and codify its elements with authorization for $2 million - FY 89, $20 million - FY 90 and $25 million - FY 91.

The U.S. steel industry has decided to pool some research funds in order to set up a market-driven research program at a midwestern university. Operating through the American Iron and Steel Institute, the industry in 1985 selected Northwestern University in Illinois from among 20 university proposals. Initial industry funding of the "Steel Resource Center" is set at $700,000. This "seed money" is intended to leverage several million dollars from other sources.

In December of 1986, the Chicago Mayor's Task force on Steel and Southeast Chicago published a report, "Building On The Basics," which recommended the retention of existing steel producing and steel consuming industries, creation of an advanced technology program for basic industry and the determination of ways to facilitate labor adaptation to ongoing changes in the industry. The report also recommended that the Argonne National Laboratory, in conjunction with the University of Illinois at Chicago and the City, sponsor a "summit" for midwest steel producing and consuming industries with a program focus on advanced technology and related technology transfer issues. The summit would also bring together public policy officials in the region to consider long-range strategic concerns. The resulting "Conference on Technology Transfer and Steel" was held in Chicago on March 4, 1987. It attracted 140 persons who heard updates on the status of the steel industry and participated in six workshops on topics that included cooperative ventures; intra-firm technology transfer; feasibility of an R&D center for basic industry; impacts of social, economic and environmental factors in introduction of new technologies; future technology needs; and the role of federal, state and local governments.

Much of the iron ore and taconite pellet research in the U.S. has taken place at northern Minnesota and Michigan operations. The closure of some mines and pellet plants along with selective retrenchment in operations may have an impact on future raw materials research. In 1983 the Natural Resources Research Institute (NRRI) was established as part of the University of Minnesota at Duluth. The mission of NRRI is to concentrate on applied research and development. The Institute's minerals division hopes to become the central lab for iron ore and minerals research in the area. In July 1986, the USX Corporation agreed to lease its research lab at Coleraine, Minnesota and pay the Institute $950,000 over the next two-and-one-half years to conduct research including the feasibility of using a "home-grown" organic binder in pellet production. Michigan Technological University's School of Business and Engineering Administration at Houghton is also engaged in natural resources research including that for iron ore

and taconite. The State of Minnesota developed an Iron Ore Cooperative Research Program in 1985 with the goal of assisting private sector research with matching grants. The current state appropriation is $600,000 for the biennium (for more detail on the program see Section III).

A major project jointly proposed by the State of Minnesota, USX and a West German engineering firm is a new state-of-the-art iron mill planned for the USX Minntac taconite plant at Mountain Iron, Minnesota. The $125 million mill would turn taconite into iron through a coal and oxygen process known as COREX or K-R direct iron reduction. A substantial federal grant through the Clean Coal Technology Reserve program was applied for ($59.2 million), but the grant proposal was turned down in 1986 in favor of a similar iron mill proposed in Pennsylvania. When that project foundered, Minnesota again became the primary candidate. However, the lack of a steel company sponsor at this time has put the project on hold, but the state is considering a partnership with a steel company to use the federal money to demonstrate the COREX Process at an existing steel mill (for more information, see Section III).

GREAT LAKES COMMISSION STEEL-RELATED ACTIVITY

The Great Lakes Commission has initiated legislative efforts to assist the revitalization of the steel industry. In July 1986, the Commission wrote to House Ways and Means Committee Chairman Dan Rostenkowski and other Great Lakes state members of the tax reform conference committee in support of a "transition rule" for the steel industry. The transition rule would provide for a 15-year carryback of 50 percent of the value of unused investment tax credits against taxes previously paid, amounting to an immediate refund of about $500 million to the steel industry. Support for the transition rule by the Commission was based on the understanding that the amount refunded to the steel industry would be used for reinvestment in steel operations and modernization, consistent with the provisions and intent of the Steel Import Stabilization Act of 1984. The transition rule for steel was included in the Tax Reform Act of 1986 (P.L. 99-514).

The Commission has been active with Great Lakes navigation and steel interests in supporting authorization and funding for a second large lock at Sault Ste. Marie, Michigan. Great Lakes navigation has become increasingly dependent on the present 1200-foot Poe Lock. During recent shipping seasons, nearly half of U.S.-origin iron ore movements were carried aboard large lakers restricted to the Poe Lock. In addition, the substantial low-sulfur western coal movement to lower lakes utilities is also dependent on this lock. It is clear that if a Poe Lock shutdown were to occur for any reason, a serious disruption in certain Great Lakes and national bulk commodity flows would result. The Water Resources Development Act of 1986 authorized a second large lock but a 35% nonfederal cost share requirement ($80 million) has stalled progress on lock appropriations.

The Great Lakes Commission has also sponsored a Great Lakes Steel Policy Colloquy held October 12, 1988 in Detroit. The objective of the Colloquy and preliminary activities was to develop a regional steel policy framework to guide advocacy efforts relative to federal legislation and Commission involvement in related state actions. Colloquy participation included policy representatives from governors' offices and economic development agencies.

SUMMARY

The Great Lakes region accounts for 70 percent of total U.S. steel production and almost all of the iron ore/taconite mining. The eight Great Lakes states use about 50

percent of all steel consumed in the U.S., clearly depicting a steel-intensive regional economy. Integrated operations have been involved in a tremendous restructuring effort since the early 1980s as a means to become more competitive. The closing of outmoded facilities and the reduction of costs were needed to counter the pressure brought on by minimills and an unparalleled assault by unfairly traded steel imports generated by excess world steelmaking capacity. The continuing adjustment of the U.S. integrated steel industry and the implementation of a steel import restraint program have improved the financial performance of most companies. However, this steel sector remains vulnerable to import penetration and its constrained profit potential will likely hinder a timely industry turnaround. As the industry evolves, so does the Great Lakes regional economy. The two have been partners for over a hundred years and the relationship has had its ups and downs (business cycle swings) but divorce is out of the picture.

APPENDIX

ECONOMIC IMPACTS OF A STEEL IMPORT RESTRAINT PROGRAM

Introduction

This analysis of the economic impacts of a steel import restraint program, for calendar year 1986, involves a determination of the economic benefits to the steel industry and of the economic costs to steel purchasers. It indicates that the annual cash flow to domestic steel producers would have increased by $1.14 billion, and prices paid by domestic companies that use steel would have increased by $116 million which represented less than 3/10 of 1 percent of their annual steel material costs. In addition, the economic impacts would have been felt within other sectors of the U.S. economy, such as from higher prices paid by consumers for cars and home appliances and by farmers for farm equipment and machinery, but this analysis does not attempt to predict these impacts.

Methodology

For the purpose of this analysis, the economic impacts of a steel import restraint program are estimated for 1986, assuming that steel imports had been limited to 20.2 percent of the U.S. market. The analysis includes the following steps:

1. Determine the reduction in steel imports due to imposition of steel import restraints that would limit imports to 20.2 percent of the U.S. market.

2. Determine the increase in domestic steel shipments due to the limit on imports.

3. Determine the economic benefits in terms of increased revenues to the U.S. steel industry.

4. Determine the economic costs in terms of higher prices paid by U.S. steel purchasers.

The following assumptions have been made to simplify analysis:

1. Domestic steel purchasers will switch to domestically produced steel and will not reduce steel consumption due to higher prices for U.S. steel.

2. There will be no increase in the prices of domestic steel and imported steel.

Effects of a Steel Import Restraint Program in 1986

In 1986, U.S. steelmakers shipped 69,948,000 tons of steel to domestic markets, 929,000 tons were exported, and steel imports totaled 20,692,000 tons. Imports represented 23.1 percent of the total domestic market of 89,711,000 tons. Had a steel import restraint program been successful in limiting imports to 20.2 percent of the U.S. market, and had U.S. steel purchasers switched to domestic steel without any reductions in the amount of steel purchased due to higher prices, then imports would have totaled 18,122,000 tons, a reduction of 2,570,000 tons. This would have increased steel shipments from U.S. steel producers to 72,518,000 tons.

Steel Prices

According to Peter F. Marcus and Karlis M. Kirsis of Paine Webber Mitchell Hutchins, Inc., publisher of World Steel Dynamics, the price of steel produced in the U.S. in 1986 averaged $490 per metric ton or $445 per short ton. This price represented the composite average prices of 16 steel products. In comparison, Paine Webber indicates the price of imported steel ordered from foreign producers averaged $400 per metric ton or $363 per short ton. F.O.B. foreign port (Antwerp), and the foreign spot market price averaged $310 per metric ton or $281 per short ton, F.O.B. foreign port.

The charge to ship steel from Antwerp to Chicago in 1986 via the St. Lawrence Seaway was about $40 per metric ton or $36 per short ton. Adding this to the price of steel at the foreign port, the price of foreign steel landed in the U.S. will range from $317 to $399 per short ton. On average through 1986, the price of imported steel was 10 percent to 20 percent less than the price of U.S. produced steel.

Paine Webber indicates that, in 1985, the price of U.S. produced steel was $467 per short ton at the beginning of the year, and the price fell to $445 per ton by the end of the year. The downward trend in steel prices from 1985 was supported in testimony by David M. Roderick, Chairman of the Board of United States Steel corporation, on April 4, 1986 before the House Subcommittee on Commerce, Consumer and Monetary Affairs. Mr. Roderick stated that the price of steel produced by his company was $500 per ton in mid-1984 and fell to $445 per ton by the fourth quarter of 1985.

According to a report by the U.S. Bureau of the Census, Highlights of the Export and Import Trade, imports of iron and steel in 1985 had a C.I.F. value of $9.6 billion and were charged duties of $492 million, for a total landed value of $10.1 billion, or an average of $417 per ton. In 1986, steel imports had a C.I.F. value of $8.2 billion and were charged duties of $392 million, for a total landed value of $8.4 billion or $402 per ton. While Paine Webber indicates steel import prices remained steady through 1985 and 1986, the Census Bureau reports a slight decline in import prices.

Based upon the domestic and foreign prices of steel indicated by Paine Webber and the value of imported steel reported by the Census Bureau, the following table presents the trend in steel prices in 1985 and 1986.

	1985		1986	
	Domestic Price/Ton	Import Price/Ton	Domestic Price/Ton	Import Price/Ton
Paine Webber	$445-467	$317-399	$445	$317-399
Census Bureau	-	$417	-	$402

Using $400 per ton as the average price for import steel in 1986, the import price averaged $45 per ton less than the domestic price of $445 per ton.

In 1986, U.S. companies that use steel in their production processes purchased 69.9 million tons of domestic steel at an average price of $445 per ton, for total expenditures of about $31.1 billion. In addition, U.S. companies purchased 20.7 million tons of imported steel at an average price of $400 per ton, for a total of about $8.3 billion. Overall, U.S. companies paid about $39.4 billion in 1986 for steel used in their production processes.

Economic Impacts of a Steel Import Restraint Program

Determination of the economic impacts of the steel import restraint program is based on the assumption that steel imports were held to 20.2 percent of the U.S. market in 1986. The following data on tons of U.S. steel shipments, imports and steel prices are used in this analysis:

- U.S. steelmakers shipped 69.9 million tons in 1986.
- Foreign steel producers shipped 20.7 million tons to the U.S., an import market share of 23.1 percent.
- Had imports been limited to 20.2 percent of the U.S. market in 1986, imports would have declined to 18.1 million tons, a reduction of 2.6 million tons.
- Limiting imports to a 20.2 percent share would have increased domestic shipments in 1986 by 2.6 million tons, to a total of 72.5 million tons.
- The average price of steel in 1986 was $445 per ton for steel produced in the U.S. and $400 per ton for imported steel, a difference of $45 per ton.

Using the assumptions listed above, limiting steel imports to 20.2 percent of the U.S. market in 1986 would have had the following economic impacts:

- Foreign steel producers would have lost 2.6 million tons of steel sales in the U.S. At prices of $281 per ton, F.O.B. foreign port for spot market purchases and $363 per ton, F.O.B. foreign port for steel order prices, the average F.O.B. price of foreign steel destined for the U.S. market was about $322 per ton. At this price, foreign steel producers would have lost sales revenues of $828 million.
- U.S. steel companies would have increased domestic shipments by 2.6 million tons, at an average price of $445 per ton, for an increase in total sales of $1.14 billion.
- On average, the price of steel produced in the U.S. exceeded the landed price of imported steel by $45 per ton. On 2.6 million tons that would otherwise have been imported, but instead would have been purchased from U.S. steelmakers, the domestic companies purchasing the steel would have paid higher prices totaling $116 million.
- An increase of $116 million in the price paid by U.S. companies for steel would have represented less than 3/10 of 1 percent of their total steel material costs.

Section II
Policy Positions

TRADE POLICY

Principles

- o U.S. trade policy should be designed to promote industrial competitiveness that supports a high and rising standard of living in the U.S. U.S. trade policy should not seek competitiveness through a strategy that lowers the standard of living.

- o U.S. trade policy should be designed to sustain world growth, raise living and labor standards in the markets and competing industries of developing countries, and resolve the U.S. trade deficit.

- o Trade policy with regard to steel should be coupled with domestic policies to address four basic goals:

  1. to help restore the U.S. industry to sustained, long-term profitability.

  2. to provide U.S. steel customers with a sufficient supply of steel of competitive quality at competitive prices.

  3. to minimize the nation's steel trade deficit.

  4. to help steelworkers and their communities adjust to structural changes in the industry.

- o The U.S. should no longer allow its market to be the world's outlet for excess steel production. No other nation is unilaterally abandoning a significant share of its domestic market to foreign competition; neither should the U.S. Access by foreign producers to the U.S. domestic market should be better negotiated to the nation's advantage.

- o The U.S. steel industry requires a trade policy designed to help it withstand the predatory international competitive pressures arising from worldwide steel-making overcapacity, especially during periods of weak steel demand worldwide. Returning world steel trade to market conditions can better be accomplished through multilateral negotiations to restore balance to world steel capacity and demand than through prevailing competitive forces.

- o Trade policy should support the international competitiveness of the U.S. steel and steel-using industries through measures that stabilize international economic and monetary conditions, that lower barriers to U.S. exports in foreign markets, and that restore growth in developing countries, particularly those in Latin America, that are critical markets for U.S. steel-containing goods.

Background Statement

More and more nations have adopted steel industry policies in response to a variety of international economic conditions, giving rise to chronic overcapacity in the world steel economy. As a result, world steel trade is now governed more by national policies in support of their steel industries than by the economics of the marketplace. Steelmaking has been a largely unprofitable enterprise for the past 20 years for most countries. Between 1977 and 1984, the western world's sixty major steel producers lost over $22 billion. The U.S. industry lost nearly $12 billion between 1982 and 1986.

The casualties in this environment are not the least competitive steel producers, but rather those least protected. Unwilling or politically unable to close inefficient or unneeded capacity, most nations rely heavily on import restrictions, export assistance, production subsidies, debt relief, and state ownership to support their domestic steel industries. Many world steel producers have come to rely on the relatively open U.S. market to absorb excess production, to the disadvantage of the comparatively unassisted U.S. industry. This situation becomes especially acute during cyclical economic downturns. Production is maintained, but reduced demand forces producers to unload steel on the world markets at prices below the costs of production.

These conditions enabled imports to capture an increasing share of the U.S. market in both good times and bad through the 1980s until they were limited by the Voluntary Restraint Arrangement (VRA) program. Imports' share of the U.S. market grew substantially during the recession early in the decade, and, aided by the overvalued dollar, surged during the U.S. recovery. Import share grew to 26% of the U.S. market in 1984. Imports captured 21% of the U.S. market in 1987, limited by the VRA program and stronger demand worldwide.

The problems of the U.S. steel industry have been compounded by the declining international competitiveness of its American industrial customers. The overvalued dollar, slow growth outside the U.S., and closed markets abroad led to increased U.S. imports of steel-containing goods and lost export markets, particularly in Latin America. The annual U.S. trade surplus in capital goods (not including automobiles!) collapsed between 1980 and 1986, declining by almost $60 billion. This accounts for one-third of the entire U.S. merchandise trade deficit, and has added as much as 9 million tons per year of additional net steel imports.

Though slow to adjust to global competition in the 1960s and 1970s, the U.S. industry has invested in modernization, cut costs, and drastically reduced capacity in the last decade. Since the late 1970s, steel producers reduced capacity by almost one third (almost 50 million tons), and steel industry employment fell from 450,000 to 163,000, a reduction of more than 70%. The steelworkers who survived these cuts accepted real wage declines in many firms to help reduce costs and restore competitiveness.

While this adjustment has restored profits to U.S. steel firms during the current period of strong demand, the recovery is limited. The focus on capacity cuts has limited the industry's ability to take advantage of surging demand, and may threaten the nation with shortages in certain steel products: research shows that the present steel shortages cannot be attributed principally to limits on imports imposed by the VRAs. Volatile international economic and monetary conditions and high domestic interest rates yield too much uncertainty for the long-term return horizon of steel investments. The crushing debt burden on Third World countries has forced them to slash their demand for American steel-containing goods and to direct increased exports to the U.S. market. The U.S. industry still faces closed markets abroad, shrunken demand for capital goods in the third world, and increasing steelmaking capacity in low-wage developing countries.

During periods of weak world demand, American producers, though now among the most efficient in the world, will continue to face predatory international competition that generates huge losses, and a number of firms will again be threatened with bankruptcy. U.S. cutbacks in the face of world overcapacity threaten to abandon a substantial share of the domestic market and make permanent the trade deficit in steel. The U.S. is the only nation to unilaterally abandon a share of its domestic market and the only industrialized nation without the capacity to meet its steel needs. Including the steel traded indirectly in steel-containing goods, U.S. capacity is sufficient to supply only 85% of the steel it uses. Japanese capacity is sufficient to produce 211% of the steel ultimately used by the Japanese economy. Europe's capacity equals 159% of

the steel it uses. The cuts announced by Japan and Europe will leave them far above the level of the U.S. relative to their steel needs.

Excepting the U.S. and Britain, which imports slightly more than it exports, every other developed country is a net exporter of steel, as are Brazil, Korea, and South Africa. The U.S. stands alone with the People's Republic of China as a net importer of a substantial amount of its steel needs. Clearly, the world's excess capacity is not in the U.S. Despite the U.S. industry's past cuts, modernization, and increased efficiency, without action to restore balance to worldwide demand and capacity, the industry will be forced to shrink further as the U.S. continues to absorb the world's excess capacity.

The U.S. should pursue a trade policy to promote growth, rationalize the world's capacity, restore open markets in world steel trade, and help the U.S. industry adjust in the interim.

Policy Positions

National policy should seek an internationally negotiated solution to the conditions that give rise to predatory trade practices in steel and should promote continued revitalization of the U.S. industry.

Toward these ends the Great Lakes States urge the federal government to:

1. Extend the Voluntary Restraint Arrangement (VRA) program in order to provide effective negotiating leverage with foreign trade partners and to assist the domestic industry to adjust in the meanwhile. The extended program (or any subsequent program) should be linked to the success of international negotiations and to committed adjustment measures by the industry that are consistent with the region's economic interests and the interests of domestic steel users.

   Federal trade policy as reflected in an extended VRA program and international negotiations should be refined to address the following provisions:

   - Link foreign producers' access to the U.S. market to an agreement to join multilateral negotiations that seek to restore balance to world steel demand and capacity and end predatory trade competition.

   - Tie import relief to an industry adjustment plan and revitalization strategy prepared in consultation with labor, the relevant federal agencies, steel consumers, and the major steel-producing states. A consultative group of representatives from these sectors should be established to facilitate such discussion.

   - Where predatory trade practices exist, extend the import relief program and international negotiations to important foreign producers not now covered by the VRA program.

   - Prohibit circumvention of the program by covered countries that ship products to the U.S. through third countries.

   - Use import levels as a tap (such as through the short supply provisions) to prevent uncompetitive pricing in the U.S. market.

   - Consider allocating quotas based on strategic trade considerations rather than simply on current share.

- o Consider assigning quotas through auctions in order to capture quota rents.

- o Discourage trading up in steel products by restricted countries.

2. Pursue an active strategy to enhance export opportunities and reduce predatory import competition.

   - o Where foreign trade barriers exist, link access to the U.S. market to reciprocal market openings for high-value U.S. steel products and steel-containing goods.

   - o Adopt an affirmative role in resolving the third world debt crisis.

3. Discourage international finance agencies and foreign governments from supporting construction of additional export steel facilities while steel remains in over supply worldwide.

4. Where appropriate, link access to the U.S. market to efforts in trade surplus countries to stimulate domestic demand.

5. Where appropriate, link access to the U.S. market to efforts by developing countries to raise labor standards, such as wages, benefits, and health and safety standards, in their export steel industries.

6. Make the establishment of comparable environmental standards for foreign industries which export to the United States a major goal of U.S. trade and foreign policy. This is particularly critical for world steel trade, in which U.S. steel companies compete with foreign companies subject to little or no environmental regulation.

Implementation

1. The Great Lakes states should pursue policy positions 1-6 in communications with Congress and the Administration as circumstances warrant.

ADJUSTMENT ASSISTANCE POLICY

Principle

The competitive pressures of our dynamic economy require development of a strategy to manage change and facilitate adjustment by the integrated steel industry, the workers and communities dependent upon that industry.

Background Statement

The integrated steel industry has undergone considerable change. The recession of the early 1980s, increased imports, the rise of "minimills," and the use of substitute materials are major forces that have shaped the industry. The result: consumption declined from 122.5 million tons in 1973 to 76.3 million tons in 1982, rising to 96 million tons in 1987. During the same period, steel production dropped from 150.8 million tons to 74.6 million tons, increasing to 89.2 million tons by 1987.

The response of the industry has been dramatic. Since 1982, steel made using continuous cast technology has increased from under 25 percent to almost 70 percent. Moreover, between 1977-87 the number of large integrated steel facilities fell from 47 to 23; between 1980-87 average annual employment declined from 453,000 to 163,000. But the impact of these changes has often been beyond the capacity of local communities to respond.

The forces of the past decade will continue to shape the industry, necessitating further efforts to improve competitiveness and the possibility of facility closures.

Policy Positions

The Great Lakes states agree that an adjustment assistance strategy must be developed to help workers and communities respond to and manage change flowing from the competitive realities facing the integrated steel industry.

1. Assessment and Planning

   A. An assessment of the competitive and technological forces affecting the industry and individual facilities in the region should be undertaken. The assessment should focus on the competitive position of individual facilities within the industry, and identify the skill level of employees at those facilities. The goal is to develop an understanding of each facility to allow for the development of programs to upgrade the skills of employees and the competitiveness of those facilities.

   B. A process should be initiated to realistically assess the economic position of communities having integrated steel facilities. The goal is to identify assets and liabilities, strengths and weaknesses, in order to develop a strategy that will achieve economic diversification and long-term prosperity.

2. Restructuring

   A. Alternatives facing a troubled facility should be explored, with special consideration given to ways of restructuring operations in order to begin the process of becoming competitive. The goal is to determine whether steps can be taken that might "buy time" for changes to be implemented. These could include job restructuring, retraining, retooling, reorganizing production, developing new steel products, finding new markets, and employee ownership.

B. A program or mechanism should be established within each state to coordinate the response of the state to the existence of a troubled facility. The goal is to have in place a responsible person or program to coordinate the resources of the state to assist with the restructuring of a facility.

C. A comprehensive and coordinated set of services for workers who face displacement should be developed. The goal is to minimize unemployment caused by restructuring. These services could include skills assessment, counseling, job search techniques, vocational training, remedial education and job development.

3. Closure

A. Workers displaced as a result of a facility closure should have access to the same services as workers displaced as a result of restructuring.

B. The adaptive reuse of abandoned facilities should be facilitated, consistent with health, safety and environmental standards. The goal is to provide communities with facilities and land which may be useful in its recovery.

C. The trigger for extended benefit eligibility should be revised in order to permit substate regions to become eligible in the event of a major facility closure. The goal is to better target assistance to areas of critical need.

Implementation

The Great Lakes states agree that implementation of the adjustment assistance strategy must be a joint effort between government and relevant private interests. At a minimum, this public-private partnership should include management, labor, local communities, state and federal government, and in some cases, important customers, suppliers, and creditors. The partners will be involved to greater or lesser degrees depending upon the specific task.

1. Assessment and Planning

A. The Great Lakes Commission should work with the states to coordinate development of the assessment.

B. Local governments and community organizations, in conjunction with the appropriate state agency, should conduct the self-assessment.

2. Restructuring

A. A prerequisite to state involvement in any restructuring is the agreement of management and employee representatives for such assistance. The state should work with management and employee representatives, and where appropriate, customers, suppliers, creditors and local governments, to develop a strategy. While the largest costs will be borne by those having a direct economic interest or relationship, federal, state and local governments should provide assistance.

B. The governor should appoint a lead person or agency who will be responsible for coordinating the state response.

C. The appropriate state agency, working with management, employee representatives and community interests, should identify and coordinate public and private services for inclusion in the program.

3. Closure

A. The same approach should be used as in 2-C. above.

B. The potential costs of reclaiming an industrial facility, specifically the cost of environmental clean-up, requires federal financial assistance to achieve the adaptive reuse.

C. The partnership should press for federal legislation revising the trigger to make extended benefits available for substate regions.

TAX AND INVESTMENT POLICY

Principle

In recognition of the fact that the steel industry is capital intensive, tax policies at the federal, state and local levels should promote the capital formation and investment required by the domestic steel industry to be a competitively viable entity in the global marketplace. A profitable domestic steel industry will provide a tax base from which tax revenues will be generated to support governmental services.

National tax policy is not the only economic instrument available to assist the steel industry. The reduction of the federal deficit and the corresponding drop in interest rates and the devaluation of the American dollar would have a more profound effect on the American steel industry and on its customers than would "fine tuning" fiscal policy.

Background Statement

The steel industry in the United States experienced, in aggregate, financial losses of more than $11 billion during the 1982-87 period. It is only recently that the industry has returned to profitability, buoyed by a combination of increased demand, dollar devaluation, higher selling prices and aggressive cost reduction activities. During the period of heavy financial losses, the steel industry was not able to use accrued investment tax credits. The tax reform legislation signed into law in 1986 contained a "transition rule" for steel which provided for a 15-year carryback of 50% of the value of unused investment tax credits against taxes paid in previous years. This provision was worth over $400 million and was conditioned on the funds being invested in steelmaking operations.

The recent return to profitability should not indicate the steel industry's problems have been resolved. Arguably, domestic steel has made progress via aggressive cost reduction, quality control programs, facility modernizations and product enhancements, but domestic steel continues to be extremely vulnerable to economic factors external to its control.

The steel industry is in a state of constant change, as is every major industry in the nation. Any governmental policy which attempts to maintain the status quo may be more harmful in the long run. Any policy which is developed must free the creativity of the American steel industry, allowing it to adapt and compete in a dynamic environment.

Policy Positions

The Great Lakes states endorse and support the following policies:

1. Federal tax proposals to encourage capital formation:

    A. National tax and monetary policies which effectively address the federal budget and trade deficits, thereby promoting a healthy investment climate.

    B. A stabilized tax policy which allows for effective tax and investment planning over the long run.

    C. Encourage tax legislation and public policy that is sensitive to the position of domestic steel in the international marketplace.

2. Research and Development - Federal tax policy should be designed to provide appropriate incentives for R & D that enhance international competitiveness.

3. State and local tax policies should be designed to encourage the capital investment and modernization programs which are needed to close the competitive gap which exists between domestic steel producers and foreign producers. Changes in tax policy should be designed to improve the economic climate within the locality or state, thereby improving an already existing tax base.

Implementation

1. The Great Lakes states should carefully evaluate any proposed state or federal tax law changes as they may impact the integrated steel production sector. Proposed tax changes should be consistent with policy positions 1 - 3.

RESEARCH POLICY

Principle

As the American steel industry has strained to adjust to the competitive global marketplace, private research and development expenditures have declined sharply. Federal and state governments may play an important role in stimulating new research efforts crucial to the survival of the American steel industry.

Background Statement

Both national and international trends have worked against sustained research efforts by the domestic steel industry in the past decade. Competition from new, efficient steel facilities around the world has focused the attention of the domestic steel industry on basic productivity improvements. The problem was compounded by macroeconomic policies which kept the dollar high on international markets, making foreign steel attractive here and contributing to a severe price squeeze during the period of restructuring. Research and development, the key to any industry's survival, was a victim of the shake-out.

Within the United States, high interest rates and a focus upon short-term profits has worked against long-term research efforts by capital-intensive industries such as steel. This problem has been compounded by a decline in graduation of engineers in mining and metallurgy, as the well-funded research activities of high technology defense sectors have captured a significant share of available talent.

The past decade has seen overall research capacity in the American steel industry drop to a level far below that of its international competitors. One major steel maker estimates that the Japanese steel industry spends five times as much on research as the American industry. Whereas twenty-five years ago, American steelmaking technology was sought by foreign producers, today the important innovations in most phases of steelmaking come from abroad. The American steel industry will not regain a competitive edge unless it regains a technological edge. If the industry fails to regain a place in steelmaking technology, the manufacturing base of the nation is put at a competitive disadvantage.

Domestic steel producers face two major obstacles in their renewed efforts to embark upon an aggressive research agenda: access to sufficient funds for risky research projects and access to qualified personnel to carry out those projects. The public sector may play an important role in helping the industry overcome these obstacles by encouraging collaboration among firms in the area of process research; by creating university-based steel research institutes which may work with the industry on process and product development and which provide training and support for a new generation of engineers and technical specialists for the steel industry; and through selective, targeted financial incentives to stimulate research activities.

Policy Positions

1. The Great Lakes Commission shall urge Congress and the Administration to continue funding the Steel Industry Initiative and increase funding for iron and steel research at U.S. Bureau of Mines Laboratories. The Great Lakes states should work to maximize the impact of those federal funds through coordination of state, industry and university resources.

2. The Great Lakes states should work together to identify and access a pool of patient capital needed for larger, more capital intensive steel research projects.

3. The Great Lakes states, through their own economic development efforts, should identify strengths (and weaknesses) of their respective steel industries that present opportunities for research and design public/private partnerships to facilitate such research.

4. The Great Lakes states should provide support and technical assistance as appropriate to encourage the creation of steel industry research institutes and activities at universities throughout the region.

5. The Great Lakes states should work together to redirect the interests of the nation's most qualified engineers from defense-related research activities to commercial applications. An important part of this effort must be to redirect a share of the research support from defense sectors to commercial sectors.

6. The Great Lakes states should work closely with the National Bureau of Standards and Technology to ensure that research in basic manufacturing sectors such as steel be paramount in any national technology agenda.

7. The Great Lakes states should encourage engineering education at the graduate level to provide the qualified research and development specialists vital to the steel industry's renewed research efforts.

8. At present, much federal and industry research effort is being directed at developing more efficient and direct casting techniques. The states can play an important role in expanding the industry's research agenda, particularly in areas that promote the use of Great Lakes area iron ore and coal. Projects that focus on "clean coal" technology and direct smelting of ore are particularly appropriate.

9. The Great Lakes states shall continue to work collectively and individually to create appropriate public sector financial incentives that encourage the steel industry to make investments in research and development. Such incentives may include targeted appropriations for research efforts or educational activities, or tax credits (with adequate performance standards) specific to the steel industry's research and development programs.

Implementation

1. The Great Lakes states will work collectively and individually with their elected officials in Washington and through their Washington, D.C. staffs to support federal policies, initiatives and legislation that promote research initiatives in basic industries, particularly the steel industry.

2. The economic development staff of the various Great Lakes states will monitor closely their own research-related initiatives, incentives, programs and progress. Complementary programs will be identified and partnerships developed. A quarterly newsletter, with a "revolving editorship," could be the vehicle for coordination.

REGULATORY POLICY

Principle

The air, water, and land of the Great Lakes region are its most precious resources. Every effort must be made to protect them and, if possible, restore their condition to as clean a state as possible when and where environmental resource deterioration has occurred. The future of the Region's quality of life, as well as its economic future, depend upon the protection of the natural environment.

Background Statement

The steel industry is comprised of many related industries. First and foremost are the foundries and mill facilities that produce the raw iron and steel. The raw material supply sector (coal, limestone and iron ore, including taconite processing) make up another cluster of industries. The steel industry can also be considered to include the metals fabricating and finishing industries (plating, painting, adhesives, etc.).

Given the size and diversity of these industries, when taken as a whole, the pathways to potential environmental damage are many. Industrial wastes generated by the steel and steel-related industries can enter the environment through the air, surface water, ground water, and soil. Over the past twenty years, much has been done by the steel industry to reduce pollution at its sources. We must now continue to assess how society can remedy the affected remaining areas.

The steel industry has been faced with numerous economic difficulties during the last two decades; however, despite having to deal financially and managerially with the need to regain a competitive status in world markets, the steel industry has spent significant capital on environmental controls. In recent years, many steel companies have installed new environmental control equipment, modified production practices to reduce pollution, and sought ways to use energy sources more efficiently. The Great Lakes States have helped steel companies comply with environmental standards, sometimes permitting delays or exemptions from full compliance for some steel facilities. Future regulatory efforts on the part of the federal and state governments will likely involve the adoption of stricter environmental standards, particularly in the areas of air and waterborne contaminants. As the steel industry attempts to meet stricter standards, additional capital and managerial talent will be necessary. Development of new waste minimization and pollution control technologies will be increasingly important.

Policy Positions

The Great Lakes states agree that it is important for states to continue monitoring impacts on the environment and to continue prosecuting violators of existing environmental regulations. However, more must be done to ensure the long-term viability of both the environmental systems and the industrial infrastructure (particularly the steel industry). The recommended state efforts are:

1. Establish a process to minimize enforcement and regulatory policy discrepancies and promote the cooperative functioning between U.S. EPA, state environmental regulatory agencies and industry.

2. Promote the concept of waste minimization and recycling and encourage its implementation wherever possible.

3. In conjunction with consistent enforcement policies, the Great Lakes states should

endeavor to provide more and better technical assistance to those companies interested in improving their waste management practices.

4. Develop funding strategies to assist in defraying the cost of pollution control and pollution reduction equipment and technologies.

5. Encourage the use of energy efficient technologies in steelmaking and processing practices wherever and whenever possible.

6. Aggressively promote and support the expansion of the existing knowledge base in the areas of ecology, waste management, waste minimization, and the basic sciences. States should encourage cooperation research to maximize the leveraging of available federal and institutional dollars.

Implementation

The Great Lakes states should assess the policy and environmental regulation of the steel industry in their states with particular reference to the above policy positions.

INTERSTATE COOPERATION

Principle

As the states with the greatest concentration of steel making, iron ore mining, and related industries, the Great Lakes states have a stake in the industry's success that exceeds that of other states. Because the federal government's agenda contains so many other issues, that level of government will not be able to develop a full and complete agenda for the steel industry. The Great Lakes states are in a unique position to develop cooperative actions to assist the industry. Moreover, integrated action by the states will reduce inefficiency and produce consensus faster than independent actions by the various states.

Background Statement

In recent years, the Great Lakes states have been able to fashion common policy positions in a variety of issue areas, including the environment, federal spending, federal research, and economic development. The Great Lakes Commission has a solid track record in many development issues and has built a foundation for cooperative efforts in steel policy. Following a long period of decline, the Great Lakes steel industry now finds itself more efficient and, with the decline in the value of the dollar, in a substantially more competitive position internationally. The coming decade will define the shape of the industry in the 21st century, so the time is ripe for cooperative effort among the states to make the most of the opportunity.

Policy Positions

Besides the issues of common interest identified in other sections of this document, the Great Lakes states agree to pursue a common agenda in the following areas:

1. Washington agenda. Each of the states maintains a representative or office in Washington to keep states informed of federal legislative and executive branch matters. The representatives often lobby on behalf of state interests or work with state congressional delegations on matters of common interest.

   These individuals should work together to keep the states fully informed of federal trade and tax policy changes that will have an impact on the development of the steel industry. Following major tax revisions and the new trade bill, major overhaul of these laws is unlikely. But as time passes, the Congress will inevitably make alterations to the laws as circumstances demand.

   Collective state action to insure that any changes in these or other laws conform to the best interests of the industry can have an important impact on industry growth. Collective action by the Washington representatives can keep states informed, and also allow for coordinated congressional delegation action on specific matters.

2. Development of an agenda of federal legislation. Opportunities exist for the steel industry to increase efficiency through a variety of measures that involve federal regulation or legislation. The states should help the industry by forging cooperative lobbying and information gathering on these topics. Specifically, the Washington representatives should explore relaxation of anti-trust provisions for exporting, research and development and particular industry restructuring activities. In the recent trade bill, Congress allowed limited anti-trust exemption for cooperative overseas marketing of electronics products, signaling a potential opportunity for the steel industry.

3. State issues and initiatives. Besides federal legislative changes, there are several issues that the states can work on together that will allow greater efficiency in the industry. The states can identify industries that are large users of steel and review regulatory or other barriers to their growth in the Great Lakes region. The states can look for ways for the steel industry and steel users to increase market share in the region, in the nation, and in world markets. The states can work on a reduction of input costs -- such as transportation, power, and other major cost items -- to the steel industry.

Implementation

1. The Great Lakes Commission should survey the Great Lakes states' Washington, D.C. representatives to determine what steel-related issues are likely to arise in the next year and share this information with industry and state officials.

2. The Great Lakes states' Washington, D.C. representatives should explore relaxation of anti-trust provisions for exporting, research and development, and particular industry restructuring activities.

3. The Great Lakes Commission should establish a committee or working group of state officials to study and develop an action plan on the issues identified in policy position 3.

Section III

Great Lakes State Steel-Related Programs and Activities

INDIANA

Indiana is now the nation's largest steel manufacturing state in the nation. Indiana's mills, concentrated in Northwest Indiana, employ more than 35,000 people, have a total annual payroll of nearly $1.5 billion, pay more than $100 million in taxes, and sell more than $6 billion worth of steel.

In recent years a solid foundation has been laid to insure a bright future for Indiana's steel industry. The mills have invested more than $10 billion in modernization since 1980. Strong markets exist nearby, and there is good access to water and raw materials.

There are five integrated mills located on the shores of Lake Michigan: LTV Indiana Harbor works, East Chicago; Inland Steel, East Chicago; USX Gary Works; Bethlehem Steel Burns Harbor; and Midwest Division of National Steel in Portage.

This area boasts two of the three largest ironmaking blast furnaces in the country, four ladle metallurgy stations for ultra-clean, tightly controlled state of the art steel making, the most productive hot strip mill, the only two continuous heat treating lines in the nation, and countless data-logging and process control computers.

Additionally, there are two major mills under construction. The I/N Tek project is a joint venture between Inland Steel and Nippon Steel of Japan. The new plant, located in St. Joseph County, will cold roll steel produced at the Inland East Chicago works. Nucor is currently constructing a new mini-mill near Crawfordsville, in Montgomery County in west-central Indiana.

Recognizing the integral role the steel industry plays in the economic vitality of Indiana, the Department of Commerce has encouraged investment in the new technology and the new plants. More than $8 million have been granted for training for new technologies or as a result of the creation of new jobs. More than $16 million have been loaned or granted for the development of infrastructure to support these projects.

In addition to supplementing the steel industry's investments through grant activity, a public-private partnership between the state and the industry has developed. In 1987 the Indiana General Assembly created the Steel Industry Advisory Commission and charged it to develop policy recommendations to help the Indiana industry improve its competitiveness. In its annual report, the Commission identified four policy areas critical to the industry's future. Those four areas were energy, regulatory policy, taxation issues and market and trade. For the first time, a forum exists in which the industry and government are able to identify and discuss areas of concern.

Currently, the Steel Commission is developing a marketing program to promote awareness of the steel industry among Hoosiers. Using the theme, "Indiana Steel, Coming on Strong!", the program will target state leadership, the academic community, and the general public. Through the use of a video, regional informational meetings and brochures, the program will be designed to show the tremendous economic impact the Indiana steel industry has on Hoosier citizens, and to instill pride in one of the state's basic industries.

The video will utilize a series of vignettes which will depict the industry's position in such areas as the impact on local and regional economies; the high-tech nature of the industry; the future need for highly educated workers; the environment and quality of life issues. The brochure will provide basic information on the Indiana steel industry, along with inserts targeting specific audiences such as the academic community.

MICHIGAN

Introduction

Michigan's Commerce Department is no stranger to the state's steel industry. For many years, it has been involved with corporate and labor leaders in their common objectives of preserving and creating jobs. This has been particularly difficult in recent years as the traditional American industry has been rocked by new technologies, new market participants here and abroad, competing materials, and ever-increasing costs of capital equipment, labor, energy and raw materials.

Michigan officials, led by Governor James Blanchard, Commerce Director Doug Ross and Labor Director Elizabeth Howe, have met the challenge head-on by developing strategies to assist Michigan steelmakers and their employees. A division has been established in Commerce's Manufacturing Development Group to deal exclusively with automakers and steelmakers, and a full-time account executive is assigned to work with the steel sector. This group hosted an extremely successful "Governor's Conference on the Future of Steel" in October 1988 which attracted wide support and received acclaim from all steel constituencies-integrated and mini-mill, management and labor, government and education. A second conference is now being discussed.

The state was responsible for helping to attract North Star's investment in Monroe; it was involved in helping to encourage Rouge Steel to commit to a $100 million capital investment program last year; and it was involved in working with National Steel's Great Lakes Division in what will be, when complete, more than $1 billion capital investment program in Michigan. Similar help has been provided to the Cleveland Cliffs Company, which operates iron ore mines at Tilden and Empire in the state's Upper Peninsula.

McLouth Steel Products Corporation

No involvement, however, has been more intense than that which occurred over the past two years with the McLouth Steel Products Corporation. This company, which was on the verge of financial collapse, has now been restructured and some 2,250 jobs have been preserved. The success of this restructuring can be attributed, at least in part, to the fact the state played a central role in working with all parties - owners, management, labor, creditors, suppliers, lenders, the Pension Benefit Guarantee Corporation and numerous levels of government.

The state was asked to get involved in the early part of 1986, when the situation appeared hopeless and liquidation likely. The first step was to cement the coalition by encouraging labor and management to join with the Commerce Department in funding a business plan analysis by an outside consultant, Touche-Ross. Simultaneously, the state did an internal analysis to determine the financial impact to government if the plants closed. Needless to say, the direct loss of taxes coupled with heightened demand for services caused by such an action, would be dramatic; this gave the state great incentive to do whatever it could to assist in a restructuring program.

Conditions deteriorated at McLouth late in 1986, as creditors were becoming more anxious and break-even production levels were not maintained. Results of the Touche-Ross analysis offered little encouragement unless drastic, immediate steps were taken. At this point, Commerce Director Doug Ross entered the process in a much more visible way, spending a day each week in the mill shoring-up employee attitudes. He sent a letter to all McLouth employees asking for anonymous suggestions (and received several hundred letters). And he helped develop a news media strategy that gave community support to the company's survival plan.

Ross spearheaded a second Touche-Ross study - designed to create a successful business plan, and he recruited Lee Ozley and Doug White, noted national labor-management consultants, to craft an employee participation program. The state funded substantial portions of both action plans (about $400,000). He also committed a staff member, Fred Hoffman, to work almost full time in assisting in the restructuring effort.

At this point, the state was called upon to offer financial assistance in the form of long-term capital funding. Governor Blanchard agreed to help identify this "patient capital," internally or externally, and that process is currently under way. The state also agreed to convert an existing income debenture on the same terms as other creditors accepted. And the state committed to finance much-needed worker training programs.

Throughout the effort, the Governor, Ross, Howe and Hoffman - in addition to state Treasurer Robert Bowman and his staff - attended, convened, chaired and orchestrated literally hundreds of meetings on the McLouth restructuring. Ross played a pivotal role on many occasions as the "honest broker" who hammered out compromises among the parties. His skill led to his designation as chairman of the regular "Round Table" meetings at which all parties reported on their progress throughout the process.

For the restructuring to occur, the employees had to agree to a new 5-year contract calling for wage reductions...the existing equity owners had to agree to create new corporate stock so that two employee stock ownership plans (ESOP) would control 87 percent of the shares...creditors had to agree to convert nearly $130 million to a preferred stock, thus cleaning up the balance sheet.... The Pension Benefit Guarantee Corporation had to agree to participate in this conversion while retaining all pension rights for employees...lenders had to agree to participate by stretching out payment terms...a new working capital lender had to be identified...local governmental units had to agree to new assessment and tax payment plans...and dozens of others had to agree to reduced vendor prices, debt cancellation and other specific new terms. A new board, carefully balanced among all interests (including Ross) was elected, and a new corporation president (Ed Sambuchi) was hired after an extensive national search. Any of these matters could have been "deal-killers." In reality, this effort was akin to a bankruptcy without a judge!

Throughout this process, the state did all it could to negotiate "pain-sharing" and "gain-sharing" among all parties--creating a new entity into which all participants felt equally invested. No one party could have done this alone, but, by working together, a new McLouth has been created. It is now the state's largest ESOP and it has attracted attention throughout the country. There was no business school text that could have solved the crisis at McLouth...it was solved by partnership, involving public and private sectors, and a willingness on the part of those partners to go beyond the usual rhetoric to new and more creative approaches that benefited them all.

MINNESOTA

Introduction

Minnesota produces about 70 percent of the iron ore used in the U.S. steel plants, but the amount of ore demanded by the steel industry has declined 30 percent since 1979. This declining demand was even more pronounced in 1983 when Governor Perpich recommended increased state appropriations for research on iron ore to improve the competitive position of Minnesota taconite pellets. The resulting program has focused on methods for cost reduction, quality improvement, and implementation of new ironmaking technology.

In addition to the technology development programs started in 1983, the state fostered over $74 million in tax reductions for the iron ore industry, used state regulators to assist with rationalization of electric generation capacity differences between utilities, and created the Natural Resources Research Institute at the University of Minnesota - Duluth. These steps, along with those taken by the industry itself, have resulted in a cost structure which is now competitive with world market prices for iron ore.

Iron Ore Cooperative Research

The state's Iron Ore Cooperative Research Program was initiated in the Fall of 1985 after successful completion of a project which described the benefits of adding limestone and dolomite to taconite concentrate prior to pelletization. That project showed potential savings of $3 to $5 per ton of iron produced. The results indicated that state financing might generate other promising research projects.

The state approached the iron ore industry with a proposition for a 50/50 split on $400,000 worth of research. The initial management plan called for joint selection of projects, assignment of projects to the laboratory best equipped to do the work, cost sharing based on industry market share, joint discussion and agreement on workplans, and data sharing. The industry has banded together before on specific projects, but this was the first attempt at developing a jointly supported research program.

The Iron Ore Research Committee represents a cooperative effort between the private sector, academia, and governmental agencies. Its members include:

M.A. Hanna Company
Pickands Mather & Co. - Hibbing Taconite, LTV Mining Co.
Inland Steel Corporation - Minorca
National Steel Pellet Co.
United States Steel Corporation - Minntac
Oglebay Norton Co. - Eveleth Taconite
Cleveland Cliffs Iron Co.
Minnesota Power Co.

University of Minnesota:
- Natural Resources Research Institute - Duluth Campus
- Mineral Resources Research Center - Minneapolis Campus

U.S. Bureau of Mines - Twin Cities Research Center

Minnesota Department of Natural Resources

At this time three rounds of proposals have been reviewed. All of the projects selected in the first round have been completed. Projects selected in the second round are nearing completion, and the contracts for the third round are now in being processed.

The cooperative research program has a $600,000 state budget for the current biennium. Matching funds from industry are $400,000, plus the U.S. Bureau of Mines has supplied about $300,000 in in-kind match. This provides somewhat better than a 1:1 match against state funds. The projects funded in the current biennium include

- o Acid Pellet Metallurgical Properties Improvement
- o Oxygen Addition to Pellet Induration Systems
- o Water Chemistry and Its Impact on Iron Ore Pellet Production
- o Secondary Ball Mill Circuit Optimization
- o Feasibility of Converting Rod Mills to Ball Mills
- o Production of Low-Silica Concentrate
- o Moisture Control Based on Feed-Forward Vacuum Filter Control
- o Applicability of Slagging Combustors in Minnesota Taconite Plants
- o Evaluation of On-Stream Moisture Sensors
- o Evaluation of a new On-Stream Particle Size Analyzer
- o Development of a Computerized Digital Image Sensor

The program has generated several worthwhile results in the areas of fluxed pellet production, use of organic binders, and pellet property improvements. The industry supports its continuation in the next biennium, so the Department of Natural Resources has requested the same level of funding for the next budget cycle.

Minnesota's Iron-making Initiatives

The state has supported three streams of effort related to value-added production based on its iron ore and taconite resources. These are:

Direct reduction of taconite pellets to produce sponge iron using existing idle production capacity in taconite plants (Allis-Chalmer's project)

Iron-making using plasma processes (the Mesabi Metal Project)

Direct smelting of iron ore to molten iron using the COREX process

The work completed on direct reduction showed that the use of sponge iron for steel production was technically feasible, but the process economics did not lead to follow-up work by the steel industry. No further work on direct reduction is planned. The first phase of the Mesabi Metal Project was successfully completed, but again estimated production costs appear to preclude the use of plasma to make an iron product in Minnesota. However, plasma technology shows promise as a route to higher-valued semi-steels or alloys. The project which has shown the most promise is the one which proposed using the COREX Process as the nucleus for steel-making in Minnesota.

COREX Project History

In June of 1984, employees of the Minnesota Department of Natural Resources visited several iron-making pilot plants in Europe searching for new processes that might be used to revitalize the U.S. Domestic steel industry and, in turn, the state's taconite industry. The department believed that the largest long-term problem facing this country's steel industry was the age and obsolescence of its iron-making plants. During the trip, the department identified the COREX Process as the most promising of the new technologies investigated.

In November, 1984, the state was the major participant in a twelve-day trial of the COREX Process at Korf Engineering's pilot plant in Kehl, West Germany. The total cost of this test, exclusive of plant operation supplied by Korf Engineering, was just under $600,000. Minnesota contributed $270,000 to the effort. Other sponsors included the U.S. Department of Energy, the U.S. Bureau of Mines, the state of West Virginia, and the American Iron and Steel Institute. This test was the foundation upon which subsequent consideration of the COREX Process was based. The results, published in early 1985, showed that the process could economically produce iron comparable to blast furnace output. The results also showed that the process could reduce the environmental impact of iron-making by eliminating coke ovens. In addition, the use of the export gas in place of coal could reduce air emissions from coal combustion, since SO_2 levels would be about one-tenth of the Minnesota state standards.

The next logical step after the pilot plant test would have been construction of a demonstration plant in the United States. However, none of the companies which participated in the pilot plant trial appeared willing to build the first commercial-sized plant. Most firms felt that the largest plant Korf Engineering was willing to build at that time (364,000 tons/yr.) was too small to fit well into their steel production schedules.

The hesitancy of the steel companies caused Minnesota to begin its own project, and in December of 1984 Korf Engineering and the State of Minnesota signed an agreement that gave Minnesota exclusive access to Korf Engineering's expertise and personnel for the purpose of writing a proposal to the U.S. Department of Energy's Clean Coal Technology Program. The proposal was submitted on April 14, 1986.

The proposal requested $59.2 million from the Clean Coal Technology Program to build and demonstrate a 364,000 ton/yr., $125.2 million COREX plant in Minnesota. The plant site selected was next to Step 3 of USX's Minntac taconite plant in Mountain Iron, Minnesota. USX would be Minnesota's project manager, and a new company, tentatively named Minnesota Iron Development, Inc., would be organized to own and operate the plant. The product produced during the demonstration period would be high-purity iron which could be sold to the foundry industry. The state pledged more than $28 million to the effort, and the $38 million balance would have been raised from a variety of sources, including equity contributions from steel companies and foundry customers.

The economic data contained in the proposal indicated that iron from the plant could be sold to foundries for about $130/ton. That price was quite attractive to potential customers, as it was about equal to the then current price for the highest grades of steel scrap.

Shortly after the proposal was submitted to DOE, another pilot plant trial was conducted in Kehl, West Germany, using Brazilian materials. The results of that test indicated that western subbituminous coal could be used for iron-making. Subsequent economic analysis indicated that the use of western coal in a plant located in Minnesota would allow even lower cost production of hot-metal. Preliminary

calculations also showed that the COREX Process could be the nucleus for the production of semi-finished steel slabs.

The state's optimism regarding steel production is based on calculations which indicate that steel slabs from a plant in Minnesota can be delivered to the lower Lakes for prices near $200/ton. Data from other sources indicate that steel plant production costs for slabs at domestic plants range from $220 to $230/ton. The state also learned that many companies were delaying blast furnace repairs. These factors, along with the general aging of the equipment currently in use, all pointed to a growing market for semi-finished steel.

The state's proposal was not selected for negotiation in the first round, but the department kept its proposal active in case a second chance materialized. In November 1987 the U.S. Department of Energy asked the state if it was willing to begin negotiations based on its original proposal. The department responded positively, but suggested that the passage of time had created a new set of conditions which required reconsideration of the basic assumptions. The major change was construction of a 300,000 metric ton/year COREX plant in South Africa. It was felt that completion of the South African plant would reduce the value of a U.S. demonstration plant of the same size.

After an initial feasibility assessment, the state decided to pursue DOE funding by recommending a larger COREX plant that would become the centerpiece of a new steel plant. The department approached ten steel companies seeking a partner in the venture. All of the companies declined to take a leadership role in the project. Their reluctance appeared to be due to corporate strategies aimed at incremental improvement of existing capacity rather than construction of new capacity. Without an industrial partner, the state was forced to drop the idea of a Minnesota location, but it is now considering a partnership with a steel company to use the federal money to demonstrate the COREX Process at an existing steel mill.

Another recently completed economic comparison showed that the cost of liquid steel produced using the COREX Process and an LD converter is about the same as the cost of liquid steel produced from scrap. This result is significant as it opens the possibility of mini-mill production of steel products from virgin raw materials at costs near those of scrap based plants.

The results produced thus far have shown that a new plant located in Minnesota can compete with new iron ore or scrap-based plants at eastern locations. Therefore, the state's effort is now aimed at those steel firms interested in new capacity, to ensure that they consider Minnesota locations.

NEW YORK

The recent history of the American steel industry has been especially severe in New York. After almost three decades of decline, five specialty steel plants, one mini-mill, and a handful of firms that supply them are all that remain of New York's once flourishing industry.

New York's steel industry experienced uninterrupted growth until 1960. Production was concentrated in the western part of the state around Buffalo, with its ideal location between the urban centers of the East and the developing Midwest. Buffalo also enjoyed the advantages of an ample supply of immigrant labor and the ready availability of coal and iron ore. Steel production in New York expanded steadily with the growth of the automobile and construction industries of the Midwest. The first indication of its eventual decline occurred during World War II, when Federal government defense spending spread the nation's industrial sector to the West Coast, cutting into the East's share of the steel business and developing a market that Buffalo was no longer best suited to serve.

Steel employment in New York reached its peak employment figure in 1960, but from then, its story became one of a series of employment shocks -- shutdowns and gradual cutbacks which paralleled the general decline of manufacturing in New York State and of the steel industry nationally. The manufacturing sector share of jobs in New York fell from 31% in 1958 to 15.8% in 1986. During the same period, New York employment figures associated with blast furnaces and basic steel products dropped from 34,700 to 6,800.

The history of the Bethlehem Steel plant in Lackawanna offers a vivid account of the decline of steel in New York. In 1973, the Buffalo area employed 16,300 of New York State's 26,500 blast furnace and basic steel products employees -- Bethlehem alone accounted for 11,700. Bethlehem's 1984 closing had been preceded by steady employment declines during the 1960s and major cutbacks in 1974, 1977, and 1981; 1977 saw a 40% capacity reduction. Bethlehem's experience was mirrored by those of other small plants in the Buffalo area. The recession of the early 1980's proved fatal to many. In 1982, Republic Steel, Donner Hanna, Shenango, Orban Industries, Hanna Furnace, and Cromwell Metals Corporation closed, while three additional firms -- Roblin Steel, Guterl Steel, and SKW Alloys -- experienced temporary shutdowns.

The factors plaguing the steel industry nationally -- surging imports, and changing markets and product mix -- hit the Buffalo area hard and led to Bethlehem's 1984 closing. Steel imports were growing at an annual rate of 11.5% at the same time that Bethlehem was cutting back on its employees and production. In an environment where developing low-wage countries were building modern facilities with updated technology to compete for the U.S. market, the Lackawanna facility, built in 1900, was clearly at a disadvantage. Rather than investing to retool and modernize the Lackawanna plant, Bethlehem decided to build an efficient, high-capacity facility at Burns Harbor, Indiana in 1969. The competitive environment for steel had changed so much since the early 1960s that the Great Lakes states which once prospered together with the industry's growth were now forced to compete for a shrinking number of steel jobs.

The decline of steel in New York was so severe that by the early 1980s it was too late for the state to address the problems of the industry. Instead, New York has provided assistance to several of the remaining steel manufacturers individually through its various economic development programs. For example, at one steel plant, the state has provided capital funding assistance, while at another, the state is helping to design a comprehensive training program to integrate statistical process controls with a labor-management cooperation program to enhance the company's competitiveness.

The loss of traditionally high wage steel industry jobs has had a severe effect on employees and their communities. The average weekly wage for steel industry workers in Erie County in 1984 was $596.10. During the period 1981-84, Erie County lost 8315 steel jobs, resulting in annual lost wages of almost $247 million. A 1987 State Department of Labor study estimated the direct payroll loss of the Lackawanna Bethlehem closing alone at $100 million, and if the cutbacks beginning in 1981 are included, the figure doubles to $200 million. The DOL study also calculated the effect of the general decline of the steel and foundry industry from 47,700 employees in 1960 to 9,000 in 1986. Including the multiplier effect of consumption expenditures, the loss to the Western New York area was estimated at $3-4 billion annually. Extensive tax revenues were also lost. In addition, several hundred secondary jobs in the Buffalo area were eliminated following the Bethlehem closing.

The State Department of Labor's recent survey of 3,000 displaced Bethlehem workers reveals that three years after Bethlehem's closing, only 39% of them had fund employment. Thirty-four percent were still actively seeking work and 27% had opted out of the work force into retirement. For those able to secure a new job, the average period of unemployment was 16 months, and they often had to settle for part-time work or lower wages. The DOL study found that average family income of those who found reemployment dropped 36%; the family income of those still unemployed plummeted 50%.

Like steel workers elsewhere, the former Bethlehem Steel workers have faced particular obstacles in finding new employment. The average age of those filing for benefits after closure was 48 years. Most employees had limited education, only 55% having finished high school. All employees had a blue-collar manufacturing background, but now faced a new job market with most opportunities in the service sector. The DOL study found that of those who remained unemployed, 51% felt at a disadvantage in competing for available jobs due to lack of education, training, skills, or experience.

To assist the displaced steel workers, the state has funded Occupational Assessment and Development Centers in Buffalo. These Centers provide career redevelopment opportunities, job placement assistance, social services, remedial education, and job training for those displaced by steel's decline.

Steel in New York in 1988 is a far different industry than it was in 1960: a handful of small firms scattered throughout the state in Niagara Falls, Syracuse, Watervliet and Dunkirk. Remaining blast furnaces and basic steel products firms employ only 6,800 New Yorkers, whose average wage has fallen since 1983. Steel's painful history is not one that we want to see repeated in other New York industries or in our neighboring Great Lakes states.

OHIO

The Ohio Steel Industry: State Investment

Ohio has been the site of numerous and diverse iron and steel production activities since its earliest days, when a vigorous iron production industry flourished along the Ohio River. Today, Ohio is one of the nation's strongest steel producing regions, hosting a broad variety of technologies in numerous integrated mills, minimills, and thousands of firms that bend, shape, finish and distribute steel. The importance of the steel industry to the Ohio economy is reflected in the fact that Ohio was first in employment in the nation in iron and steel foundries and second in blast furnaces and basic steel production employment in 1987.

The prominence of the Ohio steel industry means that the fortunes of many Ohio residents and communities rise and fall with the fortunes of the steel business. The painful shakeout of the domestic steel industry in the past decade reverberated in a shakeout of families, small businesses and communities in the steelbelt regions. Throughout the 1980s, a share of all state services has been devoted to assisting workers, the unemployed, communities and the industry itself in this most difficult period of adjustment.

Because the steel industry is so prominent in the Ohio economy, development efforts have naturally concentrated in that area. Recent studies indicate that since 1982, the Department of Development alone provided $33.5 million state dollars in loans and grants to the steel industry, leveraging roughly $400 million in private investment in Ohio production facilities. The Ohio Industrial Training Program has trained 60,000 steelworkers in new production processes. Ohio's Thomas Edison program has sponsored a number of research and development projects in the steel industry, supporting technology transfer between Ohio universities and the steel industry, training industrial engineers, stimulating new uses for steel, and improving existing production processes. The state has worked with utility companies and steel companies to hammer out cost-efficient energy contracts.

The State has also taken an active role in national efforts to assist and protect the domestic steel industry. Governor Celeste has consistently pressed for tough federal policies to protect Ohio jobs from subsidized foreign steel imports, and has pressed the Reagan Administration to enforce the VRA agreements to hold down unfair steel imports.

At this time, the Ohio industry, like the rest of the domestic steel industry, is doing well. Some firms have talked about adding new steelmaking capacity. Several minimills have investigated Ohio sites for new facilities. However, steel industry experts in the state warn that the current boom in steel may not last. Domestic steelmakers face another round of international competition as new, sophisticated steel facilities in third world countries come on line. The State of Ohio is therefore providing additional incentives intended to strengthen the industry for a newly competitive future through a targeted grant program called the Ohio Steel Futures Program.

Governor Celeste originally recommended the creation of a broadly conceived "Steel Futures Fund" to encourage innovative approaches to strengthening Ohio's steel industry in the competitive global marketplace. The five million dollar fund was created in March of 1988 with the signing of a bill to create the Ohio Steel Futures Program. To date, the program has considered and/or funded projects in the area of research and development, plant modernization, employment and training, labor and management, and business analysis.

The Ohio Steel Futures Program has targeted the following areas for funding:

- Projects which build upon the unique research opportunities presented by Ohio institutions and companies.
- Projects which will create energy savings in steel production.
- Projects which combine two interests of the state, such as waste minimization for steel companies.
- Projects which strengthen or support creation of stand-alone, entrepreneurial or employee owned firms.
- Projects which provide industry-wide or project-specific studies for Ohio and Ohio firms.
- Employment and training projects, particularly those which enhance employment opportunities for women and minorities.

PENNSYLVANIA

Steel production in Pennsylvania began with the production of iron in approximately 1716. In 1791, Pennsylvania had 16 furnaces and 37 forges. After 1800, the industry expanded substantially. In 1810, the U.S. produced 917 net tons of steel, more than half of which was produced in Pennsylvania's six furnaces. The U.S. census lists five establishments manufacturing steel in the U.S. in 1850, all of which were located in Pennsylvania, with an estimated production of 6,078 net tons annually. Pennsylvania was also the leading iron producing state by 1860, with 60% of the output, 125 blast furnaces, and 580,049 tons of iron produced.

Initially, iron and later steel flourished in Pennsylvania because of the location of raw materials for production. Iron ore deposits and woodland were abundant for the manufacture of charcoal used in iron production. Pennsylvania led the nation in mining ore from 1860 through 1880. Anthracite coal became the principal blast furnace fuel in 1855. Large quantities were found in eastern Pennsylvania, which is why iron production was popular in the Lehigh Valley. Bituminous coal replaced anthracite as the principal blast furnace fuel in 1875. The Connellsville area near Pittsburgh contained large quantities of bituminous coal which helped Pittsburgh gain prominence in the industry.

In 1860, of the thirteen steel establishments in the U.S., Pittsburgh had become the nation's production center with six of the establishments. Concentration of the iron and steel industry in southwestern Pennsylvania was favored principally for the bituminous coal supply. In the late nineteenth century, the greatest iron and steel region in the world developed in an industrial zone outlined by the cities of Youngstown, Ohio; Wheeling, West Virginia; and Johnstown, Pennsylvania. The Pittsburgh district, in the heart of this area, was the first center and long dominated the industry. Pittsburgh became so closely associated with the iron and steel industry that most people came to think of this city as the steel capital of the world.

By 1880, Allegheny County represented 30% of the capital investment in the iron and steel industry in Pennsylvania, accounted for 33% of the employment, produced 23% of the tonnage, and 32% of the value of all iron and steel products produced in the state. Substantial investments were made in plant and equipment at this location since it offered good shipping facilities by water for finished products to the newly developing West.

In 1880, Pennsylvania had 5 of the active 11 Bessemer steel works in the country. In 1880 the value of Pennsylvania's iron and steel production was 49.1% of the nation's total, and by 1900 it had risen to 54.1%. By 1900, Pennsylvania produced 47% of the nation's pig iron, 80% of the open hearth steel, 52% of the Bessemer steel, and 56% of the finished rolled iron and steel products. The number of workers in iron and steel (blast furnaces, steelworks, and mills) rose from about 10,000 in 1860 to 110,000 in 1900, and 186,000 by 1920. No other state has ever achieved the dominance in iron and steel that Pennsylvania enjoyed in the late nineteenth and early twentieth centuries.

The Pittsburgh area produced about 70% of the nation's iron and steel early in the twentieth century. However, since the early twentieth century, the relative importance in the nation of southwestern Pennsylvania's iron and steel industry has declined.

Several factors contributed to the decentralization of the U.S. iron and steel industry. One was the country's economic growth. The market's rapid increase made it

no longer feasible to supply the demand for iron and steel from a single region. The development of the by-product coke oven also transformed the industry, by making the beehive coke ovens (located predominately in southwestern Pennsylvania) obsolete. Also, changing sources of raw materials have had an adverse effect on Pennsylvania. High grade iron ore is no longer abundant in the Lake Superior region, and it is being imported from foreign countries. Government policies also added to the decentralization of the steel industry. During national emergencies, iron and steel plants were constructed in strategic locations throughout the U.S. Pennsylvania received no such aid during WW II.

Beginning in the early 1970's, the challenge to the Pennsylvania iron and steel industry has come not from further decentralization but from increases in foreign imports. The world iron and steel industry has grown rapidly. New overseas plants are more modern than those in Pennsylvania, and indeed, most other parts of the U.S.

As a response to steel imports, two types of steel industries have developed in the U.S. The older integrated mills producing nonspecialty steels have taken the brunt of the import problem. In contrast, smaller plants, known as mini-mills have flourished and are producing a greater share of the nation's steel.

Although there are a number of mini steel companies in Pennsylvania, the industry is still dominated by the traditional integrated companies. As a result, the iron and steel industry in Pennsylvania has experienced a significant decline in recent years. Employment in the primary metals industry has fallen from 241,189 in 1965 to 91,100 in 1988. However, Pennsylvania is still the third largest steel producing state, with total production in 1988 of 13,673,000 net tons, representing 13.7% of the U.S. total.

Pennsylvania has several programs that have aided or assisted the steel industry. Several examples include:

- The Governor's Response Team - a group formed to seek out development opportunities and then link those who need aid with those who can provide it - helped J & L Structural, a small but viable steel rolling mill that employs about 140, to remain in business. J & L Structural was once a part of the massive Jones & Laughlin Works in Aliquippa. Later, LTV Corp. bought the business and then declared bankruptcy. The Response Team moved in and lined up several state loans that helped a private party to buy J & L Structural and keep it operating. Speed was critical in the deal to prevent the long-tine customers from going elsewhere.

- The Governor's Response Team was also instrumental in aiding the Sharon Steel plant which employs 2,200. The Response Team pooled major aid to help reline a blast furnace and saved this company from liquidation.

- The state's job training program, Customized Job Training, is a direct tool for economic development. It trains people for actual, immediate business needs. CJT has helped to create more than 9,000 new jobs in fiscal years 1987-88 and 1988-89.

- A new program instituted in 1989-90 is the Industrial Communities Action Program. This program is designed to stimulate municipalities, counties, and other local development organizations, in conjunction with local real estate developers and investors, to reuse dormant manufacturing and industrial facilities which will create new jobs in the Commonwealth. ICAP provides real estate development

financing to attract development to industrial buildings (including steel facilities) that are unable to attract private investment without being modernized or rebuilt.

- In conjunction with this program, the new Industrial Communities Site Program provides grants to bring blighted industrial land into productive uses. The Program is designed to create competitive industrial sites where the redevelopment costs are prohibitively high, redevelopment efforts may take many years to complete, and no immediate private investment is available. The program is particularly applicable to the Commonwealth's "Steel Valley" areas -- projects which present strategic and regional economic development opportunities throughout the Commonwealth.