STATUS REPORT
ON THE STEEL INDUSTRY
IN THE GREAT LAKES REGION

By The

Economic Analysis and Policy Task Force

Of The

Great Lakes Commission

November 3, 1986

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Purpose of the Status Report

The Economic Analysis and Policy Task Force agreed at its meeting of February 10, 1986 that international economic trends and forces should be included in its work plan. The topic, however, is so broad that a narrower focus is necessary to develop research findings and policy recommendations. For that reason, the steel industry is offered as a vehicle for analysis. Additionally, the steel industry is important to all the Great Lakes states and is strongly linked to mining, transportation, energy, processing, distribution and durable goods manufacturing industries.

At its May 25, 1983 Economic Summit, the Council of Great Lakes Governors resolved that:

> Retention of the basic industries of this region being vital to its economic health, an intergovernmental and public/private reinvestment strategy will be developed to enhance the competitive positions in the world economy of such industries as automobiles, automobile parts, steel and machine tools. (Emphasis added)

As a first step in a regional industrial revitalization strategy, the resolution mandated the creation of a Great Lakes Governors' Commission on the Machine Tool Industry. That commission produced a report containing recommendations that fell into one of three categories:

1. Those where the Governors could, as a group, form a powerful and effective bi-partisan lobby in Washington for the benefit of the industry.

2. Those where the strengths of the six states could be combined and focused on a particular issue as a regional entity.

3. Those where existing state or state-administered programs could be targeted to solve specific industry problems.

The Great Lakes Commission will use these three principles in developing policy recommendations on ways to revitalize the region's basic industries including steel, automobiles, machine tools, construction equipment and other durable goods. These industrial sectors are vital to the domestic economy and are under increased competitive pressures from foreign producers. However, because it would be difficult for the Commission to address the overall issue of international trade, a narrower focus is necessary to develop research

findings and policy recommendations. For this reason, the steel industry was selected as a vehicle for analysis. Additionally, the steel industry is important to the Great Lakes region and is strongly linked to mining, transportation, energy, processing, distribution and durable goods manufacturing industries.

To develop an overall perspective, the concept of industrial competitiveness was presented to the Great Lakes Commission by Congressman John J. LaFalce on May 25, 1984. Building on the analytical work of Lester Thurow of MIT and the work of the President's Commission on Industrial Competitiveness, the states can influence the five factors crucial to competitiveness. John A. Young, Chairman of President Reagan's Commission on Industrial Competitiveness, identified these factors in a speech reprinted in the Congressional Record as: 1) natural resources and infrastructure, 2) human resources, 3) capital resources, 4) technology and 5) institutional conditions.

Because the health of the steel industry has a significant impact on the economic well-being of the Great Lakes region, it is imperative that both private and public sector decision-makers in the region be made aware of the condition of the industry, its contribution to the Great Lakes economy and competitive pressures facing the steel industry. To assist in the development of policy positions on ways to revitalize the region's steel industry, the Great Lakes Commission has requested recommendations for policy initatives from private companies, state economic development agencies, universities and other organizations involved in the steel industry and related industries. Those contacted included the major steel producing companies in the region, the American Iron and Steel Institute, representatives of steel consuming industries such as autos, farm equipment, appliances and the construction industry, the Federal Reserve Bank of Chicago and representatives of the maritime industry including the Lake Carriers' Association, steamship companies and Great Lakes ports, as well as state agencies and universities.

U.S. International Competitive Position

The U.S. has become uncompetitive in the global marketplace. Trade statistics document the deterioration of our competitive position.

The Bureau of the Census summarizes trade statistics into 37 major commodity groups. Of that number, only nine show a positive trade balance for 1985. They are agricultural products, anthracite coal, bituminous coal and lignite, tobacco manufactures, chemicals and allied products, nonelectrical machinery, manufactured commodities not identified by kind, and scrap and waste. Almost $120 billion of the $148 billion 1985 trade deficit arose from manufactured commodities. Large imbalances occurred in apparel and related products, petroleum refining and related products, primary metal products, electrical and electronic machinery and supplies, and transportation equipment. Even what would be considered a "high tech" industry like scientific and professional equipment showed a net trade deficit.

The following table indicates the growing magnitude of the U.S. trade imbalance during the period of the 1980s. The value of exports and imports is for merchandise and does not include the value of services or transfer payments.

U.S. Trade Balance
($ million)

Reporting Period	Value of Exports (F.A.S)	Value of Imports (C.I.F.)	Trade Balance
Jan.-June, 1986	$108,118.9	$192,039.5	-$ 83,920.6
1985	213,146.1	361,626.3	- 148,480.2
1984	217,888.0	341,176.8	- 123,288.8
1983	200,537.6	269,878.2	- 69,340.6
1982	212,274.6	254,884.5	- 42,609.9
1981	233,739.1	273,352.2	- 39,613.1

Source: U.S. Bureau of Census, Highlights of U.S. Export and Import Trade, FT990/December 1985 and special release by telephone.

According to The DRI Report on U.S. Manufacturing Industries, "There are so few exceptions to the decline of the international positions of U.S. manufacturing industries that one must seek more general causes that act on the entire economy. Without a strongly advancing manufacturing industry, the U.S. economy is hardly likely to maintain its progress in the decades ahead."

The Brookings Institution has estimated that half the jobs lost in manufacturing from 1978 to 1982 can be traced to increased imports and decreased exports. Robert Lawrence of Brookings has further calculated that to regain an equal balance in our balance of trade, the U.S. would need a 28% decline in the value of the dollar. That means about an equal fall in our standard of living which would be socially and politically disruptive.

The present U.S. trade imbalance is attributable, in part, to increased foreign competition and to non-tariff barriers faced by U.S. companies in their efforts to export products overseas. These foreign barriers include local content requirements, minimum export requirements that obligate firms to export and subsidies to companies that experience competition from imports.

Introduction on the Steel Industry

During the last four years, the U.S. steel industry has been in a depressed state, the result of economic forces in the U.S. and overseas. As the U.S. economy suffered the effects of a recession from early 1982 through late 1984, the steel industry was devastated by reduced demand for steel by traditional steel-consuming industries and by increased imports of foreign produced steel.

During the pre-recession years, steel mill shipments totalled 100.3 million tons in 1979, 83.9 million tons in 1980 and 88.5 million tons in 1981. With the downturn in the U.S. economy, steel mill shipments fell to 61.6 million tons in 1982, and then increased to 67.6 million tons in 1983, to 73.7 million tons in 1984 and declined slightly to 73.0 million tons in 1985. During this

past seven-year period, imported steel increased its share of the U.S. market by 10.0%, from 15.2% in 1979 to 26.4% in 1984, before falling slightly to 25.2% in 1985. The following table indicates annual steel mill shipments since 1976.

Net Steel Mill Shipments, 1976-1985
(Thousand Tons)

Year	Tons	Year	Tons
1976	89,447	1981	88,450
1977	91,147	1982	61,567
1978	97,935	1983	67,583
1979	100,262	1984	73,739
1980	83,853	1985	73,043

Source: American Iron and Steel Institute

Unlike no other major U.S. industries, the steel industry and iron ore industry are concentrated within the Great Lakes region. Steel mills in the Great Lakes states produced 69.6% of the nation's steel in 1984 and 68.0% in 1985, while mines in the states of Minnesota and Michigan produced 97.2% of the domestically produced iron ore in 1984 and 97.6% in 1985. In comparison, auto plants in the Great Lakes states produced 54.1% of the U.S. autos in 1984. The following table indicates the amount of steel produced in each of the Great Lakes states in 1985 and the percent of the national total.

Great Lakes and U.S. Steel Production, 1985

State	Production (Thousand Tons)	Percent of U.S
Indiana	19,687	22.3
Ohio	14,094	16.0
Pennsylvania	12,034	13.6
Michigan	7,297	8.3
Illinois	6,479	7.3
New York	456	0.5
Minnesota	-	-
Wisconsin	0	0
Great Lakes	60,047	68.0
U.S.	88,259	100.0

Note: Data for Minnesota not disclosed for reason of confidentiality.

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 last year. These figures clearly depict a steel-intensive regional economy compared to the rest of the country.

The depressed condition of the steel industry has critically impacted 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. Increasing steel imports and the decline in domestic production have caused steel mills and mines to close, and this has caused a sharp loss of jobs in the steel industry and in related industries. This contributed to the severity of the recent recession and has slowed the economic recovery of 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 include integrated producers, mini-mills and specialty steel producers.

1. Integrated Producers

Integrated producers, which comprise the traditional core of the steel industry, typically have ownership control of the mines that produce the iron ore and coal used to produce the steel, transportation networks (shipping primarily) that deliver raw materials, and the mills that produce the steel. Most integrated steel companies own several large steel mills, and most of these plants are located in the Great Lakes states.

The market share of the eight largest integrated steel producers fell from 82.2% of the market in 1950 to 54.1% in 1983. The two largest integrated producers, U.S. Steel and Bethlehem Steel, experienced a loss in 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 of the steel industry has been forced in recent years to shut down existing plants and several smaller producers have merged. The number of integrated producers fell from 23 independent companies in 1968 to 15 companies in 1983. 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 1980 to 208,000 in 1985, a 54% decline. The following table indicates annual employment in the steel industry since 1976.

Employment By Steel Companies, 1976-1985

Year	Employees	Year	Employees
1976	454,128	1981	390,914
1977	452,388	1982	289,437
1978	449,197	1983	242,745
1979	453,181	1984	236,002
1980	398,829	1985	208,168

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 semifinished 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 iron ore is processed into taconite pellets to remove physical impurities. 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 semifinished 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 semifinished shapes. This eliminates the need to pour the molten steel into ingots and then to reheat the ingots before rolling the steel into semifinished 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.

According to the American Iron and Steel Institute, 16 casters were installed in U.S. mills from 1982 to 1984, having a capacity of 16 million tons, and another 8 casters with 10 million tons of capacity were under construction in 1985, to be on-line by 1987. In 1985, 44.4% of the U.S. steel production was from continuous casters, a low figure relative to Japan's 85% of steel produced from casters. Other heavy 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.

2. Mini-Mills

Mini-mills are independently owned companies and which generally confine their production to low cost, simple steel products such as bars, rods and wires. These products are made from scrap steel which is melted in electric furnaces. While the integrated steel producers are concentrated in the Great Lakes region, mini-mills are located primarily in the South and West regions, where they typically employ non-union workers and rely on local markets for scrap steel, the raw material of mini-mills, and for sales of their products.

Almost all mini-mills have continuous casters, and, in addition, mini-mills use electric furnaces to produce steel from scrap steel. 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 the take place in a relatively small mini-mill.

3. Specialty-Steel Producers

Specialty-steel involves the production of higher-valued products such as alloy and stainless steel and steel used to produce tools. Such steel is used extensively in aircraft production and in components of nuclear power plants, and to smaller extent, in most manufacturing process, such as the chrome parts of automobiles.

The producers of specialty-steel include the integrated steel companies and a large number of small, specialized companies. Like mini-mills, specialty producers use scrap steel as the raw material and electric furnaces to produce molten steel.

Steel Production Trends

Nationally, U.S. steel production fell from 117 million tons in 1975 to 88 million tons in 1985, a 24.8% decline. During this period, integrated mills experienced a decline from 109 million tons to 70 million tons or 35.8%, while mini-mills increased their output from 8 million tons to 18 million tons, a 125.0% increase. In 1975, 93.2% of the U.S. steel production was by integrated mills, but this fell to 78.7% in 1985. 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.

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 speech entitled "Future of America's Steel Industry", January 12, 1986, 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 mini-mills will capture 34.5% of the market with 29 million tons of production. Thus, while the integrated sector will experience a further 22.9% decline in production by the year 2000, mini-mills will increase their output by 61.1% over 1985 levels.

While the integrated steel sector faces severe competitive pressures during the next 15 years, Crandall forecasts that the mini-mill sector will

experience sustained growth. This is the result of investments in modern equipment, lower labor costs, relatively low imports in steel products produced by mini-mills, and future possibilities for mini-mills to diversify by investing in sheet product equipment.

Composition of Steel Imports

A study by the Congressional Budget Office (CBO) in 1984, The Effects of Import Quotas on the Steel Industry, presents the annual tonnage of steel imports by types of finished steel products. For the year 1983, total steel imports of 17.2 million tons included sheet and strip, 7.5 million tons; pipe and tube, 2.9 million tons; bars and rods, 2.2 million tons; heavy structurals, 1.6 million tons; plates, 1.1 million tons; and other products such as semifinished shapes, wire products and rails, 1.9 million tons. In terms of the percent share of the U.S. domestic market for these iron and steel products, imported pipe and tube represented 49.0%; heavy structurals, 30.4%; plates, 22.9%; sheet and strip, 16.3%; bars and rods, 13.1%; and other products, 37.5%.

The CBO study found that the composition of steel imports, by product types, fluctuated annually and was affected by international and domestic economic factors. Following the jump in world oil prices in 1980, there was a sharp increase in imports of pipe and tube products, used for domestic oil exploration and drilling. By 1983, when world oil prices had stabilized, imports of pipe and tube steel fell to the lowest level since 1977. Sheet and strip product imports increased sharply in 1983, as this type of steel is used in the manufacture of consumer goods, and renewed demand for these products signaled the end of the recession. Imports of bars and rods remain relatively low as domestic mini-mills produce for this market and can produce at prices that are competitive with foreign producers.

To demonstrate the cost competitiveness of U.S. mini-mills, the CBO study presents a cost analysis of the production of a ton of wire rod, in 1981 dollars, in U.S. and foreign integrated mills and mini-mills. The cost of a ton of wire rod produced in an integrated mill varied from a high of $393 in the U.S., to $336 in West Germany to a low of $304 in Japan, a range of $89 per ton; while the range in costs in mini-mills was much closer, from a high of $284 in the U.S., $283 in West Germany to a low of $275 in Japan, a difference of only $9 per ton. The results of this cost analysis show that U.S. mini-mills can compete with foreign producers, which should hold down imports in product lines handled by mini-mills; however, U.S. integrated producers are at a clear cost disadvantage.

U.S. Responses to Steel Imports

Since the late-1960's, the U.S. steel industry has sought restraints in imports of foreign steel as a means to revitalize the domestic steel industry. Various programs that have been initiated on behalf of the steel industry have included voluntary restraint agreements with Japan and European producers from 1972-1977, quotas on specialty-steel imports from 1976-1980 and the Trigger Price Mechanism from 1978-1982.

In 1984, the U.S. International Trade Commission (ITC) ruled that steel imports in five steel product categories had caused injury to domestic steel companies, and the ITC recommended imposition of steel import quotas to relieve the U.S. steel industry. Pressure from the steel industry led to introduction in both the Senate and the 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.

The CBO study concluded that a 15% quota would increase the average price of steel in the U.S. by 10%, increase 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 cause foreign countries to retaliate against products exported by the U.S., the President, in September 1984, initiated a program that involved the negotiation of voluntary restraint agreements (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.

In 1984, steel imports accounted for 26.4% of the U.S. market, and the foreign share fell only slightly to 25.2% in 1985. The following table indicates the tonnage of annual steel imports and the percent of the U.S. market since 1976.

U.S. Iron and Steel Imports, 1976-1985

Year	Imports (Thousand Tons)	Imports As A Percent of U.S. Supply
1976	14,285	14.1
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

Economic Impacts of Steel Import Restraints

Implementation of an effective steel import restraint program, that would limit imports to about 20.2 percent of the U.S. market, could provide for increased purchases of domestic steel, increased profitability for steel producers, additional funds for capital investments by steel producers in modern equipment and stabilized employment in the steel industry.

The Great Lakes Commission conducted an analysis of the economic impacts of a steel import restraint program, involving a determination of the economic benefits to the steel industry and of the economic costs to steel purchasers. It indicates that annual cash flow to domestic steel producers would increase by $1.25 billion, and prices paid by domestic companies that use steel would increase by $154 million which represents less than 4/10 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 farmers for farm equipment and machinery, but the analysis does not attempt to predict these impacts. The analysis of the economic impacts of steel import restraints is presented in the Appendix.

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 developed 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. In 1973, 24.4% of the U.S. steel imports were shipped via the Seaway to Great Lakes ports. This increased to 25.9% of U.S. steel imports in 1977, but declined to 10.3% in 1981 and increased to 16.2% in 1984.

From the perspective of Great Lakes ports, steel imports via the Seaway are vital cargoes that comprise the 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 the outbound voyages to foreign countries.

The downturn in U.S. steel production is causing problems throughout the Great Lakes fleet as well as posing particular difficulties for certain carriers. In August 1986, midway through the navigation season, only 44 vessels or 51 percent of the operational fleet were in business. The LTV bankruptcy combined with the strike at USX plants has aggravated the current situation. Partly in response to these developments, the railroads have lately stepped up efforts to make in-roads in the lake shipping trade. Some shipping companies may not be able to stay in business as they exist today. The Maritime Administration is concerned that some companies may be forced out of the

shipping business thus causing defaults on federal loan guarantees. A recent review of the situation indicates a total outstanding liability under Title II of the Merchant Marine Act of 1936, as amended, for 20 lake vessels of around $340 million. MARAD, if faced with defaults, could not cover the costs and the Treasury would have to intervene.

The Lake Carrier's Association (LCA), which represents the U.S. flag fleets operating in domestic commerce on the Great Lakes, supports measures to limit steel imports. The LCA 1985 Annual Report states that unfair competition by subsidized foreign steel producers has "led to severe depression in the U.S. iron ore, steel and Great Lakes shipping industries and jeopardized the nation's defense capabilities." The report indicates that iron ore shipments from U.S. and Canadian ports on the Great Lakes fell from 105.9 million tons in 1973 to 58.4 million tons in 1985, a 45% decline.

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. Cooperative 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 though passage of a continuing resolution (appropriations) that included $7.5 million for what is now referred to as the Steel Industry/Federal Labs 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. Federal monies available at this time amount to $7.1 million of which approximately two-thirds is to be spent at the Argonne facility. The Steel Initiative contemplates further appropriations.

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 its trade organization, the American Iron and Steel Institute, the industry 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.

The Chicago Mayor's Task Force on Steel and Southeast Chicago recently recommended that the Argonne National Laboratory, in conjunction with the University of Illinois at Chicago, 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 City of Chicago's Department of Economic Development has suggested that this summit be preceded by a one-day conference on the topic to take place in late 1986 or early 1987.

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, USX Corporation agreed to lease its research lab at Coleraine, Minnesota and pay the Institute $950,000 over the next two-and-a-half years to conduct research including the feasibility of using a "home-grown" organic binder 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. One area of interest to researchers in the field is the potential for alternative uses of iron ore.

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 to be built near the USX Minntac taconite plant at Mountain Iron, Minnesota. The $100 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, but the grant proposal was turned down in 1986 in favor of a similar iron mill proposed in Pennsylvania. However, Department of Energy officials have indicated that grant prospects have not been exhausted under the program.

Recent Commission Legislative Initiative

The Great Lakes Commission has already 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 House members of the tax reform bill conference committee from Great Lakes states in support of the 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 modernizatation, consistent with the provisions and intent of the Steel Import Stabilization Act of 1984.

APPENDIX

ECONOMIC IMPACTS OF STEEL IMPORT RESTRAINTS

One policy option identified by the Great Lakes Commission to effectively manage short-term change for revitalization of the integrated steel industry calls for a continuation of the Voluntary Restraint Agreement (VRA) program which was initiated by the President in September 1984. The goal of the 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. Adherence to these limits could provide for increased purchases of domestic steel, increased profitability for steel producers, additional funds for capital investments by steel producers in modern equipment and stabilized employment in the steel industry.

This analysis of the economic impacts of an effective steel import restraint program involves a determination of the economic benefits to the steel industry and of the economic costs to steel purchasers. It indicates that annual cash flow to domestic steel producers would increase by $1.25 billion, and prices paid by domestic companies that use steel would increase by $154 million which represents less than 4/10 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 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 steel restraints are estimated for 1986, assuming that steel restraints had been effective in limiting steel imports 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 the 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.

Tons of Domestic Shipments and Imports

In 1985, U.S. steelmakers shipped 73,043,000 tons of steel, and steel imports totalled 24,256,000 tons which represented 25.2 percent of the domestic market. Had a steel import restraint program been sucessful 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 totalled 19,466,000 tons, a reduction of 4,790,000 tons. This would have increased steel shipments from U.S. steel producers to 77,833,000 tons.

According to the American Iron and Steel Institute, as of the end of August of 1986, steel shipments from U.S. producers totalled 48.0 million tons, while imports of 14.3 million tons accounted for 23.2 percent of the domestic market. Were this level of steel shipments and imports to continue through the end of 1986, shipments from U.S. steel producers would total 71.7 million tons and imports would total 21.4 million tons. While steel shipments would fall by 2.7 percent from 1985, imports would decline by 11.9 percent.

Based upon this projected level of steel imports for 1986, were imports for the year to be held to 20.2 percent of the U.S. market, then imports would total 18.6 million tons, a reduction of 2.8 million tons from the projected 21.4 million tons of steel imports in 1986. Assuming the 2.8 million tons would be purchased from U.S. steelmakers, shipments from U.S. producers in 1986 would total 74.5 million tons.

The following table indicates the change in domestic and import shares of the U.S. steel market with imposition of a steel import restraint program that limits overall imports to 20.2 percent of the U.S. market.

Year	Domestic Steel Shipments (Million tons)	Steel Imports (Million tons)	Import % of Market
1985	73.0	24.3	25.2
1986 (Projected)	71.7	21.4	23.2

Year	Imports Under Restraint Program (Million tons)	Domestic Shipments Under Restraint Program (Million tons)
1985	19.5	77.8
1986 (Projected)	18.6	74.5

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 will average $490 per metric ton or $445 per short ton. This price represents the composite average prices of 16 steel products. In comparison, Paine Webber indicates the price of imported steel ordered from foreign producers will average $400 per metric ton or $363 per short ton, F.O.B. foreign port (Antwerp), and the foreign spot market price will average $310 per metric ton or $281 per short ton, F.O.B. foreign port.

The charge to ship steel from Antwerp to Chicago via the St. Lawrence Seaway is 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 will be 10 percent to 29 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 is 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 totalled 24.3 million tons and had a C.I.F. value of $9.7 billion, for an average value of about $400 per ton. Through May of 1986, steel imports totalled 9.2 million tons, valued at $3.6 billion, for an average landed value of about $391 per ton. While Paine Webber indicates steel import prices have 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	-	$400	-	$391

Using $390 per ton as the average price for import steel in 1986, the import price is $55 per ton less than the domestic price of $445 per ton.

In 1986, U.S. companies that use steel in their production processes will purchase 71.7 million tons of domestic steel at an average price of $445 per ton, for total expenditures of about $31.9 billion. In addition, U.S. companies will purchase 21.4 million tons of imported steel at an average price of $390 per ton, for a total of about $8.3 billion. Overall, U.S. companies will pay about $40.2 billion in 1986 for steel used in their production processes.

Economic Impacts of Steel Import Restraints

Determination of the economic impacts of the steel import restraint program is based on the assumption that the program would limit steel imports 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 will ship 71.7 million tons in 1986.
- With a projected import market share of 23.2 percent, foreign steel producers will ship 21.4 million tons to the U.S.
- By limiting imports to 20.2 percent of the U.S. market in 1986, imports would fall to 18.6 million tons, a reduction of 2.8 million tons.
- Limiting imports to a 20.2 percent share would increase domestic shipments by 2.8 million tons, to a total of 74.5 million tons.
- The average price of steel in 1986 is $445 per ton for steel produced in the U.S. and $390 per ton for imported steel, a difference of $55 per ton.

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

- Foreign steel producers will lose 2.8 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 is about $322 per ton. At this price, foreign steel producers will lose sales revenues of $902 million.
- U.S. steel companies will increase domestic shipments by 2.8 million tons, at an average price of $445 per ton, for an increase in total sales of $1.25 billion.
- On average, the price of steel produced in the U.S. exceeds the landed price of imported steel by $55 per ton. On 2.8 million tons that would have been imported but will instead be purchased from U.S. steelmakers, the domestic companies purchasing the steel will pay higher prices totalling $154 million.

- An increase of $154 million in the price paid by U.S. companies for steel will represent less than 4/10 of 1 percent of their total steel material costs.