FINAL REPORT

Conceptual Evaluation of Markets for Steel to be Produced in a Nova Scotia Steelmaking Complex

DEPARTMENT OF
REGIONAL ECONOMIC EXPANSION

Nova Scotia, Canada

September 11, 1973

BOOZ · ALLEN PUBLIC ADMINISTRATION SERVICES, Inc.
1025 Connecticut Avenue, N. W.
Washington D.C. 20036
(202) 293-3600

September 11, 1973

Mr. Ronald F. Harper
Resource Adjustment Officer
Department of Regional Economic Expansion
Fifth Floor, Centennial Building
1645 Granville Street
Halifax, Nova Scotia, Canada

Dear Mr. Harper:

We are pleased to submit this final report of our conceptual evaluation of potential markets for steel produced in a Nova Scotia Steelmaking Complex.

This assignment was conducted under Contract Reference Number 1796 to provide the Department of Regional Economic Expansion with a preliminary evaluation of such a facility and to present a plan for conducting a detailed feasibility study.

We have found this assignment to be quite interesting and welcomed this opportunity to assist the Department in its work.

Very truly yours,

TABLE OF CONTENTS

INDEX OF EXHIBITS

INDEX OF EXHIBITS (Continued)

I. CHARACTERISTICS OF THE WORLD STEEL MARKET

I. CHARACTERISTICS OF THE WORLD STEEL MARKET

This chapter discusses some of the trends which are expected to characterize the world steel market in the period 1980 to 1985. Such a time frame is necessary because of the five to eight year lead time to bring a major steelmaking complex into production. This discussion will provide background information for the conceptual evaluation of potential markets for Nova Scotia produced steel, which is presented in Chapter II.

1. BY 1985, WORLD STEELMAKING CAPACITY WILL HAVE TO INCREASE BY ABOUT 65% TO MEET EXPECTED DEMAND

Projections prepared by the International Iron and Steel Institute indicate that world steel consumption is expected to grow at a slower rate in the future than it has in the recent past. From 1955 to 1970, the annual growth rate of world steel consumption was about 5.7%. From 1970 to 1985, it is expected to grow at an annual rate of about 4.5%. Based on these projections, worldwide demand for raw steel is expected to grow from a level of about 691 million short tons in 1972 to about 1,261 million short tons in 1985. This represents a total increase over this period of about 82%.

Projections of worldwide steel demand to 1985 are shown in Exhibit I, following this page.

World raw steelmaking capacity in 1972 was estimated by the Economic Commission for Europe to be approximately 780 million short tons. Allowing for excess capacity to compensate for seasonal demand fluctuations and imperfect distribution of products and markets, a minimum of 530 million short tons of additional steelmaking capacity will be needed to meet expected 1985 world demand. This would require an annual capacity increase of about 41 million tons, or an average capacity growth rate of about 4% per year for the next 13 years.

2. BOTH STEEL CONSUMPTION AND STEELMAKING CAPACITY ARE EXPECTED TO GROW MOST RAPIDLY IN THE DEVELOPING NATIONS

Exhibit II, following Exhibit I, shows relative steel consumption projections by major areas of the world. These projections point to certain significant shifts in the geographic distribution of world steel consumption. The proportionate shares of North America and Western Europe are shown to be shrinking. This reflects in part a further increase for Japan, but primarily a substantial change in the relative position of "All Other" areas, comprised primarily of developing countries. This category shows a projected threefold increase in consumption, bringing its share to

EXHIBIT I

Department of Regional Economic Expansion

RAW STEEL CONSUMPTION PROJECTIONS
(Millions of Short Tons)

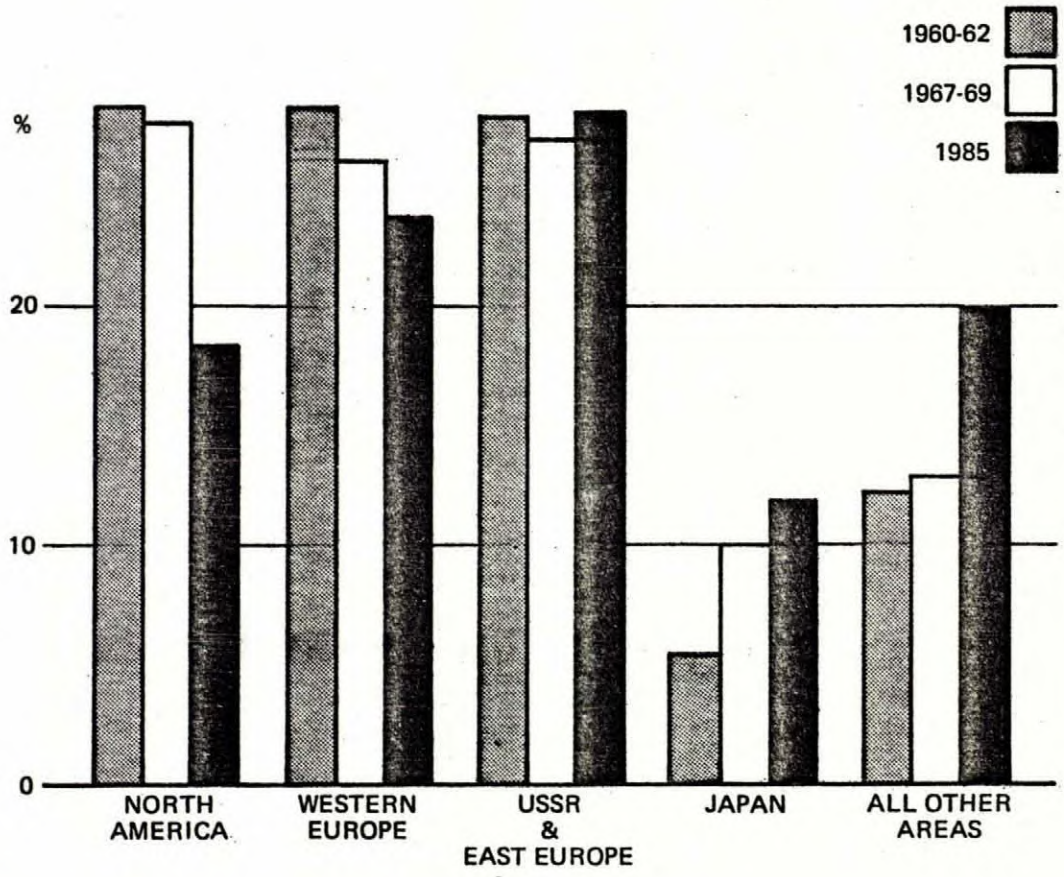
	1970	1980	1985
USA	139.4	187.4	209.4
Canada	12.2	18.2	22.0
Latin America	20.2	38.6	52.9
Common Market and U.K.	134.7	178.3	208.5
Other Western Europe	39.5	64.8	85.6
USSR	121.1	202.7	237.0
Eastern Europe	46.2	81.7	100.5
Oceania	8.3	13.4	16.8
Japan	77.8	124.0	147.5
India	6.7	15.9	22.0
China & North Korea	24.5	58.4	87.1
Other Asia	9.0	24.6	34.3
South Africa	5.4	9.0	11.9
Other Africa	4.6	5.8	7.2
Middle East	5.5	12.5	18.6
Total	655.1	1035.3	1261.3
Percent of 1970 Consumption	--	158.0	192.5

Source: International Iron and Steel Institute

EXHIBIT II

Department of Regional Economic Expansion

GEOGRAPHY OF STEEL CONSUMPTION



SOURCE: INTERNATIONAL IRON & STEEL INSTITUTE

20%. Approximately 80% of this increase will occur in Asia and Latin America. The relative position of the fifth category, the USSR and Eastern Europe, is expected to remain virtually unchanged.

Steelmaking capacity is also expected to increase at the greatest rate in developing areas. Several factors contribute to this expectation:

- Per capita consumption has historically grown more rapidly in developing areas than in industrialized countries where consumption levels are already quite high.
- Steel is regarded as a basic element of industrialization and is invariably one of the first industries to be emphasized in developing countries. Political/economic considerations often predominate over profitability factors in making investment decisions in these countries.
- Many developing countries have heretofore undeveloped resources of iron ore and coal which will make steel production attractive.
- Labor costs associated with developing and operating steelmaking facilities are lower in developing countries, and new technologies of steel production are readily transferable. As a result, steel can be produced cheaply and efficiently in developing countries.
- Sources of capital for steel investments, currently a major concern in free market areas, may be less of a problem in developing areas because of the availability of loans from bilateral or multilateral assistance programs and from industrial development banks.

3. WORLDWIDE STEELMAKING CAPACITY MAY FALL SHORT OF EXPECTED DEMAND BY 1980

Because of the long lead time required to bring a new steelmaking facility into production, the ability to meet consumption demands in the 1980's will be determined by investment plans implemented in the next few years.

The major determinant of investment expenditures in free market economies is the availability of capital and the expectation of an adequate return on investment. The profit performance of major steel producers in the United States, Western Europe, and Japan has been poor in recent years. Capital for steel investment has been difficult to obtain due to a combination of poor profits and heavy debt burdens. As a result, expansion plans have been revised downward in these parts of the world. Whether or not these plans will be revised upward again within a few years will depend on the prosperity of these economies in the near future.

Investment expenditures to increase steel capacity have also been adversely affected in industrialized countries by pollution abatement expenditure requirements. These expenditures are being made with capital that would otherwise be available for new facilities.

In planned economies, the level of capital investment in steel production depends to a large extent on the relative emphasis which a country decides to place on its steel industry. This is often determined as much by the balance of payments impact of insufficient domestic capacity as by the apparent profitability of the investment. Five year plans for the USSR, Eastern Europe, and China suggest that investment in steelmaking capacity will continue to receive high priority in these countries. In developing areas, as was mentioned earlier, capital investments in steelmaking capacity also are expected to increase, financed in part by development assistance from industrialized areas.

The major unanswered questions are whether capital spending for steel production will pick up within the next few years in those areas where it is currently lagging and whether investment expenditure in other parts of the world will continue to grow as planned. One study has indicated that, based on planned expansions announced through 1972, worldwide steel capacity may lag behind demand by more than 75 million tons as early as 1978. If these estimates are accurate, tight world steel markets in the early 1980's are a possibility.

Projection estimates of steel consumption and steel capacity for major areas of the world are shown in Exhibit III, following this page.

EXHIBIT III

Department of Regional Economic Expansion

WORLD RAW STEEL DEMAND AND CAPACITY ESTIMATES*
(Millions of Short Tons)

	1972 Estimates				Estimated Projections					
Country or Area	Production	Consumption	Capacity	Apparent Capacity Excess/ (Shortfall)	Year	Consumption	Annual Consumption Growth Rate (1970-1985)	Capacity (1980)	Annual Capacity Growth Rate (1972-1980)	Apparent Capacity Excess/ (Shortfall)
Canada	13.1	13.3	13.5-14.0	0.2-0.7	1980: 1985:	18 22	4.5%	19- 21**	4.0% -5.0%	1-3
United States	133.2	148.3	155-160	6.7-11.7	1980: 1985:	187 209	2.3%	168-185	1.0% -2.0%	(2)- (19)
Western Europe	182.4	179.5	200-210	20.5-30.5	1980: 1985:	243 294	3.6%	245-255	2.0%-2.5%	2-12
Latin America	17.1	21.8	18-20	(1.8)-(3.8)	1980: 1985:	39 53	7.1%	33-38	7.0%-8.0%	(1)-(6)
Japan	106.8	82.0	134-138	52-56	1980: 1985:	124 147	4.4%	160-172	2.0%-3.0%	36-48
USSR & Eastern Europe	187.9	175.7	190-200	14.3-24.3	1980: 1985:	284 338	4.4%	275-295	4.0%-5.0%	(9)-11
All Other Areas	50.6	70.5	52-55	(15.5)-(18.5)	1980: 1985:	140 198	8.5%	85-110	6.0%-9.0%	(30)-(55)
Total World	691.1	691.1	780-795	88.9-103.9	1980: 1985:	1035 1261	4.5%	985 -1070	3.0%-4.0%	(45)-35

* Data drawn from several sources including Booz, Allen & Hamilton's own estimates

** Not including a new Nova Scotia steelmaking complex

These estimates contain a number of uncertainties and should be regarded as possible trends rather than definitive predictions.

4. WORLD PRICE COMPETITION FOR STEEL PRODUCTS WILL BE DETERMINED BY BOTH PREDICTABLE AND UNPREDICTABLE FACTORS

Steelmaking costs in Western Europe and Japan can be expected to approach those in Canada and the United States within the next decade. This is the result of three factors:

- Wages are rising at a faster rate in Japan and Western Europe
- Similar productivity levels across the developed countries
- Devaluation

These factors will help to alleviate the problem of import penetration from these areas into North American markets.

Developing countries will tend to enjoy production cost advantages over other producers. This will be the result of lower labor costs, new facilities, and plants which will be technologically comparable to the most efficient plants in the developed countries. The possibility of export competition from these countries will depend on whether their capacity development programs will be

sufficient to surpass the growth of local consumption. The answer to this question cannot be accurately predicted with information currently available.

Export price competition will also be determined in large measure by world trade policies. Because steel is regarded as a key element of industrialization, many countries provide protection for internal steel markets and subsidies for exports. These have included:

- Special depreciation measures
- Credit guarantees and low-interest loans
- Special freight rates, both internally and externally
- Tax advantages for internal producers
- Tax rebates for exports

Whether or not the world will experience a move toward free trade for steel products is difficult to predict. The most likely tendency may be for trade barriers to be lowered in periods of high world demand and increased in times when world demand is slack. Such possibilities create significant uncertainties in the future export price behavior of steel products.

* * * *

This chapter has examined the characteristics of the world steel market into the 1980's. The next chapter will present a conceptual evaluation of potential markets for steel produced in Nova Scotia.

II. POTENTIAL MARKETS FOR NOVA SCOTIA STEEL

II. POTENTIAL MARKETS FOR NOVA SCOTIA STEEL

This chapter identifies and analyzes, at a conceptual level, alternative potential markets for steel produced in an Atlantic deep water steel complex in Nova Scotia. Primary emphasis is given to semifinished steel markets with secondary attention to markets for finished steel products.

The world market characteristics presented in the previous chapter suggest that the potential markets for Nova Scotia steel can be divided into five major categories, each of which should be examined independently:

- Canada
- United States
- Western Europe
- Latin America
- Rest of the world

1. CURRENT EXPANSION PLANS IN CANADA SHOULD PROVIDE CAPACITY SUFFICIENT TO MEET EXPECTED INTERNAL CONSUMPTION THROUGH 1980

Steel consumption in Canada is expected to grow at a rate of about 4% per year through 1985. Current consumption of 13.3 million short tons of raw steel in 1972 is expected to increase to about 18.2 million tons by 1980 and 22.0 million tons by 1985.

In the last few years, Canadian imports have about equaled exports. However, total steel import tonnages have increased by 75% in the past 5 years, from 1.3 million to 2.4 million net tons, and are becoming a major concern.

Canada's raw steel capacity in 1972 is estimated to be 13.5 million short tons. Expansion programs currently underway at Stelco, Defasco, Algoma, and Sidbec will increase capacity to about 17.5 million tons, and other announced plans will increase raw steel capacity by an additional 2.5 million tons to about 20.0 million tons by 1980. This should be adequate to meet projected consumption levels.

The preceding estimates of the steel supply/demand balance in Canada indicate that a Nova Scotia steelmaking facility will have to sell most of its output outside of Canada to be economically viable. Preliminary analysis indicates that, although a Nova Scotia facility will have abundant nearby sources of high grade iron ore, metallurgical grade coal will have to be obtained either from Western Canada or from abroad. Whether the transportation costs of importing coal and exporting semifinished or finished products will be adequately offset by low costs of iron ore or other production advantages cannot be stated without further analysis.

2. THE UNITED STATES IS EXPECTED TO REMAIN THE WORLD'S LARGEST IMPORTER OF STEEL PRODUCTS AND PROVIDES A POTENTIAL MARKET FOR NOVA SCOTIA STEEL

Steel production in the U. S. is concentrated in a few large firms. The 4 largest steel companies account for about 54% of raw steel production, and the 8 largest account for about 75%. Shipments of semifinished steel are even more concentrated, with shipments among the "Big 8" accounting for about 83% of the market.

Geographic concentration of steel production is also significant. Five states in the Northeast and Midwest account for almost 70% of raw steel output. Exhibit IV, following this page, shows the changes which have taken place from 1953 to 1970 in the share of raw steel produced by states and regions. Significant slippage in percentages has occurred in Pennsylvania and Ohio, and major gains have taken place in Michigan as well as in the Southern and Western regions. Since major markets are expected to remain concentrated in the Northeast and Midwest, however, it is expected that steel production will remain heavily concentrated in these regions.

A high degree of integration of steel production is typical of the larger steel producers. Of the total of about 200 steel

EXHIBIT IV

Department of Regional Economic Expansion

RAW STEEL PRODUCTION BY STATE AND REGION
1953, 1961, 1970
(Millions of Short Tons)

State/Region	1953 Tons	1953 %	1961 Tons	1961 %	1970 Tons	1970 %	Change In Share of Total Production
Indiana/Illinois	23.0	20.6	22.4	23.2	30.2	23.0	2.4
Pennsylvania	31.1	27.9	22.4	23.2	30.0	22.8	(5.1)
Ohio	21.7	19.4	16.5	17.1	21.7	16.5	(2.9)
Michigan	6.0	5.3	6.7	6.9	9.5	7.2	1.9
Other Northeast	12.6	11.3	11.8	12.2	14.1	10.7	(0.6)
Southeast	8.7	7.8	7.0	7.2	12.0	9.1	1.3
West (including California)	5.1	4.6	6.7	6.9	8.7	6.6	2.0
Southwest	3.4	3.0	3.1	3.2	5.3	4.1	1.1
Total	111.6	100.0*	96.6	100.0*	131.5	100.0*	

* May not add due to rounding

Source: American Iron and Steel Institute

producing companies, 25 are integrated from the blast furnace through the rolling mill, 61 produce raw steel from scrap only, and the remainder--mostly very small producers--purchase semi-finished steel for rolling into finished products.

Overall, semifinished products have accounted for a very small portion of total steel product shipments. As shown in Exhibit V, following this page, semifinished products have accounted for only 5.2% to 8.1% of total shipments in the past 5 years. The greatest tonnage of semifinished products shipped by U.S. producers was 7.4 million tons in 1970, over 3 million tons of which went for exports, reflecting a temporary world demand surge. In 1972 semifinished shipments totaled only 4.9 million tons. Semifinished imports have also been quite small. In the past 5 years total semifinished imports have been in the range of 1.2 million to 1.9 million tons, or about 9% of total imports.

Since 1965 the U. S. steel industry has been beset by a number of economic problems. Net shipments of steel mill products had virtually stagnated over the period 1966-1972 and were, in fact, 500,000 tons less in 1972 than the 1965 level of 92.6 million tons. Labor productivity has been sluggish, and production costs have been among the world's highest. Import market penetration rose sharply, reaching a peak of 18.3 million

EXHIBIT V

Department of Regional Economic Expansion

NET SHIPMENTS OF FINISHED AND SEMIFINISHED STEEL PRODUCTS
BY U.S. PRODUCER
(Millions of Short Tons)

	1972		1971		1970		1969		1968	
	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent
Semifinished Products	4.9	5.4	5.0	5.7	7.4	8.1	6.4	6.7	4.8	5.2
Finished Products:										
Shapes and Plates	13.2	14.4	13.6	15.6	14.2	15.6	14.5	15.4	14.5	15.8
Bars and Tool Steel	15.5	16.9	14.2	16.3	14.5	16.0	14.3	15.3	13.7	14.9
Sheets and Strips	39.9	43.4	35.6	40.9	35.1	38.7	38.1	40.6	36.7	39.9
Rails, Wire, Pipe and Other	18.3	19.9	18.7	21.5	19.6	21.6	20.6	22.0	22.2	24.2
Total Finished Products	86.9	94.6	82.0	94.3	83.4	91.9	87.5	93.3	87.1	94.8
Total Shipments	91.8	100	87.0	100	90.8	100	93.9	100	91.9	100

tons in 1971. In addition, producer profitability and cash flow declined while debt levels increased sharply.

During 1973, U. S. domestic steel output rates have grown explosively. Net steel shipments for the year are projected to be as high as 106 million tons, and raw steel output may well exceed 150 million tons. This output surge is the result of two major factors:

- An increase in U. S. steel consumption to an expected level of about 117 million net tons (finished and semifinished steel), reflecting the current economic boom as well as customer inventory building
- A decrease in expected import penetration to approximately 13 million or 14 million net tons (finished and semifinished steel), reflecting a strong resurgence of steel demand in world-wide markets

Current output levels are placing a severe strain on U. S. capacity, and it is improbable that higher output levels can be obtained without the addition of capacity. Also apparent, of course, is the fact that the U. S. requires imported steel to meet demand as current domestic capacity is clearly insufficient.

Admittedly, 1973 is an atypical year. For example, roughly 3 million or 4 million tons of anticipated domestic shipments are for purposes of rebuilding customer inventories depleted in 1971 and 1972. Steel shipments in 1974, however, are likely to

exceed 102 million tons, assuming that economic growth continues. This anticipated shipment level may well approximate 1974 output capacity as producer inventories have been virtually depleted during the first half of 1973 and some facilities will be taken down for maintenance and repair deferred during 1973.

Producer profits have increased substantially during 1973 in line with increases in output and capacity utilization; however, profits and return on investment have not yet risen to levels which producers regard as satisfactory. Limitations on profitability have been imposed by two basic factors:

- Increasing costs of production, notably as a result of increasing wage rates, energy costs (including coking coal), and transportation costs.
- The inability to increase prices to pass on increased costs due to price controls.

For 1972, U. S. producers overall displayed a return on sales of 3.4% and a return on stockholders' equity of 5.7%, clearly not sufficient to provide access to large amounts of new capital. For 1973, as indicated above, the picture is brighter. Exhibit VI, following this page, compares the 1972 and 1973 performance of four major steel producers. On an annualized

EXHIBIT VI

Department of Regional Economic Expansion

COMPARATIVE PROFITABILITY OF
SELECTED MAJOR U. S. STEEL PRODUCERS*
FOR 1972-1973
(Dollars in Millions)

	1972	1973**
Sales	$11,823	$13,860
Net Profit	407	650
Net Profit Percent (%)	3.4	4.7
Shareholder's Equity	8,334	8,659
Return on Equity (%)	4.9	7.5

*U. S. Steel, Bethlehem Steel, Republic Steel, National Steel.

**Six months annualized.

basis, profits would be up 60% on a sales gain of 17%. Profit margins would be up 38%, and return on equity would be up 53%. However, a 7.5% rate of return on equity remains insufficient to attract significant amounts of outside capital. Public utilities in the U. S. are currently basing rate increase requests on a required return of 10%. Note that to achieve a 10% rate of return steel producer profits would have to increase by $216 million, an increase in revenue of $432 million or 3.1% at current output levels. This assumes that performance in the second half of 1973 matches that of the first half, which will likely not be the case. Were price controls to be removed, prices and profits would undoubtedly increase; however, given rising costs, it is not clear that profits will increase to a level that will permit future producer capital needs to be easily met.

Overall, the United States' steel consumption growth rate in the next decade is expected to be about 2.3%. This is the lowest expected growth rate of any major producing county. Despite this low demand growth rate, U. S. producers must add about 30 million additional tons of raw steelmaking capacity to meet projected 1980 demand, as shown in Exhibit III.

U. S. producers will have difficulty expanding capacity at this pace, especially since they will also be required to continue

investing to phase out and replace obsolete equipment and to install pollution abatement equipment to meet environmental regulations.

One source estimates that to add the needed new capacity while meeting these other capital spending demands would require capital expenditures averaging about $3 billion per year over the next 7 years. Capital spending in 1972 was around $1.4 billion, and the highest historical level was $2.3 billion in 1968. It is questionable whether adequate capital can be obtained to meet these required levels of expenditures without pushing debt burdens beyond acceptable limits. For this reason, levels of imported steel products will continue to be as high as, and probably higher than, in recent years, and thus present a likely potential market for Nova Scotia steel.

A major uncertainty in the future role of steel imports is the likely trade policy of the U. S. government. Import controls may be continued into the future in order to improve the profitability of domestic steel and to reduce the balance of payments deficit problem. Given the need for significant imports, however, such controls will likely be significant factors only in slack demand periods.

Several U. S. steel producers have indicated that construction of new large "green fields" plants in the U.S. by individual producers is unlikely because of the magnitude of investment required. In addition, only limited capacity expansion can be achieved by rounding out existing facilities which have been extensively modernized and balanced during the 1960's. Bethlehem Steel has proposed that anti-trust regulations be modified to permit domestic joint ventures because of the capital investment problems faced by the industry. Whether such a proposal will be seriously entertained is, of course, unknown. U. S. producers, however, have a long history of foreign joint ventures which are not subject to domestic restriction. For this reason, and in view of the capital access problems faced by the industry, participation in a Nova Scotia complex by U. S. producers may be attractive. Also, such participation, as indicated below, may contribute to market stability in slack demand periods.

Production of semifinished steel in Nova Scotia for shipment to the U. S. for finishing is conceptually attractive from a balance of payments viewpoint. Given limitations on feasible domestic capacity expansion, the importation of semifinished steel would tend to reduce adverse balance of payments in comparison to impacts associated with higher value added

finished steel. In addition, participation by U. S. producers in a Nova Scotia facility would tend to hedge the risk of Nova Scotia steel being "locked out" of U. S. markets in slack demand periods.

The relatively small amounts of intercompany trade in semi-finished steel would indicate that steelmaking and finishing facilities in the U. S. are reasonably well balanced, although finishing capacity may exceed basic steelmaking capacity by a small margin. Accordingly, it is likely that new finishing capacity in the U. S. will be required to absorb the output of a Nova Scotia steelmaking facility.

The deciding factors regarding markets for semifinished steel in the U. S. will thus be:

- Capital access constraints faced by U. S. producers
- The economics of semifinished steel production in Nova Scotia with finishing in the U. S.

3. ALTHOUGH WESTERN EUROPE'S STEELMAKING CAPACITY WILL CONTINUE TO EXCEED INTERNAL DEMANDS, TIGHT CAPITAL MARKETS HAVE CURTAILED EXPANSION PLANS

In recent years, Western Europe has been a net exporter of steel. West Germany is currently the largest Western European steel producer, followed in order of 1972 steel production by the United Kingdom, France, Belgium-Luxembourg, and Italy.

Although capital for investing in new facilities has been tight and some investment plans have been revised downward, Western Europe is expected to continue to be a net exporter of steel in the 1980's. As shown in Exhibit III, Western Europe will have to increase new steel capacity by about 40 million to 50 million net tons to meet 1980 consumption estimates. This would require an annual expansion rate of about 2.5%.

The British steel industry has had a number of problems, including import penetration and heavy financial losses, in the last few years. Despite these problems, the government-owned British Steel Corporation is planning to continue with investment plans to increase steel capacity by as much as 10 million tons by 1980, while intensively modernizing or replacing existing obsolete capacity. France and Italy have also continued with expansion plans, with integrated facilities having outputs of 6 million to 8 million tons planned to become operational by 1980. On the other hand, financial setbacks suffered by West German steel producers have resulted in the postponement or abandonment of a number of new facility investment plans.

A major feature of the Western European steel industry in the past few years has been an increasing tendency toward mergers and joint ventures. Major mergers have occurred

involving firms from West Germany and the Netherlands, with smaller mergers taking place in Spain and Austria.

Because of current tight capital markets and recent low operating profits, Western European steelmakers might be attracted to the possibility of investing in a Nova Scotia facility for producing semifinished steel. Such a joint venture might be attractive on the grounds that it would reduce the amount of capital required for a major expansion program. Devaluation also tends to make capital investment in Canada significantly more attractive than in the past. On the other hand, a Nova Scotia producer of semifinished steel would offer potentially significant disadvantages in terms of transportation costs to Europe. Such factors would have to be evaluated before the economic viability of such an arrangement could be determined.

4. LATIN AMERICA WILL CONTINUE TO BE A NET IMPORTER OF STEEL PRODUCTS

Latin America has historically been a net importer of steel products. Both capacity and consumption in these countries are expected to increase at rates well above the world average, as shown in Exhibit III. By 1980, however, the gap between capacity and demand may actually be greater than it is today.

The major steel producers in this area are Brazil and Mexico, and they will continue in their leadership roles for the next decade. Brazil in particular is expected to be the dominant country in this region. By 1980 steel production in Brazil is expected to be 20 million tons. This would increase its percentage of total Latin American steel production to between 53% and 60% compared with 42% in 1972. Equally significant is the expectation that Brazil's capacity will exceed internal consumption by about 4 million tons in 1980.

Because Latin America is expected to continue to be a net importer of steel products and because major ports are reasonably close, Latin America represents a potential market for either semifinished or finished steel produced in Nova Scotia. Of course, markets for semifinished steel are predicated on the assumption that the finishing capacity required to absorb such products will exist, an assumption which requires close examination. A major factor, however, would be the ability of Nova Scotia steel to compete on price with steel produced in Brazil and other low cost countries, particularly during periods of economic downturn and reduced demand.

5. THE REST OF THE WORLD APPEARS TO OFFER FEW POTENTIALLY ATTRACTIVE MARKETS FOR NOVA SCOTIA STEEL

The areas of the world not yet examined in this chapter are likely to be either too small or too distant for Nova Scotia steel to compete favorably with other steel exporting nations. In Asia and the Pacific, for instance, Japan can be expected to continue to be a major exporter and the dominant market force. Eastern European nations will continue to rely on steel produced in the USSR or Western Europe to meet demand not fulfilled internally.

North Africa and the Middle East also can be served more competitively by steel from Western Europe, and steel demand in the other African nations is not expected to exceed 15 million tons by 1980. Markets in these areas are likely to be attractive for Nova Scotia steel only in the event that world demand presses very hard on steelmaking capacity during the 1980's. Even in this eventuality, markets in the United States, Western Europe, and Latin America should continue to offer significantly greater potential.

* * * *

This chapter has presented a conceptualized analysis of potential markets for steel produced in Nova Scotia. The most

attractive market for either semifinished or finished Nova Scotia steel appears to be in the United States. Possibilities of markets in Western Europe and Latin America also warrant further investigation. The next chapter presents a conceptual analysis of facility financing and development possibilities.

III. FACILITY FINANCING AND DEVELOPMENT

III. FACILITY FINANCING AND DEVELOPMENT

This chapter identifies, on a conceptual level, alternative means of assembling the financial resources to establish and operate a Nova Scotia steel complex. The specific topics addressed are:

- Estimated capital investment requirements
- Potential types of investors
- Potential capital assembly mechanisms
- Explicit costs of financing alternatives
- Other considerations in choosing alternatives

The information sources used were those available within Booz, Allen. Consideration was given to our making informal contacts with selected U. S. producers to obtain a preliminary assessment of their interest in participating in such a venture. It was decided, however, that such contact by us would be premature at this time.

1. THE CAPITAL INVESTMENT REQUIRED FOR A MAJOR NOVA SCOTIA STEELMAKING COMPLEX MAY BE SEVERAL BILLION DOLLARS

An assessment of the estimated amount of capital needed to establish a Nova Scotia producer of semifinished steel will provide important background information for the identification of financial resource assembly alternatives. Exhibit VII, following this page, provides a rough order of magnitude estimate of the capital investment cost of various capacity levels. Caution should be used in interpreting these estimates, as the estimated cost per annual ton cannot take into account such specific aspects of a Nova Scotia facility as site location and plant economics.

These estimates indicate that the capital investment required to establish a facility capable of producing 5 million to 8 million tons of semifinished steel would be on the order of $1.5 billion to $3.0 billion*. The magnitude of these figures can be put in perspective when compared to total investments by the U. S. steel industry, which were $1.2 billion in 1972.

low estimate more like $2.5 billion to $4 billion at least

A major semifinished steel complex would also need significant finishing capacity to absorb its output. In 1972 only 5 U. S. producers had total raw steel output exceeding 8 million

---

* Does not include working capital.

EXHIBIT VII

Department of Regional Economic Expansion

ESTIMATED CAPITAL INVESTMENT FOR A FACILITY PRODUCING SEMIFINISHED STEEL*
(1973 Dollars)

Raw Steel Output Capacity (Millions of Tons)	Estimated* Cost Per Annual Ton (Dollars)	Estimated Total Capital Investment (Millions of Dollars)
5	$312	$1,560
10	312	3,120
15	312	4,680
20	312	6,240

* Based on estimates by the Association of Iron and Steel Engineers
** Assumes use of developed raw materials sources, included provision for

- Transportation and ore yard
- Utilities
- Administrative facilities
- Coking facilities
- Blast furnace
- Steelmaking facilities

tons per year. Thus, the amount of additional finishing capacity needed to absorb the output of a Nova Scotia complex will be as large as that of a major U. S. producer.

2. MULTI-PARTY JOINT VENTURES MAY BE THE MOST PRACTICAL MEANS OF FINANCING A NOVA SCOTIA STEELMAKING COMPLEX

Capital access constraints in the U. S. and Western Europe have already been mentioned. Capital for new investments has been limited because of slack demand and low profits in recent years. Many firms have borrowed very heavily already, and debt-equity ratios are approaching feasible limits. In addition, investment capital which could otherwise be used to expand production capacity has been diverted to pollution abatement investments to meet air and water quality standards.

Given these constraints on capital and the required levels of investment discussed earlier, it may be infeasible for a single firm to raise the necessary capital at this time. Thus, to provide the financing for a Nova Scotia facility, multi-party joint ventures may be the most practical alternative.

Such joint ventures could include international cooperation among firms from several countries or two or more firms from a single country. Possible interest in participation seems most

likely to come from major producers in the United States, West Germany, or Japan. It should be noted that the magnitude of the recent devaluations of the dollar in relation to the mark and the yen should make direct investment in Canada significantly more attractive than in the past.

3. SEVERAL ALTERNATIVE CAPITAL ASSEMBLY MECHANISMS CAN BE CONSIDERED POTENTIALLY FEASIBLE

There are a large number of potential mechanisms for raising the necessary investment and operating capital for such multi-party joint ventures. The major alternatives can only be discussed at a conceptual level at this time.

One possibility is to have each of the participants in the venture raise its share of the capital required to invest in such a joint venture. Such capital could come either from debt sources, such as long-term notes or bonds, or from the issue of additional shares of capital stock by the existing firms, although equity markets are not a particularly attractive source of capital for major producers.

A second alternative would be for the newly formed joint venture corporation to seek capital on its own, based on the reputations of the various participants. Capital could be raised

in the form of long-term debt from banks or bond markets, as equity by a public subscription of stock in the new corporation or by equity investment by steel producers using funds available internally.

Finally, there are possibilities for governmental participation in or assistance for the new joint venture. These could include debt financing assistance, such as government loan guarantees or low-cost loans, or direct equity participation by the government.

4. EXPLICIT COSTS CAN BE DETERMINED FOR BOTH DEBT AND EQUITY SOURCES OF INVESTMENT CAPITAL

Both long-term debt and common stock have explicit costs to the corporation, which must be evaluated in choosing among financing assembly alternatives.

The explicit cost of debt is the cost to the corporation of the interest provision which the debt carries. Because interest payments are deductible for income tax purposes, the actual cost of the debt obligation is the after-tax interest rate. Current U. S. long-term notes and bonds are carrying pre-tax interest rates of about 8% to 9%, which after corporate income taxes cost corporations about 4. 5%.

The explicit cost of common stock can be expressed by relating the earnings and dividends expected by the stockholders to the amount of capital which the stock provides to the corporation. Management is responsible to maintain or improve the position of the stockholder, and thus the value which the market places on a share of stock is directly related to stockholder expectations regarding earnings and dividends.

An estimation of the cost of common stock in the steel industry can be made by looking at stocks of several major U. S. steel producers. Exhibit VIII, following this page, provides 1972 common stock data for the five largest steel companies in the U. S. Dividend cost of common stock is calculated by dividing dividends per share by average price per share; earnings cost is calculated similarly. For purposes of analysis, earnings cost is generally used as the basis for evaluating the cost of common stock equity, as dividends are discretionary and reflect corporate earnings reinvestment policies which change over time. The earnings cost of common stock among these firms ranges from 8% to 13%, which is significantly higher than the cost of long-term debt.

5. IN EVALUATING THE VARIOUS ALTERNATIVES FOR CAPITAL ASSEMBLY, SEVERAL FACTORS IN ADDITION TO COST MUST BE CONSIDERED

The explicit cost of debt versus common stock is only one factor which must be taken into account in evaluating alternative

EXHIBIT VIII

Department of Regional Economic Expansion

1972 COMMON STOCK INFORMATION FOR MAJOR STEEL COMPANIES IN THE U.S.

Company	Raw Steel Production 1972	Dividends Per Share	Earning Per Share	Average Price Per Share	Dividend Cost of Common Stock	Earnings Cost of Common Stock
U.S. Steel	30.7	$1.60	$2.90	$33	5%	8%
Bethlehem	18.3	1.20	3.02	28	4	11
Republic	10.4	1.25	2.66	27	5	9
National	9.8	2.50	3.81	38	7	10
Armco	8.5	1.00	2.28	28	4	8
Inland	7.8	2.00	3.43	31	6	11
Jones & Laughlin	7.3	1.00	2.43	19	5	13

Source: 1972 Corporate Annual Reports

capital assembly arrangements. The four other areas of consideration which also should be included are:

- Risk
- Flexibility
- Timing
- Control

The requirements for analysis in each of these areas can only be presented at a conceptual level at this time.

The risk of an alternative is related to the fixed obligation and covenants which it entails. The use of debt, for instance, creates fixed contractual interest payments which must be met out of the firm's operating capital, whether or not earnings are sufficient to meet interest obligations in a given year. In the case of dividend payments, the firm is not obligated to continue payments when financial hardships would result. Furthermore, the firm may decide to eliminate dividend payments if reinvesting earnings can be expected to bring a return on investment which stockholders might consider more attractive.

The flexibility of an alternative is related to the limitations which the alternative imposes on the corporation. Such limitations might be in the form of restrictive covenants or other constraints. These may be imposed either by outside debt sources or by the joint venture partners themselves.

The timing aspect of an alternative is related to the movement of prices in securities markets. Timing will influence the explicit cost spread between alternatives and at times may preclude alternatives. For instance, in times of depressed stock prices, it may be particularly difficult to raise adequate capital by issuing stock in a new corporation.

Finally, there is the element of control which relates to the relative ownership position of the various partners in a joint venture.

6. AN EVALUATION OF FINANCING ALTERNATIVES MUST BE MADE IN LIGHT OF THE CHARACTER OF THE POTENTIAL INVESTORS

The view taken of various means of capital acquisition throughout the world is by no means uniform. A comparison of the situation in the U. S. and Japan provides a striking example of this. Exhibit IX, following this page, presents a comparison of the capital structures and 1972 operating performances of Nippon Steel and Bethlehem Steel. Note that a comparison of absolute net profit and return on sales comes out distinctly in favor of Bethelehem Steel but if return on equity is used as a measure, the apparent performance of the two companies is much more nearly equal. The reason for this is the relative leverage employed by the two producers. Nippon Steel's long-term debt is equal to

EXHIBIT IX

Department of Regional Economic Expansion

COMPARISON OF CAPITAL STRUCTURES AND EARNINGS OF A MAJOR U. S. AND JAPANESE STEEL PRODUCER*
(Millions of dollars)

	Nippon Steel		Bethlehem Steel	
	$	%	$	%
Total Revenue	$4,021	100.0	$3,114	100.0
Net Income	53	1.3	135	4.3
Shareholders Equity	$ 962		$2,137	
Return on Equity (%)	5.5		6.3	
Long-Term Debt	$3,110		$ 642	
Total Invested Capital	$6,862		$3,645	
Long-Term Debt as % of Total Invested Capital (%)	45.3		17.6	
Return on Total Invested Capital (%)	0.7		3.7	
Net Earnings and Interest Paid	$ 349		$ 173	
As Percent of Total Invested Capital (%)	5.1		4.7	
Interest & Dividends Paid	$ 349		$ 91	
Total Payments to Investors (Interest and Dividends) as % of Total Invested Capital	5.1		2.5	

* Fiscal year 1972

45% of total invested capital, but long-term debt for Bethlehem Steel is equal to only 18% of total invested capital.

Also striking is the difference between the two companies in the magnitude of total invested capital employed in relation to revenues and net income. Nippon Steel appears to be much less efficient in resource employment than Bethlehem. Again, however, such comparisons are deceptive. The primary cause of the difference in total invested capital is the fact that Nippon Steel has been expanding operations very rapidly while Bethlehem has not, thus making the book value of Nippon Steel's plant and equipment more than $1 billion higher than that of Bethlehem. The balance of the difference in investment can be found in current accounts, which may reflect seasonal factors as well as differences in current asset turnover rates.

Because of the differences in relative capital structures between the two producers, the most useful basis for comparison relates interest paid plus earnings to total invested capital. Note that on this basis, Nippon Steel actually outperforms Bethelehem Steel in both absolute and relative terms. On the basis of total payments to investors (dividends plus interest) the advantage enjoyed by Nippon Steel is even more striking. Also significant is the fact

that Nippon Steel distributes nearly all earnings in the form of dividends and directors' bonuses while Bethlehem retains a significant share of earnings (normally about 50% but a larger proportion in recent years) to finance the business. Nippon Steel over the years has simply acquired additional debt for this purpose.

Since steel has been a growth industry in Japan but has not been regarded as such in the U.S., it may be expected that Japanese producers would be more highly levered than U. S. producers; however, equity investment in Nippon Steel has increased by only $300 million over the last 10 years while long term debt has increased by $2.2 billion over the same period. In the U.S., a growth company would be expected to retain a much higher percentage of earnings to finance growth.

The point to be made is that debt is viewed quite differently in Japan than in the U. S. Most of Nippon Steel's debt is held by banks and insurance companies who, in terms of the U.S. view, have taken an equity position in the company. Covenants related to debt in Japan customarily provide the lender with prior consent to management decisions normally reserved for stockholders in the U. S. and sometimes prior claim on the assets of the company including absolute rights of possession, thus giving

the debt the ownership (control) features of equity as viewed in the U. S. with some additional advantages such as prior claim to company assets.

In evaluating potential investors in Nova Scotia, these major differences as they exist from country to country must be considered when means of capitalization are considered. Specific capital financing arrangements must be developed on the basis of a detailed analysis of alternatives on a case-by-case basis.

* * * *

This chapter has presented a conceptual analysis of the facility financing and development alternatives which are available to a Nova Scotia steelmaking complex. The next chapter presents an approach to evaluating in detail the feasibility of such an investment.

IV. APPROACH FOR CONDUCTING FEASIBILITY EVALUATION

IV. APPROACH FOR CONDUCTING FEASIBILITY EVALUATION

This chapter presents an overview of the technical approach which Booz, Allen would use in evaluating the feasibility of a Nova Scotia steelmaking complex. The following subjects are discussed:

- Objectives and scope of the study
- Data collection approaches and potential data sources
- Analytical techniques and evaluation criteria

1. OBJECTIVES AND SCOPE OF THE STUDY

The study is designed to evaluate the economic viability of a steelmaking complex in Nova Scotia. It will be conducted in three distinct phases representing logical breakpoints in the analysis:

- Phase I--Fundamental Feasibility Assessment--Involves a detailed evaluation of potential markets and a preliminary evaluation of prominent locational factors which will affect feasibility
- Phase II--Detailed Economic Analysis--Is a detailed analysis of the operating economics of alternative facility configurations
- Phase III--Facility Financing and Development Strategy--Involves the identification of potential investors and the evaluation of financing and investor participation alternatives

Throughout the study primary emphasis will be given to production of semifinished steel, with secondary attention to the possibility of integrated production of finished steel products.

The study is structured in three separate phases to allow for clear and distinct assessment of the viability of the proposed facility. The end of Phases I and II will mark major project milestones. Decisions regarding the viability of the proposed facility will be required, and a determination will be made as to whether proceeding to the next phase of the study is warranted. If the results are clearly unfavorable at either of these milestones, the study will be terminated. Exhibit X, following this page, diagrams the work flow process which will be followed in the study.

(1) <u>The Objective of Phase I Is To Assess the Fundamental Feasibility of a Nova Scotia Steelmaking Facility</u>

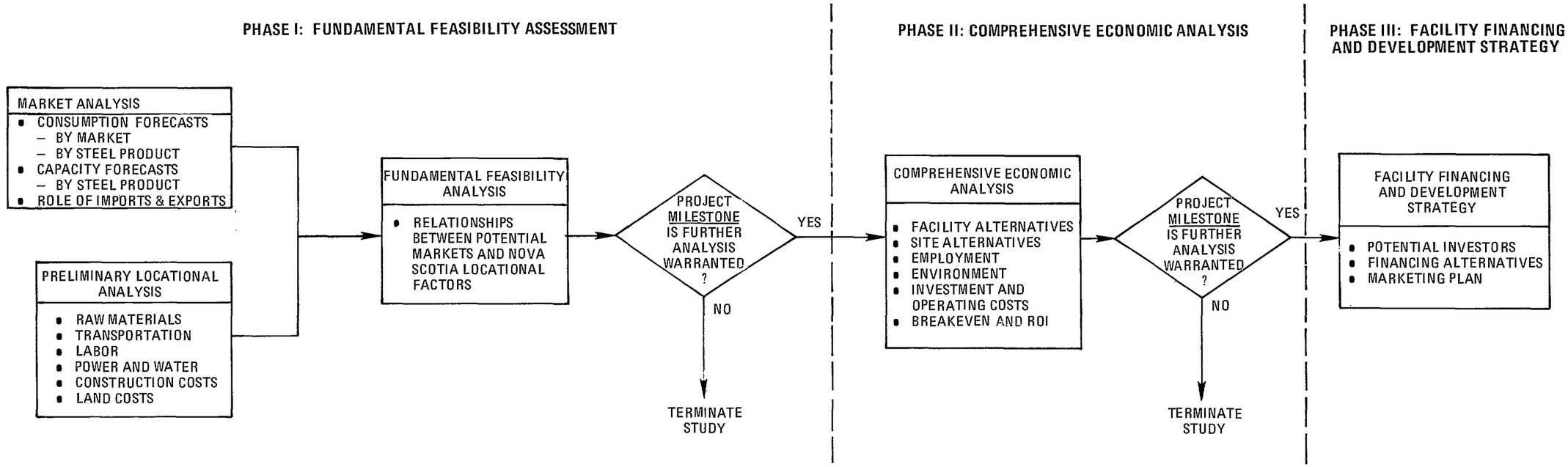
An assessment of the feasibility of a Nova Scotia steel complex will begin with a detailed analysis of the potential market for its products. The output of the analysis will include current estimates and projections to 1985 of:

- Worldwide steel consumption and capacity patterns
- Canadian and U.S. consumption patterns by:
  - Market (industry and location)
  - Type of steel product

EXHIBIT X

Department of Regional Economic Expansion

STUDY WORK FLOW DIAGRAM



- Canadian and U.S. steelmaking capacity data by:
  - Plant location
  - Product
- Potential international trade patterns in steel

The focus of the market analysis effort will be on confirming and refining to greater detail our current capacity and consumption projections.

Concurrently with the detailed market analysis, a preliminary analysis will be made of general locational factors affecting a Nova Scotia steel complex. The purpose of this analysis is to evaluate the major locational factors which will have an overriding impact on the practicality of a Nova Scotia location for a steelmaking facility. The outputs of the analysis will include:

- Identification of raw materials sources and costs, including:
  - Iron ore
  - Coking coal
  - Limestone
  - Oxygen
  - Steel scrap
- Preliminary assessment of transportation factors, including:
  - Costs for shipping:
    - Raw materials
    - Construction materials
    - Semifinished and finished outputs to:
      - Canadian markets
      - U.S. markets
      - Overseas markets

- Adequacy of existing transportation facilities and approximate costs of needed improvements

. Preliminary assessment of other locational factors including:

- Labor force supply, quality, and cost
- Power and water availability and costs
- Construction costs

  . Materials
  . Labor

- Land costs

. Preliminary comparison of locational factors with similar factors affecting other producers in Canada and the U.S.

The focus of this analysis will be on a Strait of Canso location. If this location proves infeasible, other Nova Scotia locations will be investigated.

After these two analyses have been completed, a fundamental feasibility analysis will be conducted for both semi-finished and finished steel. It will include the following outputs:

. A definition of potential markets by geographic location and product types

. An assessment of potentially viable product mix alternatives

. An evaluation of the relationships between these factors and a Nova Scotia location

Upon completion of these analyses, a determination will be made as to the fundamental feasibility of the project and whether further analysis is warranted.

(2) The Objective of Phase II Is To Determine the Economic Feasibility of the Project

If the results of Phase I indicate that a Nova Scotia steelmaking complex is fundamentally feasible, a comprehensive locational and economic analysis will be conducted. This analysis will produce the following outputs:

- Definition of alternative facility configurations, including:
  - Size of facilities
  - Product mix
- Identification of potential plant site alternatives
- Development of alternative facility specifications
- Estimation of employment impact of alternative facilities
- Preliminary estimation of environmental impact
- Development of investment and operating cost estimates
- Estimation of breakeven production levels and return on investment
- Ranking of feasible alternatives
- Development of preliminary implementation timetable

Upon completion of this phase of the study, the economic feasibility of a steel complex in Nova Scotia will be known.

(3) The Objective of Phase III Is To Prepare a Facilities Financing and Development Strategy

If the results of Phase II indicate that a Nova Scotia steelmaking complex is economically viable, a strategy will be developed to identify, evaluate, and solicit interested investors. This will include the following outputs:

- Identification of potential investors
- Identification and evaluation of preliminary financing alternatives
- Development of a marketing plan
- Conducting of preliminary discussions with potential investors
- Provision of technical assistance in negotiations

Upon completion of Phase III the most attractive potential investors should be known. At this point final negotiations can proceed, and detailed construction planning and development can be pursued.

2. DATA COLLECTION APPROACHES AND POTENTIAL DATA SOURCES

Because the data requirements in each phase are different, data collection approaches and sources will vary. In the market

analysis in Phase I, data collection will be done largely by extensive direct interviews with industry personnel, both in the steel industry and in the major steel consuming industries. On-site interviews will be conducted by our management consulting staff with producers and consumers throughout Canada and the U.S. To gather data regarding overseas producers and consumers, we will be able to utilize the resources of Booz, Allen's overseas offices including, in particular, our offices in Western Europe (U.K., France, Germany), Brazil, and Japan. Extensive use will also be made of data available from iron and steel societies, institutes, and associations, particularly in the U.S. and Europe.

A note of caution is required concerning the collection of forecast data regarding the supply and demand of steel products. Data collection will be difficult principally because of the limited availability of reliable and usable data, especially regarding breakdowns of steelmaking capacity on the basis of per-plant or per-company product mixes. Nevertheless, we would expect extensive personnel contact between our staff and steel industry personnel to yield sufficient data to make reasonable projections.

The preliminary locational analysis in Phase I will require visits to potential sites in Nova Scotia and extensive contact with raw material suppliers, transportation companies, and other steel producers to obtain data for a comparative locational analysis.

The data requirements in Phase II will also require extensive time spent in Nova Scotia. We will also rely on the use of an engineering subcontractor to provide technical inputs in this phase of the study. We have worked closely with several of the best known international steel production and facilities design firms in the recent past. A subcontractor will be selected from among these and other interested and reputable firms with the concurrence of DREE. Provision for subcontractor participation has been made in our plan of work and cost estimates.

In Phase III, extensive personal contacts with steel industry personnel, both in North America and overseas, will be the primary method of data collection. Such discussions will be necessary to identify and assess the preliminary interest of these firms in participating in a Nova Scotia steelmaking venture.

3. ANALYTICAL TECHNIQUES AND EVALUATION CRITERIA

Both in estimating consumption demands and in analyzing investment and operating costs, extensive use will be made of three case risk analysis. Within foreseeable limits, the best case, worst case, and expected case alternatives will be developed. Use will also be made of regression analysis, particularly with regard to market forecasts. Efforts will be made to adjust historical data to take into account expected future changes in market characteristics

Investment economics will be analyzed using breakeven production level and return on investment analyses for different capacity and product mix assumptions.

The principal criteria which will be used to evaluate potential markets and preliminary locational factors will be the reasonable likelihood that market demands will exist which the Nova Scotia steel complex will potentially be capable of satisfying and that locational constraints will not prevent the facility from being able to reach these markets at a cost comparable to major competitors. In the case of semifinished steel markets this will include the possibility of joint ventures with steel finishers to absorb the output of the proposed facility.

The basic criterion used to evaluate economic viability will be the reasonable expectation that the steel complex will operate at a profit sufficient to provide an adequate rate of return on the investment, given the risks and uncertainties involved. Because of the magnitude of the investment required for the facility, the risk of failure must be minimal.

Facility financing and development alternatives will be evaluated using the five criteria discussed in Chapter III:

- Explicit cost
- Risk
- Flexibility

- Timing
- Control

Specific attention will be given to the identities of the potential investors in this evaluation.

* * * *

This chapter has presented the technical approach Booz, Allen would use in conducting a detailed evaluation of the feasibility of a Nova Scotia steelmaking complex. The next chapter presents the task-by-task work plan which would be used in such a study.

V. WORK PLAN FOR FEASIBILITY EVALUATION

V. WORK PLAN FOR FEASIBILITY EVALUATION

This chapter presents a task-by-task description of the work plan Booz, Allen would use in conducting this study. Exhibit XI, following this page, presents a summary of phases and tasks and a time-phased chart of the tasks included in the study. As the exhibit shows, the total time to conduct the study is expected to be 48.5 weeks, not including the final three tasks in Phase III. The advantage of proceeding sequentially with each phase of the study is that it will allow for termination of the study at minimum cost if the proposed facility is found to be infeasible.

If the likelihood of such a possibility is felt to be reasonably low, and if it would be highly desirable to complete the study in a shorter period of time, Phase II could be initiated shortly after the beginning of Phase I. This would enable us to complete all 3 phases of the study, excluding the last 3 tasks of Phase III, within a period of approximately 28 to 32 weeks, or about 6 1/2 to 7 1/2 months.

EXHIBIT XI (1)

Department of Regional Economic Expansion

WORK PLAN
SUMMARY OF PHASES AND TASKS

Phase 1--Fundamental Feasibility Assessment

Part A--Market Analysis

Task 1--Identify Data Sources and Develop Data Collection Instruments
Task 2--Collect Steel Consumption Data for Canada and U.S.
Task 3--Collect Steelmaking Capacity Data for Canada and U.S.
Task 4--Collect Worldwide Steel Consumption and Capacity Data
Task 5--Prepare Steel Consumption and Capacity Projections
Task 6--Evaluate Potential International Trade Patterns in Steel
Task 7--Evaluate Potential Market for Nova Scotia Steel
Task 8--Prepare Market Analysis Report

Part B--Preliminary Locational Analysis

Task 1--Identify Data Sources and Develop Data Collection Instruments
Task 2--Collect Raw Materials Data
Task 3--Collect Transportation Data
Task 4--Collect Data on Other Locational Factors
Task 5--Evaluate Prominent Locational Considerations
Task 6--Prepare Preliminary Locational Analysis Report

Part C--Fundamental Feasibility Analysis

Task 1--Evaluate the Relationships Between Potential Markets and Nova Scotia Locational Factors
Task 2--Determine Fundamental Feasibility
Task 3--Prepare Phase I Final Report

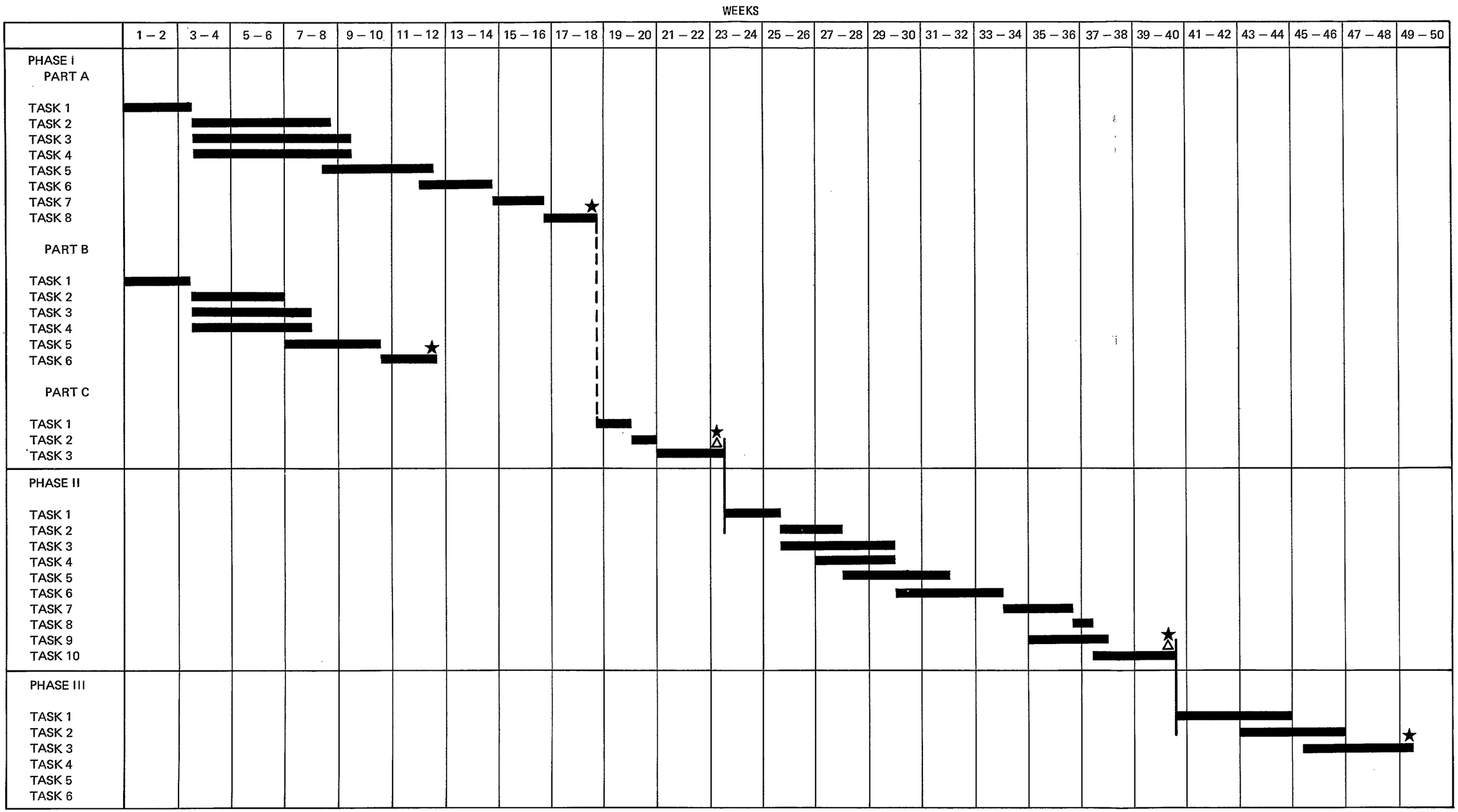
Phase II--Comprehensive Economic Analysis

Task 1--Define Alternative Facility Configurations
Task 2--Identify Potential Plant Site Alternatives
Task 3--Develop Alternative Facility Specifications
Task 4--Estimate the Employment Impact of Alternative Facilities
Task 5--Evaluate Environmental Impact
Task 6--Develop Investment and Operating Cost Estimates
Task 7--Estimate Breakeven Production Levels and Return on Investment
Task 8--Rank Feasible Alternatives
Task 9--Develop Preliminary Implementation Timetables
Task 10--Prepare Phase II Final Report

Phase III--Facility Financing and Development Strategy

Task 1--Identify Potential Investors
Task 2--Identify and Evaluate Preliminary Financing Alternatives
Task 3--Develop a Marketing Plan
Task 4--Conduct Preliminary Discussions With Potential Investors
Task 5--Provide Technical Assistance in Negotiations
Task 6--Prepare Phase III Final Report

WORK SCHEDULE



TIME REQUIREMENTS UNKNOWN FOR TASKS 4 – 6 OF PHASE III (SEE TEXT)

★ WRITTEN REPORTS AND ORAL PRESENTATIONS

△ PROJECT MILESTONES (DECISIONS TO CONTINUE OR TERMINATE STUDY)

PROGRESS REPORTS WILL BE SUBMITTED EVERY 6 WEEKS

PHASE I--FUNDAMENTAL FEASIBILITY ASSESSMENT

Part A--Market Analysis

Task 1--Identify Data Sources and Develop Data Collection Instruments

The objective of this task is to identify and specify the data sources to be used in the market analysis and to develop instruments for data collection. Data sources identified in Chapter IV will be expanded upon, and introductory contacts will be made with industry officials both in North America and overseas. We will also develop interview guides and other data collection instruments to assure that data are collected in a consistent manner. At the end of this task, we will have identified data sources and developed data collection instruments for the market analysis.

Task 2--Collect Steel Consumption Data for Canada and the U. S.

The objective of this task is to collect current and expected future steel consumption data for Canada and the U. S. to provide a basis for projecting future consumption levels. As described in Chapter IV, detailed consumption data will be gathered by market and by type of steel product for Canada

and the U. S. Emphasis will be placed on personal interviews with executives in major steel consuming industries. Data regarding independent variables controlling steel consumption will also be obtained, e.g., levels in population, revenue, GNP, etc. Special attention will be given to identifying technological factors which may become operable over the next 15 years, for example, substitution of lighter materials such as aluminum for steel in automotive manufacturing.

Task 3--Collect Steelmaking Capacity Data for Canada and the U. S.

The object of this task is to collect information on current and expected future steelmaking capacity in Canada and the U. S. Capacity data will be collected, to the extent that it is obtainable, by steel product type, including both finished and semifinished products. Geographic considerations will also be included. The principal means of data collection will be direct contacts with industry sources. As a word of caution regarding this task, Chapter IV has already discussed the limitations on data availability, which make the collection of detailed capacity data a problem. Specific attention will be given to the potential impact of capital access limitations faced by U. S. producers in domestic capacity expansion planning.

Task 4--Collect Worldwide Steel Consumption and Capacity Data

The objective of this task is to collect worldwide data regarding current and expected steel consumption and capacity. Data collection will focus on raw steel consumption and capacity, due to the magnitude of the effort involved. Particular attention will be given to collecting data for Western Europe and Latin America, which were identified in Chapter II as potential markets for Nova Scotia steel. Booz, Allen overseas offices will be used to assist in this data collection effort. As above, specific attention will be given to the importance of capital access limitations on capacity planning. In addition, the impact of the revaluation of the mark and the yen on capacity planning in West Germany and Japan will be explored.

Task 5--Prepare Steel Consumption and Capacity Projections

The objective of this task is to develop projections for steel consumption and capacity to 1985. Using the analytical techniques described in Chapter IV, projections will be made on a product basis for Canada and the U. S. and for raw steel only for other regions of the world. Expected low, medium, and high projections will be used to develop estimates of steel consumption and capacity to 1985.

Task 6--Evaluate Potential International Trade Patterns in Steel

The objective of this task is to assess the probable role of steel imports and exports in related producing and consuming countries. Steel import and export potential will be evaluated for Canada, the U. S., Western Europe, and Latin America. Export potential will also be evaluated for Japan becuase of its impact on world markets. Possible modifications in current trade policies will be assessed to the extent feasible.

Task 7--Evaluate Potential Markets for Nova Scotia Steel

The objective of this task is to assess the relative attractiveness of alternative potential markets for steel produced in Nova Scotia. This evaluation will be based on the analysis carried out in previous tasks. Alternative product mix and market combinations will be assessed for potential viability. Principal focus will be on semifinished steel, but attention will also be given to finished steel products.

Task 8--Prepare Market Analysis Report

The objective of the final task in this part of Phase I will be to prepare and present a report discussing our findings and

conclusions regarding potential markets for Nova Scotia steel. At the end of this task we will submit a written report and conduct an oral presentation of our market analysis.

Part B--Preliminary Location Analysis

Task 1--Identify Data Sources and Develop Data Collection Instruments

The objective of this task is to identify and specify the data sources to be used in the preliminary locational analysis and to develop instruments for collecting these data. Data requirements will be specified in detail, and sources identified in Chapter IV will be expanded upon. Interview guides and other data collection instruments will be developed to assure adequacy and consistency of information.

Task 2--Collect Raw Material Data

The object of this task is to collect preliminary data regarding the raw materials required for a Nova Scotia steel complex. Preliminary information will be gathered concerning availability, quality, and cost of raw materials from various sources, as described in Chapter IV. Direct contact with various potential suppliers will be sought. Comparable data for other producers will also be collected.

Task 3--Collect Transportation Data

The objective of this task is to collect preliminary information regarding transportation facilities and costs related to the construction and operation of a Nova Scotia steel complex. Preliminary data will be gathered regarding transportation costs of raw materials and construction materials to Nova Scotia and of semifinished and finished steel shipments from Nova Scotia to potential markets. Preliminary data will also be gathered regarding the adequacy of existing transportation facilities and the costs of required improvements. Direct contact with transportation companies and on-site visits to Nova Scotia will be utilized. Comparable data for steel producers in other locations will also be collected.

Task 4--Collect Data on Other Locational Factors

The objective of this task is to collect preliminary information regarding other locational factors which can be expected to significantly impact on the feasibility of a Nova Scotia steel complex. Preliminary data will be gathered concerning:

- Labor force availability, skills, and cost
- Power and water requirements, availability, and cost

- Construction costs, including availability and costs of both labor and materials
- Land costs

The primary focus of attention will be on a Strait of Canso location. Extensive on-site data collection efforts will be employed, as will personal contact with suppliers as necessary. Comparable data will also be collected for other steel producers.

Task 5--Evaluate Prominent Locational Considerations

The objective of this task is to evaluate the prominent locational considerations related to a Nova Scotia steelmaking facility and to identify any reasonably prominent locational barriers which would have an overriding impact on the practicality of a Nova Scotia location. Two basic types of locational barriers will be considered:

- Factors producing a serious comparative cost or service disadvantage
- Factors producing a technical barrier to the production of steel

Primary attention will be directed to a Strait of Canso location. If such a location appears infeasible, alternative locations will be considered.

In the event that prominent locational barriers are uncovered, means will be sought of removing them with a reasonable level of effort and resource commitment.

Task 6--Prepare Preliminary Locational Analysis Report

The objective of the final task in this part of Phase III is to prepare and present a report discussing our findings and conclusions regarding the significant locational factors affecting a Nova Scotia steelmaking facility. At the end of this task, we will submit a written report and conduct an oral presentation of our findings and conclusions.

Part C--Fundamental Feasibility Analysis

Task 1--Evaluate the Relationships Between Potential Markets and Nova Scotia Locational Factors

The objective of this task is to evaluate the relationships between the potential markets identified in Part A of Phase I and the locational factors identified in Part B. An interactive analysis will be made of the interrelationships among alternative market and product mix combinations and plant locational factors. The evaluation process will be basically iterative, testing various combinations for feasibility and attractiveness.

Task 2--Determine Fundamental Feasibility

The objective of this task is to determine the fundamental feasibility of a Nova Scotia steelmaking complex, in light of the market and locational analyses conducted earlier. Once the determination has been made a judgment will be made as to whether continuing to Phase II of the study is warranted.

Task 3--Prepare Phase I Final Report

We will prepare and present a final report giving our findings and conclusions regarding the fundamental feasibility of a Nova Scotia steelmaking facility and our recommendation for continuing or terminating the study. At the end of this task we will submit a written report and conduct an oral presentation covering Phase I of the study.

PHASE II--COMPREHENSIVE ECONOMIC ANALYSIS

Task 1--Define Alternative Facility Configurations

The objective of this task is to define potentially feasible alternative steelmaking facility configurations for detailed evaluation. Potential alternatives in terms of size of facility, product mix, and production processes will be selected, based on our findings in Phase I of the study.

It is anticipated that this task and subsequent tasks in Phase II will include participation by a subcontractor specializing in steel manufacturing facilities design.

Task 2--Identify Potential Plant Site Alternatives

The objective of this task is to identify, on a preliminary basis only, alternative sites that potentially would be adequate for the facility configurations defined in the previous task. Sites will be identified primarily by means of personal visits and firsthand observations. A general ranking of alternatives will be made based on a preliminary analysis of topography, accessibility, utilities availability, and transportation facilities.

Task 3--Develop Alternative Facility Specifications

The purpose of this task is twofold:

- To develop alternative facility specifications, including:
  - Capacity and products
  - Land, building, and equipment requirements
  - Raw material throughputs
  - Labor force requirements
  - Utilities requirements
  - Support facilities and services requirements
- To develop estimates of capital investment associated with each alternative

Performance of this task will require a detailed engineering analysis of facilities alternatives as well as the acquisition of data regarding the costs of factor inputs. To accomplish this, data available internally will be used as well as that obtained from equipment suppliers, contractors, and on-site visits. This effort will include the collection of more extensive and detailed information in those areas identified in the preliminary locational analysis conducted in Phase I of the study. At the conclusion of this task, the basis will exist for preparing a detailed comparative economic analysis of facility alternatives.

Task 4--Estimate the Employment Impacts of Alternative Facilities

The purpose of this task is to estimate both the primary and secondary employment and income potentially created by alternative facilities. Such information will be required in making policy decisions regarding the costs and benefits to the community of alternatives. Such information is particularly important in determining the level of government assistance, if any, to be provided in establishing the facility.

Task 5--Evaluate Environmental Impact

The objective of this task is to evaluate, on a preliminary basis only, the environmental impact of alternative facilities and sites. This will be a preliminary evaluation only and will not include analysis of the full range of secondary and tertiary environmental effects. Extensive use will be made of on-site data collection and analysis. The purpose of this task is to identify any potentially serious environmental consequences of facility alternatives which would bear significantly on feasibility.

Task 6--Develop Investment and Operating Cost Estimates

The objective of this task is to develop detailed investment and operating cost estimates for selected alternative complexes. This will include the development of pro forma profit and loss statements using best case, worst case, and expected case analyses.

Task 7--Estimate Breakeven Production Levels and Return on Investment

The objective of this task is to develop comparative breakeven production level and return on investment estimates for each facility alternative. Breakeven analysis

will include developing estimates of fixed and variable costs and total revenues for different volume levels at varying levels of capacity utilization. Such analysis provides a clear comparative assessment of the business risk associated with facility alternatives. Return on investment analysis will include developing estimates of total investment costs and annual cash flow levels.

Task 8--Rank Feasible Alternatives

The objective of this task is to rank feasible alternatives in order of relative merit. The major criterion will be expected return on investment, coupled with risk considerations, including breakeven levels and uncertainty of markets. If none of the alternatives show a reasonable rate of return in light of the risks involved, a recommendation will be developed to terminate the study.

Task 9--Develop Preliminary Implementation Timetables

The objective of this task is to develop a preliminary timetable for the implementation of the one or several most attractive alternatives. These timetables will include estimates of the time required for various phases of plant design and development.

Task 10--Prepare Phase II Final Report

We will prepare and present a final report containing our findings, conclusions, and recommendations.

PHASE III--FACILITY FINANCING AND DEVELOPMENT STRATEGY

Task 1--Identify Potential Investors

The objective of this task is to identify existing producers of steel who might potentially be interested in participating in a steelmaking venture in Nova Scotia. This would include producers in Canada, the U.S., Western Europe, and Japan. Direct personal contact, including the use of Booz, Allen's overseas offices, will be the primary means of identification used in this task. This task would not include the soliciting of specific offers, but rather would focus on obtaining general indications of potential interest.

Task 2--Identify and Evaluate Preliminary Financing Alternatives

The objective of this task is to identify and evaluate preliminary financing alternatives for a Nova Scotia steel complex. This will include identifying and evaluating potential forms of investor participation and potential mechanisms

for capital assembly. Data will be obtained both from the general comments of potential investors identified in Task 1 and from capital market specialists within Booz, Allen. The evaluation criteria to be used will be the five criteria discussed in Chapter III--explicit cost, risk, flexibility, timing, and control.

Task 3--Develop a Marketing Plan

The objective of this task is to develop and present a marketing plan for the development of a Nova Scotia steel-making complex. This plan will include recommended procedures for approaching and negotiating with potential investors. A marketing package which summarizes the findings and conclusions of Phase I and II of this study will also be developed for use in conducting solicitations.

Our work plan essentially stops at the end of Task 3. We recommend that services described in Tasks 4 to 6 in Phase III not be made a formal part of the initial study effort. Our recommendation is based upon our desire to maintain complete professional objectivity in conducting the basic feasibility analysis. Since the actual conduct of Tasks 4 to 6 is contingent upon favorable findings in the feasibility study and may entail extensive negotiations with

potential consultant participation, it would be desirable for DREE to make an independent assessment of the need for the consultant services while maintaining the option of selecting from among several qualified firms.

Task 4--Conduct Preliminary Discussions With Potential Investors

The objective of this task is to undertake preliminary discussions with the potential investors identified in Task 1 regarding their participation in a Nova Scotia steelmaking complex. Discussions will be conducted to obtain initial proposals from interested investors, including both the extent and the form of their proposed participation.

Task 5--Provide Technical Assistance in Negotiations

We will provide technical assistance to DREE as required during negotiations with interested investors. The specific form of this assistance will depend on the circumstances encountered.

Task 6--Prepare Phase III Final Report

We will prepare a final report summarizing our participation in the process of selecting and negotiating with

interested investors in this steelmaking complex. At the end of this task, we will submit a written report and conduct an oral presentation for Phase III of the study.

* * * *

This chapter has presented a detailed description of the work plan which Booz, Allen would use for the study. The following chapter discusses project staffing and management requirements.

VI. PROJECT STAFFING AND MANAGEMENT

VI. PROJECT STAFFING AND MANAGEMENT

This chapter discusses the management and staffing of a detailed feasibility study for steel production in Nova Scotia. The following specific subjects are covered:

- Staff capabilities required
- Project organization and management
- Coordination with related activities
- Maintenance of communications with the Department of Regional Economic Expansion

1. A MULTI-DISCIPLINARY TEAM IS REQUIRED TO CONDUCT THE STUDY

To conduct a comprehensive and detailed evaluation of the feasibility of a Nova Scotia steelmaking complex, a project team possessing a variety of skills and experience is required. Exhibit XII, following this page, summarizes the required staff capabilities and the specific needs for each capability indicated. Note that the personnel requirements as shown reflect the full range of skills and fields of endeavor usually emphasized in managing an enterprise. These include:

- Marketing
- Financial analysis and forecasting

EXHIBIT XII (1)

Department of Regional Economic Expansion

REQUIRED STUDY STAFF CHARACTERISTICS

Staff	Skills and Experience Required	Function
Officer in Charge	. Extensive background in heavy industrial management at top management levels . Knowledge of steel markets and production . Experience in managing complex analytical projects	. Responsible for overall study management including - Maintenance of progress - Quality control - Liaison with DREE - Study budgeting
Consulting Officer	. Extensive experience in consulting to the steel industry in specialized areas - Marketing - Production management - Facilities location and design	. Provide technical expertise related to specific study elements . Review and critique analytical work related to areas of expertise
Project Manager	. Broad based knowledge of the steel industry . Significant experience in complex project management	. Responsible for day-to-day project management, including - Scheduling - Personnel assignments - Monitoring of progress - Quality control - Continuing review of study methodology and procedures - Study budgeting . Also responsible for substantive analytical contribution to the overall study
Market Analysts	. Specialists in marketing and distribution . Knowledge of steel markets and markets for manufactured products containing steel	. Analysis of steel markets . Analysis of distribution economics

EXHIBIT XII (2)

Staff	Skills and Experience Required	Function
Financial/Process Analysts	. Specialists in financial analysis, capital budgeting, profitability forecasting, return in investment analysis and breakeven analysis . Knowledge of capital markets and financing alternatives . Knowledge of the economics of steelmaking including raw materials acquisition and process economics	. Capital investment analysis, profitability forecasting, and breakeven analysis . Evaluation of financing alternatives . Venture risk analysis
Economist/Statistician	. Knowledge of the competitive economics of steel production . Familiarity with international trade economics . Knowledge of techniques for demand forecasting	. Analysis of steel demand patterns and preparation of demand forecasts . Evaluation of the international competitiveness of the proposed steel complex
General Management Consultants	. Experience in fact gathering and data reduction . Capability in general business analysis	. Data collection, interviewing, and data reduction . Data analysis under the supervision of functional specialists
Facility/Production Engineer NOTE: Facilities engineering portion of the study will be conducted by a subcontractor	. Knowledge of state-of-the-art steel production facilities layout and design	. Prepare initial layouts for facilities alternatives . Provide inputs to the economic analysis of facilities alternatives

- Facilities engineering
- Production engineering

Project management and general consulting personnel serve to focus and supplement the skills of the functional specialists. A preliminary estimate of relative staff participation in the study is summarized in Exhibit XIII, following this page. The most significant participation will be that of general management consultants, who will provide the basic information-gathering resources for the market analysis. Financial process analysts will have a significant fole in evaluating the cost impacts of major locational factors in the initial analysis of feasibility and the detailed feasibility evaluations. Other specialists indicated will provide services as required. A detailed breakdown of anticipated level of effort is presented in the following chapter.

2. THE PROJECT STAFF MUST BE ORGANIZED AND MANAGED SO THAT ROLES AND RESPONSIBILITIES ARE CLEARLY DEFINED

The management of a complex study such as the one proposed requires that diverse skills and diverse but related activities be closely coordinated so that a unified final product is produced on time and within budget. To achieve this, each member of the project team must have a clearly defined role. Exhibit XIV, following Exhibit XIII, shows the proposed organization of the

EXHIBIT XIII

Department of Regional Economic Expansion

RELATIVE STAFF PARTICIPATION IN THE STUDY

ESTIMATED LEVEL OF EFFORT

	Man Weeks				Percent
	Phase I	Phase II	Phase III	Total	Participation
Officer in Charge	4	3	2	9	4.4
Consulting Officers	2	2	1	5	2.4
Project Manager	22	14	8	44	21.3
Market Analysts	22	-	6	28	13.5
Financial/Process Analysts	11	17	6	34	16.4
Economists/ Statisticians	10	-	-	10	4.8
General Management Consultants	44	-	-	52	25.1
Facility/Production Engineers*	-	25	-	25	12.1
Total	115	69	23	207	100.0

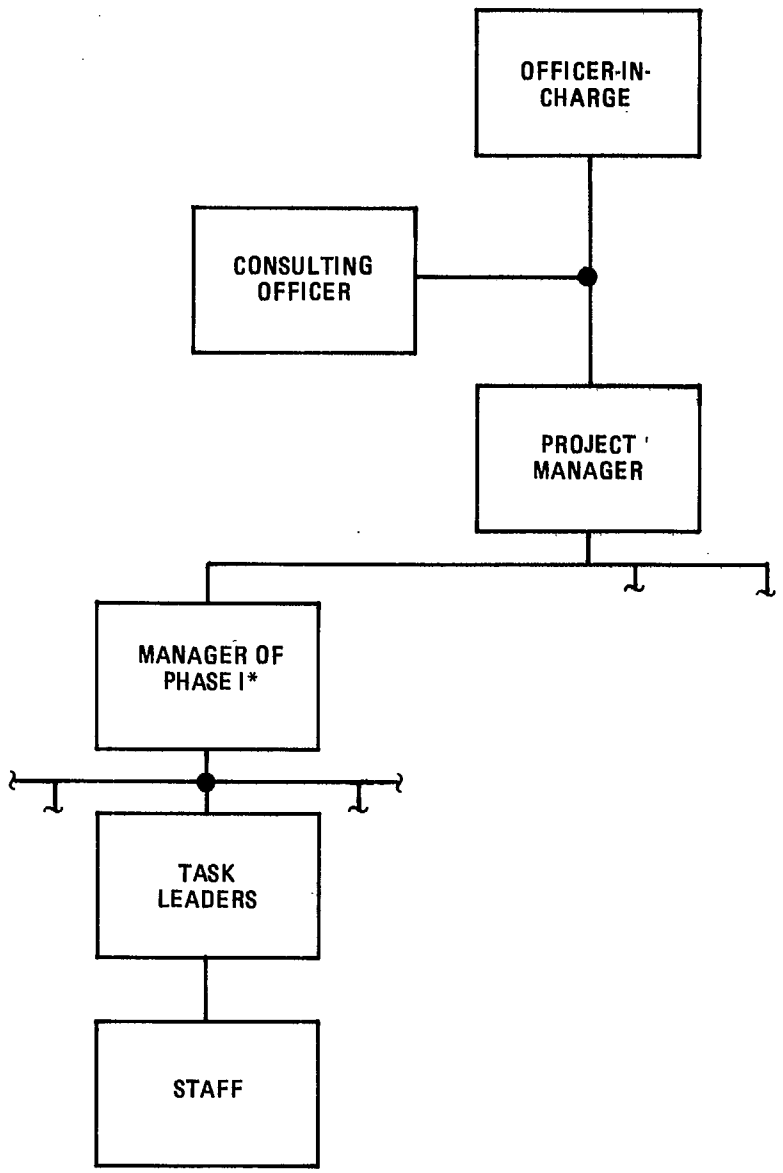
* Subcontractor personnel

EXHIBIT XIV

Department of Regional Economic Expansion

PROJECT TEAM ORGANIZATION

PROJECT TEAM ORGANIZATION



* PROJECT MANAGER WOULD BE IN CHARGE OF A SPECIFIC STUDY PHASE UNLESS TWO OR MORE PHASES ARE PROCEEDING CONCURRENTLY.

study team and specific individuals at all levels of management. This project organization is typical of that successfully employed by Booz, Allen over many years.

3. MANAGEMENT CONTROL PROCEDURES ARE DESIGNED TO ASSURE QUALITY OF WORK AND MONITOR PROGRAM AGAINST PLAN

The detailed budget and plan of work which are outlined in adjacent chapters will provide the basis for managing the project. Each staff member having management responsibility is provided with the following tools:

- A budget which details allowable level of effort and costs
- A time schedule for completion of work
- The specifications for a specific deliverable product including products to be produced in individual tasks

The progress will be reviewed against the budget and the work plan weekly, and schedule revisions will be made as the situation warrants. Quality control is a continuing function of each manager and is assured through the weekly reviews of progress as well as detailed reviews of deliverable products.

4. INDIVIDUAL MANAGERS ARE RESPONSIBLE FOR DAY-TO-DAY PROJECT COORDINATION AT THE WORKING LEVEL

While the project manager and phase managers have broad responsibilities for activity coordination, individual task leaders are responsible for coordinating their activities with those performing related tasks. This coordination will be achieved through close day-to-day contact among task leaders and within the work plan, which specifies the relationship of specific tasks to other tasks under way. Note that each study segment will have a designated staff member responsible for its completion. The roles of the project manager and each study phase manager are clear. Task managers are individual staff members responsible for insuring that specific study tasks are completed properly, on time, and within budget. Organizational flexibility exists in that staff members can function in several roles. Thus the leader of a specific task may function as a staff member on other tasks. Task leaders may also be responsible for more than one task as the situation warrants. Within this flexible organization structure, however, responsibility and authority can always be clearly identified.

5. CONTINUOUS COMMUNICATIONS WILL BE MAINTAINED WITH THE DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

It is anticipated that the project manager and the staff will work closely with representatives of DREE during the study. Informal communications will be maintained by personal contacts with DREE representatives at least weekly. It is recommended, in addition, that formal progress briefings be conducted in six-week intervals during the study so that DREE representatives and members of the study team may review progress and mutually agree on modifications to the work plan or study schedule, if such appears to be indicated.

At the completion of each study phase, a formal report will be presented to DREE along with recommended next steps.

* * * *

This chapter has discussed study staffing requirements and the organization and management of the project team. The following chapter presents a detailed review of anticipated levels of effort and costs to perform the study.

VII. LEVEL OF EFFORT AND COST ANALYSIS

VII. LEVEL OF EFFORT AND COST ANALYSIS

This chapter presents an analysis of the anticipated level of effort by task and the anticipated costs to conduct this study. These estimates are based on the description of the study presented in previous chapters and on our experience in conducting similar studies.

Exhibit XV, following this page, presents a preliminary estimate of the level of effort required for each phase of the study. Man-weeks of effort for each manpower category are provided for each task in the study. The total man-weeks by phase shown in the exhibit are:

Phase I	115	
Part A--68		
Part B--36		
Part C--11		
Phase II	69	
Phase III	23	(not including Tasks 4, 5, and 6)
Total	207	

This level of effort analysis includes the time requirements for Booz, Allen professionals both in North American and overseas and the time requirements for engineering subcontractor personnel.

EXHIBIT XV (1)

Department of Regional Economic Expansion

MAN-WEEKS OF EFFORTS BY TASK

Task	Officer in Charge	Consulting Officers	Project Manager	Market Analysts	Financial/Process Analysts	Economist/Statistician	General Management Consultants	Facility/Production Engineers	Total
	----------Personnel Category----------								
Phase I									
Part A									
Task 1	.2	.2	1.8	1.0	.5		.5		4.2
Task 2	.2	.1	1.0	3.0		1.0	5.0		10.3
Task 3	.2	.1	1.5	2.5	1.0	1.0	6.0		12.3
Task 4	.2	.1	1.5	2.5	1.0	1.0	6.0		12.3
Task 5	.2	.2	1.0	2.0	1.0	4.0	2.5		10.9
Task 6	.2	.2	1.0	2.0	.5	1.0	2.0		6.9
Task 7	.4	.1	1.2	2.0	.5		1.0		5.2
Task 8	.4		2.0	2.0	.5		1.0		5.9
Subtotal	2.0	1.0	11.0	17.0	5.0	8.0	24.0		68.0
Part B									
Task 1	.2	.2	1.7		.6		1.0		3.7
Task 2	.2		.8		.8		3.5		5.3
Task 3	.2		.8		.8		4.5		6.3
Task 4	.2	.2	.8		.8		5.5		7.5
Task 5	.2	.2	1.4		1.0	2.0	3.0		7.8
Task 6	.4		1.5		1.0		2.5		5.4
Subtotal	1.4	.6	7.0		5.0	2.0	20.0		36.0
Part C									
Task 1	.2	.2	1.5	1.5	.8				4.2
Task 2	.2	.2	1.0	1.0	.2				2.6
Task 3	.2		1.5	2.5					4.2
Subtotal	.6	.4	4.0	5.0	1.0				11.0
Total Phase I	4.0	2.0	22.0	22.0	11.0	10.0	44.0		115.0

EXHIBIT XV (2)

	Personnel Category								
Task	Officer in Charge	Consulting Officers	Project Manager	Market Analysts	Financial/Process Analysts	Economist/Statistician	General Management Consultants	Facility/Production Engineers	Total
Phase II									
Task 1	.4	.5	2.0		2.0			1.0	5.9
Task 2	.2		1.0		1.0			3.0	5.2
Task 3	.2		1.0		3.0			7.0	11.2
Task 4	.2		1.0		1.0			3.0	5.2
Task 5	.2		1.0		1.0			3.0	5.2
Task 6	.2	.5	2.0		3.0		3.0	2.0	10.7
Task 7	.5	.5	2.0		2.0		2.0	1.0	8.0
Task 8	.5	.5	1.0		1.0		1.0	.5	4.5
Task 9			.5					3.0	3.5
Task 10	.6		2.5		3.0		2.0	1.5	9.6
Total Phase II	3.0	2.0	14.0		17.0		8.0	25.0	69.0
Phase III									
Task 1	1.0	.5	3.0	2.0	2.0				8.5
Task 2	.5		2.5	2.0	2.0				7.0
Task 3	.5	.5	2.5	2.0	2.0				7.5
Task 4									
Task 5									
Task 6									
Total Phase III	2.0	1.0	8.0	6.0	6.0				23.0
Total Study	9.0	5.0	44.0	28.0	34.0	10.0	52.0	25.0	207.0

It should be noted that these estimates are preliminary and could vary by as much as ± 15% according to circumstances encountered.

Exhibit XVI, following this page, summarizes the personnel charges estimated for the study. As shown in this exhibit, total personnel charges for each phase are:

Phase I	$172,800
Phase II	$110,500
Phase III	$ 40,900
Total	$324,200

Exhibit XVII, following Exhibit XVI, summarizes our estimates of expenses and total charges for the study. Total charges by phase are estimated to be:

Phase I	$200,800
Phase II	$122,500
Phase III	$ 48,900
Total	$372,200

* * * *

This chapter has presented our estimates of the level of effort and costs required to conduct a detailed evaluation of the feasibility of a major steelmaking complex located in Nova Scotia as described in this report.

EXHIBIT XVI

Department of Regional Economic Expansion

ESTIMATED PERSONNEL CHARGES

Personnel Category	Dollar Rate Per Man-Week**	Phase I		Phase II		Phase III*		Total	
		Man-Weeks	Dollars	Man-Weeks	Dollars	Man-Weeks	Dollars	Man-Weeks	Dollars
Professional Staff									
Officer in Charge	3,400	4.0	13,600	3.0	10,200	2.0	6,800	9.0	30,600
Consulting Officer	3,000	2.0	6,000	2.0	6,000	1.0	3,000	5.0	15,000
Project Manager	1,600	22.0	35,200	14.0	22,400	8.0	12,800	44.0	70,400
Market Analysts	1,400	22.0	30,800	--	--	6.0	8,400	28.0	39,200
Financial/Process Analysts	1,400	11.0	15,400	17.0	23,800	6.0	8,400	34.0	47,600
Economist/Statistician	1,400	10.0	14,000	--	--	--	--	10.0	14,000
General Management Consultants	1,200	44.0	52,800	8.0	9,600	--	--	52.0	62,400
Facility/Production Engineers	1,400	--	--	25.0	35,000	--	--	25.0	35,000
Total Professional Charges		115.0	167,800	69.0	107,000	23.0	39,400	207.0	314,200
Clerical and Support Staff	500	10.0	5,000	7.0	3,500	3.0	1,500	20.0	10,000
Total Personnel Charges		125.0	172,800	76.0	110,500	26.0	40,900	227.0	324,200

*Does not include Tasks 4, 5, and 6 of Phase III.

**Rates subject to variation depending on the seniority of persons actually assigned to the project.

EXHIBIT XVII

Department of Regional Economic Expansion

ESTIMATED EXPENSES AND TOTAL CHARGES

Estimated Expenses by Phase

	Phase I	Phase II	Phase III*	Total
Air Travel	$ 10,000	$ 3,000	$ 3,000	$ 16,000
Subsistence	10,000	4,000	2,000	16,000
Ground Transportation	2,000	1,000	1,000	4,000
Communications	2,000	1,000	1,000	4,000
Report Production	4,000	3,000	1,000	8,000
Total	$ 28,000	$ 12,000	$ 8,000	$ 48,000

Estimated Total Charges by Phase

	Phase I	Phase II	Phase III*	Total
Personnel Charges	$172,800	$110,500	$40,900	$324,200
Expenses	28,000	12,000	8,000	48,000
Total	$200,800	$122,500	$48,900	$372,200

* Does not include Tasks 4, 5, and 6 of Phase III.