

The Economic Contribution of the U.S. Commercial Shipbuilding Industry



Prepared For:
Shipbuilders Council of America

Prepared By:
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FORWARD

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The Economic Contribution of the U.S. Commercial Shipbuilding Industry

I. Executive Summary

U.S. commercial shipbuilders' activities make a substantial contribution to U.S. economy by increasing U.S. output (GDP), increasing the number of jobs, increasing personal income, and increasing tax revenues. As a result of the commercial shipbuilding activities in 2001:

- Total U.S. output was increased by \$11.0 billion¹ ;
- 147,230 total jobs in the U.S. economy were created;
- U.S. personal income was increased by \$9.4 billion ; and
- Federal, state, and local government tax revenues were increased by \$3.4 billion.

These economic contributions are not due just to the U.S. commercial shipbuilders' activities at their shipyards, but also to the activities in the companies that supply these shipyards. There are active commercial shipyards in at least 29 states, and these shipyards purchase materials, services, and capital equipment that is produced in all 50 states and the District of Columbia.

The U.S. commercial shipbuilding industry, which grew at an average annual rate of 6.8% between 1992 and 2001, outperformed the U.S. economy which grew at an average annual rate of 3.4% over the same period. The estimated total value of shipments (gross revenues) of the U.S. commercial shipbuilding industry in 2001 was \$3.9 billion, and these shipyards directly employed 31,283 people. Of the \$3.9 billion of gross revenues, about 47%, or \$1.8 billion, goes to pay companies throughout the U.S. that supply the shipyards. The remaining 53% of the \$3.9 billion of gross revenues is disbursed or stays at the shipyard in the form of employee compensation (\$1.7 billion), gross profits of the company (\$0.3 billion), and indirect business tax payments such as sales/excise taxes and property taxes (\$0.02 billion). In turn, the owners and employees pay taxes on the income they receive.

The U.S. commercial shipbuilding industry includes facilities which build self-propelled and nonself-propelled ships and barges and clean, repair, and convert ships and barges. Facilities which build Navy combatant ships are not included. Adding these shipyards to the analysis would add significantly to the economic contributions presented above.

¹ All monetary figures reflect 2001 dollars.

II. Approach

The purpose of this study² is to determine the economic contribution of the U.S. commercial shipbuilding industry.³ The information required to perform this study was collected from a wide variety of published sources and also through a survey of U.S. commercial shipbuilding companies. The information collected on these shipyards included value of shipments (gross revenues), employment, output (including value added), and the disposition of the gross revenues between purchases from other companies, income payments to employees, gross profits of the owners, and indirect tax payments. The survey of shipbuilding companies was required to identify the composition of the shipbuilders' purchases from their suppliers and the geographic locations of these suppliers. Given this detailed information on the U.S. commercial shipbuilding industry, the total economic contribution of the U.S. commercial shipbuilding industry to the U.S. economy was calculated using the RIMS II Input-Output Model.⁴ The geographic distribution by state of this total U.S. economic contribution was determined based on information provided by the survey of commercial shipbuilding industry and obtained from published sources.

² This study was conducted by LECG. LECG is an international economic and financial consulting firm with offices in the U.S., Canada, Europe, South America, and New Zealand. This study was conducted by personnel in LECG's Washington, D.C. office.

³ The economic contribution of the entire U.S. shipbuilding industry, including military shipyards, could be over three times the economic contribution of commercial shipyards since the value of shipments from the construction and repair of military vessels in 1997 was almost two and half times the value of shipments from the construction and repair of commercial ships.

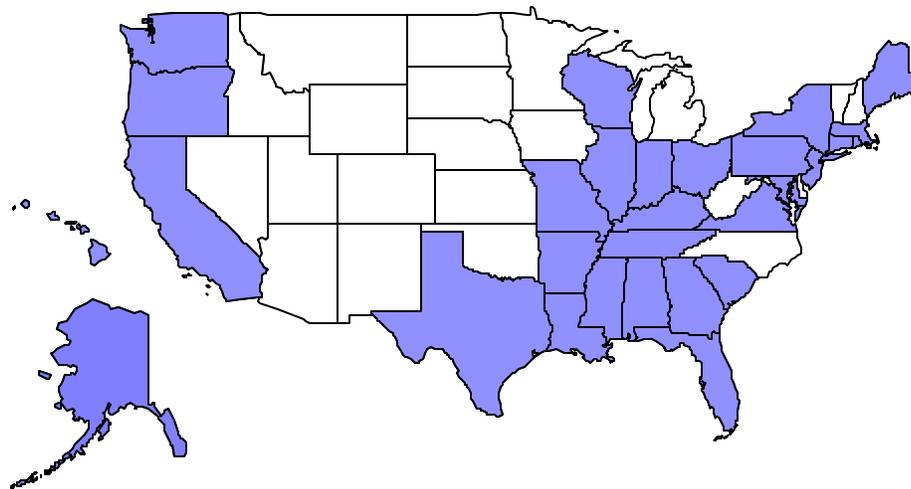
⁴ The RIMS model was constructed and is maintained by the Bureau of Economic Analysis of the U.S. Department of Commerce. See Bureau of Economic Analysis, Regional Multipliers: A User's Handbook to the Regional Input-Output Modeling System (RIMS), 3rd Edition, U.S. Department of Commerce, Washington, D.C., March 1997.

III. The U.S. Commercial Shipbuilding Industry

A. Description

There are active commercial shipyards in at least 29 states as shown in Figure 1.⁵ Almost all the coastal states have active commercial shipyards, and there also are active shipyards on the major inland waterways such as the Great Lakes, the Mississippi River, and the Ohio River.

Figure 1
The 29 States with Active Commercial Shipyards



For the purposes of analyzing the regional economic contributions of the commercial shipbuilding industry, the U.S. has been subdivided into five regions as shown in Figure 2. The estimated sales in 2001 of the commercial shipyards in these regions is shown in Table 1. Commercial shipyards in the Gulf Coast region accounted for 56% of the U.S. industry's sales. The Inland Waterway, Atlantic and Pacific regions each account for between 9% and 20% of the total U.S. industry's sales and collectively account for all the remaining sales. The Western Inland region has no active commercial shipyards. See Appendix A, Table A-1 for the U.S. commercial shipbuilders' sales by state within these regions.

⁵ Documentation has been assembled to show that there are active commercial shipyards in these 29 states, but it is possible that there are active commercial shipyards in some additional states. The list of 29 states was compiled from various sources: shipyards which received surveys, the Maritime Administration, Census of Manufacturers, Marine Log Directory of U.S. Shipyards, and Marine Log and WorkBoat lists of Shipbuilding Contracts.

Figure 2 Subdivisions of the United States into Five Regions

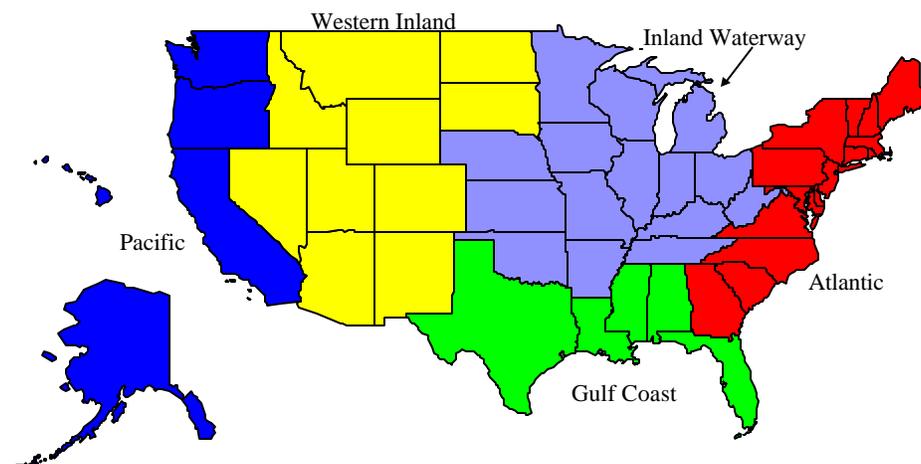


Table 1
Regional Distribution of the Estimated Sales (Value of Shipments) in 2001
of the U.S. Commercial Shipbuilding Industry

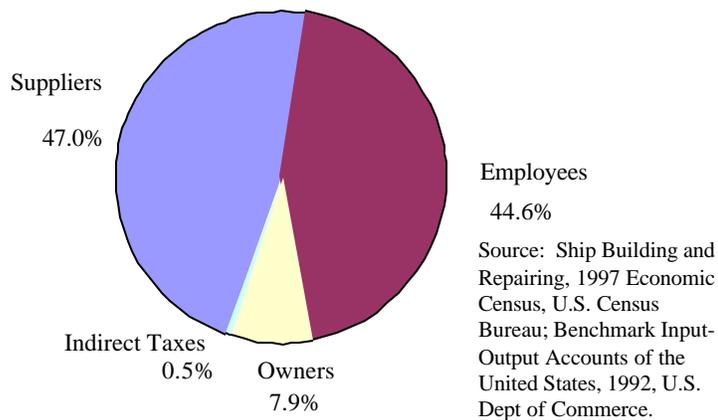
Region	Billion 2001 Dollars	Percent
Gulf Coast	\$2.166	55.6%
Inland Waterway	\$0.362	9.3%
Atlantic	\$0.609	15.6%
Pacific	\$0.758	19.5%
Western Inland	\$0.000	0.0%
U.S. Total	\$3.895	100.0%

Source: Appendix A, Table A-1.

B. Economic Performance

The U.S. commercial shipbuilding industry grew more rapidly than the U.S. economy during the 1990s continuing into the 2000-2001 period. As shown in Table 2, between 1992 and 1997, the sales (value of shipments) of U.S. commercial shipyards increased, on average, by 7.0% per year while the U.S. economy, on average, grew by only 3.5% per year.⁶ These relative growth patterns continued between 1997 and 2001 with shipyard sales increasing, on average, by 6.9% per year while the U.S. economy grew, on average, by 3.4% per year. The impressive growth of the shipbuilding industry during the last five years is also documented by the number of active contracts reported by the shipyards. According to Marine Log, the number of active contracts at commercial shipyards and the end of 1996 was 131. At the end of 2001, this number had increased by about 40% to 183.⁷ The value added by shipyards, which measures the contribution of its employees and owners,⁸ constitutes about 53% of the value of sales. The purchases of inputs from others constitutes about 47% of the value of sales. See Figure 3 for a complete breakdown of the disposition of a dollar spent at a shipyard. Finally, as shown in Table 2, employment at U.S. commercial shipyards grew more rapidly during the 1990s through 2001 than did nationwide employment. Between 1992 and 2001, jobs at U.S. commercial shipyards increased by 13,083 to 31,283.

Figure 3
**Disposition of Dollars Spent at a Shipyard Between
Employees, Owners, Suppliers and Indirect Taxes**



⁶ These percentage growth numbers measure “real” economic growth because the shipyard sales and national outputs are measured in constant 2001 dollars.

⁷ See MarineLog.com.

⁸ Value added equals the income payments by the shipyards to its employees and owners as well as the indirect (non-income) tax paid by the shipyards. The income payments to the employees and owners are measured on a pre-tax basis so value added also includes the income tax amounts that are ultimately paid by the employees and owners. Therefore, value added ultimately measures the total tax payments generated as a result of the shipyards’ activities plus the total after-tax income of its employees and owners.

Table 2
A Comparison of the U.S. Commercial Shipbuilding Industry and the National Economy: 1992 to 2001

	Commercial Shipbuilding		National Economy	
	Value of Shipments (Billions 2001 Dollars)	Average Annual Growth	GDP (Billions 2001 Dollars)	Average Annual Growth
1992	\$2.130		\$7,524.0	
1997	\$2.983	7.0%	\$8,923.0	3.5%
2001	\$3.895	6.9%	\$10,205.8	3.4%
Estimate				
	Value Added (Billions 2001 Dollars)	Average Annual Growth		
1992	\$1.138			
1997	\$1.587	6.9%		
2001	\$2.065	6.8%		
Estimate				
	Inputs from Others (Billions 2001 Dollars)	Average Annual Growth		
1992	\$0.992			
1997	\$1.396	7.1%		
2001	\$1.829	7.0%		
Estimate				
	Employees	Average Annual Growth	Nonfarm Employment (Thousands)	Average Annual Growth
1992	18,200		108,601	
1997	24,907	6.5%	122,690	2.5%
2001	31,283	5.9%	132,212	1.9%
Estimate				

Notes:

Real GDP for 2001 is the preliminary estimate from U.S. Bureau of Economic Analysis.

Nonfarm employment for 2001 is a preliminary estimate from the U.S. Bureau of Labor Statistics.

Value of shipments for commercial shipbuilding growth from 1997 to 2001 is based on growth of the number of commercial shipbuilding contracts from Marinelog.

Estimated 2001 commercial shipbuilding employees is estimated based on growth rate of value of shipments and the historical relationship between productivity (ratio of employment to value added) in the shipbuilding industry and in the national economy.

Estimated 2001 commercial shipbuilding value added is estimated based on value of shipments and the historical relationship of value added and value of shipments.

Estimated 2001 commercial shipbuilding inputs from other is estimated based on value of shipments and the historical relationship of inputs from others.

Sources:

(1): U.S. Bureau of the Census, 1997 Economic Census, Manufacturing, Ship Building and Repairing, Table 5.

(2): U.S. Bureau of the Census, 1992 Economic Census, Manufacturing, Ship and Boat Building, Railroad and Miscellaneous Transportation Equipment, Table 5a.

(3): U.S. Department of Commerce, Bureau of Economic Analysis, Press Release "Gross Domestic Product: Fourth Quarter 2001 (Preliminary)," February 28, 2002 and Survey of Current Business August 2001. See www.bea.gov.

(4): U.S. Department of Labor, Bureau of Labor Statistics, series EEU0000000, Not Seasonally Adjusted, Total nonfarm, All Employees (in thousands), www.bls.gov/cgi-bin/surveymost accessed March 4, 2002.

(5): Major U.S. Shipbuilding Contracts, 12/96 and November 2001, www.marinelog.com accessed December 12, 2001.

IV. The Survey of U.S. Commercial Shipyards

Published data on the U.S. commercial shipbuilding industry provide much useful information. However, these published data do not provide a complete picture of the industry because they do not show the composition of the inputs purchased from other companies or the geographic locations of the shipyards and their suppliers.

LECG conducted a survey of the U.S. commercial shipbuilding industry to complete the picture. The process employed to conduct this survey is described in detail in Appendix B. The process began with identifying with the Shipbuilders Council of America (SCA) the information that should be collected and the shipyards that should be surveyed. Then, LECG drafted a questionnaire which was reviewed by the SCA and modified based on comments provided. Next, LECG staff members visited several commercial shipyards in the Atlantic and Gulf Coast regions to gain first-hand information on the industry. Ideas and opinions were solicited from the shipbuilding companies' management on how to best measure the economic contribution of the industry. LECG also sought their reactions and comments on the draft survey document. After these visits were completed, the survey was modified to incorporate the recommended changes. Then, these surveys were sent to commercial shipyards throughout the country.

The detailed survey responses were sufficient to provide all the information that could not be obtained from published data sources. Completed surveys were obtained from commercial shipyards in all of the four regions with active commercial shipyards: the Gulf Coast, Inland Waterway, Atlantic, and Pacific regions. The specific information obtained from the survey responses included the amount spent on specific inputs and the locations of the suppliers of these inputs. These surveys confirmed that these shipyards rely on suppliers located throughout the U.S.⁹ and not just on those in the area around the shipyards. For example, a shipbuilder in the Gulf Coast region purchased engineering and design services from a firm located in the State of Washington, and a shipyard in the Inland Waterway region purchased steel from a mill in Utah.

⁹ The survey examined specifically suppliers located within the United States.

V. The Role of the Regional Input-Output Modeling System (RIMS II)

The Regional Input-Output Modeling System (RIMS II) was used to determine the total economic benefit resulting from the activities of the U.S. commercial shipbuilding industry. The regional distribution of these economic benefits within the U.S. were determined using RIMS II in conjunction with data collected through the survey described above and other information on the commercial shipbuilding industry. RIMS II was developed and is maintained by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). A description of RIMS II is provided in Appendix C.

VI. The Process Used to Determine the Total Economic Benefits Created By the U.S. Commercial Shipbuilding Industry's Activities

RIMS II, the survey results, and published data on the U.S. commercial shipbuilding industry were used to determine the total economic benefits created by the shipbuilders' activities and the regional distribution of these economic benefits. The total economic benefits were measured in terms of the affects of the shipbuilding industry on U.S. output (i.e., gross domestic product or GDP), employment (i.e., jobs created), personal income, and the tax revenues generated for federal, state, and local governments. First, RIMS II was used to calculate the total output and jobs created by the U.S. commercial shipbuilding industry's activities. The information collected through the survey of commercial shipbuilders, in conjunction with published data, were then used to determine the regional distribution of the total output and jobs created by the shipbuilding industry's activities. The economic benefits were distributed across the states based on the locations of the shipyards and the locations of their suppliers. This process is described in detail in Appendix A.

VII. The Size of the Economic Benefits Created by the U.S. Commercial Shipbuilding Industry's Activities

A. The Total Economic Benefits

RIMS II was used to determine the total economic benefit to the U.S. economy resulting from the activities of the U.S. commercial shipbuilding industry. The total sales (value of shipments) of the commercial shipbuilders in 2001 was estimated to be \$3.895 billion. The revenues from these sales went to the shipyard's suppliers, employees, and owners and to pay taxes to federal, state, and local governments. These payments by the shipbuilders generated additional spending by the recipients of these payments. This secondary spending generated additional economic activity which magnified the direct economic benefits of the shipbuilders' activities. The net effect of this magnification process was to increase the level of U.S. output by \$11.0 billion which was 2.8 times the size of the shipbuilders' output of \$3.9 billion.¹⁰

Another measure of the shipbuilders' contribution to the U.S. economy is the number of people it employs at their shipyards which, in 2001, was 31,283 people. However, the total number of jobs in the U.S. economy in 2001 that were created as a result of the shipbuilders' activities was 147,230. The shipbuilders' activities also generate personal income from the shipyards' owners and employees which, in 2001, amounted to \$3.3 billion. Economy-wide, the shipbuilders' activities in 2001 generated \$9.4 billion of personal income.¹¹ The total output, jobs, and personal income created as a result of the shipbuilders' activities are summarized in Table 3.

Table 3
Total GDP, Jobs, and Personal Income Created by the Activities
of the U.S. Commercial Shipbuilding Industry

	Output (Billion 2001 Dollars)	Jobs (Number of Jobs)	Output Per Job	Personal Income (Billion 2001 Dollars)
Shipyard Output and Jobs Created	\$3.9	31,283	\$124,524	\$3.3
Total Output and Jobs	\$11.0	147,230	\$74,818	\$9.4

Sources:

(1): Table 2

(2): Appendix A, Tables A-4 and A-5

(3): U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Products Accounts, Tables 1.1 and 2.1

¹⁰ The specific methodology used to calculate the total increase in U.S. output is described in Appendix A.

¹¹ The specific methodologies used to calculate the total increase in jobs and personal income are described in Appendix A.

B. The Regional Distribution of the Economic Benefits

RIMS II, the survey results, and published information on the U.S. commercial shipbuilding industry were used to determine the regional distribution of the total GDP and jobs created as a result of the U.S. commercial shipbuilding industry. The regional distribution of the total GDP generated as a result of shipbuilders' activities is presented in Table 4. The five regions are listed in this table in descending order based on each region's share of the GDP created by the shipbuilders. The Gulf Coast region's share of GDP created by the shipbuilders is substantially less than its share of commercial shipbuilders' sales but greater than its share of national GDP. Conversely, the Inland Waterway and Atlantic regions' share of GDP created by the shipbuilders exceed their share of shipbuilders' sales. The Pacific region's share of national GDP is about the same as its share of the GDP generated as a result of the shipbuilders' activities but less than this region's share of shipbuilding industry sales. The Western Inland's share of the GDP generated as a result of shipbuilders is relatively small reflecting the fact that this region has no access to waterways, no commercial shipyards, has a relatively limited number of firms in the industries that supply the shipbuilding industry, and has a small share of national GDP.

Table 4
Regional Distribution of the Output in 2001 Created by
the Activities of the U.S. Commercial Shipbuilding Industry
(Billion 2001 Dollars)

Region	GDP Created by Commercial Shipbuilding Industry		Addendum	
	Billion 2001 Dollars	Share	Share of Shipbuilding Industry Sales	Share of Total GDP
Gulf Coast	\$3.970	36.0%	55.6%	15.5%
Inland Waterway	\$2.474	22.5%	9.3%	26.9%
Atlantic	\$2.380	21.6%	15.6%	33.9%
Pacific	\$1.908	17.3%	19.5%	17.4%
Western Inland	\$0.283	2.6%	0.0%	6.4%
U.S. Total	\$11.015	100.0%	100.0%	100.0%

Sources:

(1): Appendix A, Tables A-1, A-3, and A-4.

(2): U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data, Gross State Product Data, www.bea.doc.gov/bea/regional/gsp.

Table 5 presents the regional distribution of the total jobs and personal income created as a result of the commercial shipbuilding industry. The regional distribution of these jobs and personal income is very similar to that of the total output created by the

shipbuilders' activities. The differences in the regional distributions of jobs and output are due to the differences in employment per dollar of output in the affected industries in the different regions.

Table 5
Regional Distribution of the Total Jobs and Personal Income in 2001 Created
by the Activities of the U.S. Commercial Shipbuilding Industry

Region	Jobs		Personal Income		Addenda: Share of Total Output Increase
	Number of Jobs	Percent	Billions of 2001 Dollars	Percent	
Gulf Coast	53,950	36.6%	\$3.4	36.0%	36.0%
Inland Waterway	32,472	22.1%	\$2.1	22.5%	22.5%
Atlantic	31,545	21.4%	\$2.0	21.6%	21.6%
Pacific	25,604	17.4%	\$1.6	17.3%	17.3%
Western Inland	3,660	2.5%	\$0.2	2.6%	2.6%
U.S. Total	147,230	100.0%	\$9.4	100.0%	100.0%

Source: Appendix A, Tables A-5 and A-6.

C. The Tax Revenues Generated By the Shipbuilders' Activities

The shipbuilders' activities generate tax revenues for federal, state, and local governments in the form of personal income tax payments, corporate income tax payments, indirect business tax (e.g., sales and excise tax) payments, and contributions for social insurance (e.g., social security). In 2001, as shown in Table 6, the U.S. commercial shipbuilders' activities generated \$3.4 billion in tax revenues for U.S. federal, state, and local governments. Of this total, \$2.3 billion, or about 68%, went to the federal government and \$1.1 billion, or about 32%, went to state and local governments.¹²

¹² The method used to calculate the tax revenues generated by the shipbuilders' activities is discussed in Appendix A.

Table 6
Total Estimated Taxes Created by the Activities of the
U.S. Commercial Shipbuilding Industry
(Billion 2001 Dollars)

Federal Tax Revenues	
Personal Income Taxes	\$1.126
Corporate Profit Taxes	\$0.262
Indirect Business Taxes	\$0.124
Contributions for Social Insurance	\$0.772
Total Federal Tax Revenues	\$2.284
State and Local Tax Revenues	
Personal Income Taxes	\$0.311
Corporate Profit Taxes	\$0.041
Indirect Business Taxes	\$0.727
Contributions for Social Insurance	\$0.011
Total State and Local Tax Revenues	\$1.090
Total Federal and State and Local Tax Revenues	\$3.374

Sources:

(1): Appendix A

(2): U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Tables 3.1 - 3.3.

Appendix A

Calculation of the Economic Benefits Created by the U.S. Commercial Shipbuilders' Activities

Introduction and Overview

To calculate the economic benefits created by the U.S. commercial shipbuilders' activities, we need to combine information gained from the U.S. commercial shipbuilders survey with the regional input-output modeling system (RIMS II) and other industry information. Appendix B describes the commercial shipbuilders survey and the type of information gained from the survey responses. Appendix C describes RIMS II and the types of analyses which can be performed with it. This Appendix describes how the survey information was combined with RIMS II and other information to calculate the economic benefits created by the U.S. commercial shipbuilding industry's activities.

There are several steps involved in combining the survey information with RIMS II and the other information sources to produce a measure of the economic benefit of the commercial shipbuilding industry. These steps are:

- Identify wages, input purchases, taxes, and returns to owners in the national commercial shipbuilding industry;
- Determine the location and size of the commercial shipbuilding industry by region;
- Determine the economic benefit of the commercial shipbuilding industry nationally;
- Determine the economic benefits generated by the commercial shipbuilding industry nationally;
- Measure the inputs needed by the commercial shipbuilding industry;
- Locate the suppliers of those inputs by state and region;
- Measure the total economic benefits generated by the commercial shipbuilding industry nationally and by state and region;
- Measure the employment benefits nationally and by state and region;
- Measure the personal income benefits nationally and by state and region; and
- Measure the tax revenue benefits to federal, state and local governments.

Identifying Wages, Input Purchases, Taxes, and Returns to Owners of the U.S. Commercial Shipbuilding Industry

Measuring the size and regional composition of the U.S. commercial shipbuilding industry is necessary in order to measure its total national economic benefit and the distribution of these benefits over states and regions. A large industry produces a greater economic benefit than a small industry. An industry which has a high level of input purchases relative to wages and returns to owners is more likely to spread economic benefits over more states and regions than is an industry with a low level of input

purchases. In the latter case, these benefits are likely to be concentrated in the industry's home region and in its home and neighboring states.

The primary source of the data on the size and regional composition of the U.S. commercial shipbuilding industry is the Census of Manufacturers.¹ The U.S. commercial shipbuilding industry's sales (value of shipments) in 2001 is estimated to be \$3.9 billion² of which \$2.1 billion is value added (53%) and \$1.8 billion is purchased inputs (47%).³ The value added consists of wages, returns to owners, and indirect taxes.

Determining the Location and Size of the Commercial Shipbuilding Industry by Region

Unlike many industries, the commercial shipbuilding industry is relatively concentrated in specific regions of the country because of the industry's reliance on access to waterways. Five regions were defined that mirror the location of the shipbuilding industry: Gulf Coast, Atlantic, Pacific, Inland Waterway, and Western Inland. This last region is landlocked and has no shipbuilding industry. However, the Western Inland region benefits indirectly from the shipbuilding industry activities.

The distribution of the shipbuilding industry over the regions and their component states is based on information from the Census of Manufacturers augmented by information from the shipbuilders survey. The Census provides the value of shipments for the commercial shipbuilding industry in selected states. The value of shipments by state does not add up to the U.S. total because some states are omitted. States are omitted from the list by the Census to avoid disclosing company-specific information or because the shipbuilding industry's activities in a given state are small. The Census state list was compared to the list of states known to have shipyards. The omitted states that were known to have shipyards were added to the Census list and the omitted value of shipments was proportioned equally among the omitted states. This proportioned value of shipments was then compared to information from the shipbuilders survey and from the Shipbuilders Council of America (SCA) to verify the reasonableness of the distribution. In some states, the shipbuilders survey and the SCA showed that the state's shipyards actually had a higher level of activity than an equal share of the value of shipments. In these cases, the value of shipments assigned to that state was increased to conform with the information from the shipbuilders survey and SCA. Table A-1 shows the distribution of commercial shipbuilding value of shipments by state and region.

Determining the Economic Benefits Generated by the Commercial Shipbuilding Industry

The value of shipments of the commercial shipbuilding industry by region shown in Table A-1 is the basic input to the RIMS II modeling system. There are five RIMS II

¹ U.S. Census Bureau, *1997 Economic Census, Manufacturing, Ship Building and Repairing*, July 1999.

² All monetary figures reflect 2001 dollars.

³ See Table 2 in the main report.

models, one for each region. Each regional model takes as its input the value of shipments of the commercial shipbuilding industry in its region. The spending of shipyards has two overall effects. First, shipyard spending generates wages, returns to owners, taxes, and purchases of inputs. Second, the shipyard spending generates further rounds of spending (i.e., the multiplier effect). An example of the further rounds of spending would be spending on wages and its own inputs by the primary metal industry which supplies steel to shipyards. In total, the regional models determine:

- Direct effect of the shipyards within the region containing the shipyards in terms of wages, returns to owners, and taxes;
- Multiplier effect of shipyards within the region;
- Inputs purchased by the commercial shipbuilding industry within its region;
- Multiplier effect of inputs purchased within the region on other industries within the region;
- Inputs purchased by the commercial shipbuilding industry from outside its region; and
- Multiplier effect of inputs purchased outside the region on other industries outside the region.

The sum of all these effects is the amount of total U.S. output created by the shipbuilding industry's activities which, in 2001, totaled \$11.0 billion. Comparing this to the value of shipments of the commercial shipbuilding industry of \$3.9 billion gives an overall multiplier effect of the commercial shipbuilding industry of 2.82. The multiplier of 2.82 means that every \$1.00 paid to the commercial shipbuilding industry generates \$2.82 in total U.S. output.

Measuring the Inputs Used by the Commercial Shipbuilding Industry

There are two data sources for the inputs used by the shipbuilding industry: the shipbuilders survey and RIMS II. The survey, because it is focused on commercial shipbuilding, is used as the primary source of information on the input needs of the commercial shipbuilding. RIMS II provides information on the input needs of all shipbuilding, both military and commercial, and is used to supplement the information from the survey.

The U.S. commercial shipbuilding survey described in Appendix B provided information on the type and amount of inputs by major categories purchased by the commercial shipbuilding industry. The major categories are:

- Primary metals
- Fabricated metals
- Electronic equipment
- Industrial machinery
- Chemicals
- Business services
- Communications

- Utilities
- Insurance
- Finance

RIMS II provides detailed data on the purchases of inputs other than these in the major categories listed above. Data from the survey are combined with information from RIMS II to produce the schedule of inputs shown in Table A-2.

The distribution of input purchases shown in Table A-2 can be combined with the dollar amount of total input purchases by the commercial shipbuilding industry to identify the amount spent on purchases of inputs by the commercial shipbuilding industry nationally. This is done in the rightmost column of Table A-2.

Locating the Input Suppliers by State and Region

The next step in measuring the economic benefits created by the commercial shipbuilding industry's activities is to translate the spending on inputs at the national level into spending in the states and regions. Input suppliers are located using the state-level distribution of gross state product by industry.⁴ Gross state product is the same concept as value added and is equal to gross output (sales or receipts and other operating income, taxes, and inventory change) minus inputs (consumption of goods and services purchased from other U.S. industries or imported). Gross state product is the counterpart of national gross domestic product. Table A-3 shows the distribution of gross state product by region.

Gross state product is available at a similar level of industrial detail as the survey information and the RIMS II data. Therefore, these sources can be combined. Combining the data on inputs purchased by industry with gross state product information on the locations of the industries allows us to trace the shipbuilding industry's purchases of a specific input back to the states and regions that supply that input. This spending by the shipyards has a multiplier effect via the spending by the industries supplying the shipbuilding industry. The sum of the direct and multiplier effects is the economic benefit from the shipbuilding industry's purchased inputs.

Measuring the Total Economic Benefits Generated by the Commercial Shipbuilding Industry by State and Region

The sum of the direct and multiplier effects generated by the commercial shipbuilding industry through wages, returns to owners and taxes and through its purchases of inputs measures the total economic benefit created by the commercial shipbuilding industry. Using the methodology described above, these economic benefits

⁴ U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data, Gross State Product Data, www.bea.doc.gov/bea/regional/gsp. See also Beemiller, Richard M. and George K. Downey. "Gross State Product by Industry, 1992-99," *Survey of Current Business*, August 2001.

are measured by state and by region. Table A-4 shows these economic benefits and their distribution by state and region.

Measuring the Employment Benefits Nationally and by Region and State

The economic benefits in dollars discussed above have accompanying benefits in terms of jobs created in the home states and regions of shipyards and also in the states which supply inputs to the shipbuilding industry. The commercial shipbuilding industry provides directly 31,283 jobs.⁵ These jobs are related to the estimated value added of \$2.1 billion produced by the shipbuilding industry in 2001 and are distributed to the states and regions according to the distribution of commercial shipbuilding value added by state and region. The remaining total economic benefit of the commercial shipbuilding industry also has a distribution over states and regions based on the total economic benefit shown in Table A-4 and the distribution of the commercial shipbuilding industry's value added. The remaining total economic benefit is translated into number of jobs generated using an economy-wide ratio of jobs to value added. Table A-5 shows the jobs generated by the activities of the U.S. commercial shipbuilding industry.

Measuring the Personal Income Benefits Nationally and by Region and State

The output and jobs created directly and indirectly by the U.S. commercial shipbuilding industry, in turn, generate personal income in the form of wages and salaries and returns to owners of businesses. The personal income created directly by the shipbuilding industry is \$3.3 billion.⁶ Indirectly, the shipbuilding industry generates \$6.1 billion of personal income. Total personal income created by the activities of the U.S. commercial shipbuilding industry is \$9.4 billion. The output generated by the activities of the shipbuilding industry is translated into personal income generated using an economy-wide ratio of personal income to output. Table A-6 shows the personal income generated by the activities of the U.S. commercial shipbuilding industry by state and region.

Measuring the Tax Revenue Benefits Nationally

Wages and salaries and the gross profits created by the activities of U.S. commercial shipbuilding industry generates tax revenues for the federal, state, and local governments.⁷ In 2001, the tax revenues generated by the activities of the shipbuilding industry totaled \$3.4 billion consisting of \$2.4 billion of federal tax revenues and \$1.1 billion of state and local tax revenues. The total output created by the activities of the U.S. commercial shipbuilding industry is translated into federal and state and local tax revenues using an economy-wide ratios of tax revenues by type to output.

⁵ See Table 2 in the main report.

⁶ See Table 3 in the main report.

⁷ See Table 6 in the main report.

Table A-1 - Page 1 of 2
Regional/State Distribution of the Estimated Sales (Value of Shipments)
in 2001 of the U.S. Commercial Shipbuilding Industry
(Billion 2001 Dollars)

Region/State	Billion 2001 Dollars	Percent
Gulf Coast	\$2.166	55.6%
Alabama	\$0.276	7.1%
Florida	\$0.202	5.2%
Louisiana	\$0.969	24.9%
Mississippi	\$0.386	9.9%
Texas	\$0.333	8.5%
Inland Waterway	\$0.362	9.3%
Arkansas	\$0.042	1.1%
Illinois	\$0.012	0.3%
Indiana	\$0.042	1.1%
Iowa	\$0.000	0.0%
Kansas	\$0.000	0.0%
Kentucky	\$0.042	1.1%
Michigan	\$0.000	0.0%
Minnesota	\$0.000	0.0%
Missouri	\$0.120	3.1%
Nebraska	\$0.000	0.0%
Ohio	\$0.020	0.5%
Oklahoma	\$0.000	0.0%
Tennessee	\$0.042	1.1%
West Virginia	\$0.000	0.0%
Wisconsin	\$0.042	1.1%
Atlantic	\$0.609	15.6%
Connecticut	\$0.042	1.1%
Delaware	\$0.000	0.0%
District of Columbia	\$0.000	0.0%
Georgia	\$0.042	1.1%
Maine	\$0.030	0.8%
Maryland	\$0.048	1.2%
Massachusetts	\$0.042	1.1%
New Hampshire	\$0.000	0.0%
New Jersey	\$0.052	1.3%
New York	\$0.067	1.7%
North Carolina	\$0.000	0.0%
Pennsylvania	\$0.042	1.1%
Rhode Island	\$0.010	0.3%
South Carolina	\$0.056	1.4%
Vermont	\$0.000	0.0%
Virginia	\$0.179	4.6%

Table A-1 – Page 2 of 2
Regional/State Distribution of the Estimated Sales (Value of Shipments)
in 2001 of the U.S. Commercial Shipbuilding Industry
(Billion 2001 Dollars)

	\$0.758	19.5%
Alaska	\$0.042	1.1%
California	\$0.097	2.5%
Hawaii	\$0.039	1.0%
Oregon	\$0.191	4.9%
Washington	\$0.389	10.0%
Western Inland	\$0.000	0.0%
Arizona	\$0.000	0.0%
Colorado	\$0.000	0.0%
Idaho	\$0.000	0.0%
Montana	\$0.000	0.0%
New Mexico	\$0.000	0.0%
Nevada	\$0.000	0.0%
North Dakota	\$0.000	0.0%
South Dakota	\$0.000	0.0%
Utah	\$0.000	0.0%
Wyoming	\$0.000	0.0%
U.S. Total	\$3.895	100.0%

Table A-2
Distribution of Input Purchases by the
U.S. Commercial Shipbuilding Industry

Input	Percent of All Input Purchases	Input Purchases (Billion 2001 Dollars)
Primary metals	23.7%	\$0.434
Fabricated metals	7.6%	\$0.140
Electronic equipment	2.2%	\$0.040
Industrial machinery	8.3%	\$0.153
Chemicals	2.3%	\$0.043
Business Services	3.6%	\$0.065
Communications	0.2%	\$0.004
Utilities	1.0%	\$0.018
Insurance	0.8%	\$0.014
Finance	0.2%	\$0.003
Other	50.1%	\$0.916
Total	100.0%	\$1.830

Table A-3
Regional Distribution of Gross State Product in 1999
(Billion 1999 Dollars)

Region	Billion 1999 Dollars	Percent
Gulf Coast	\$1,438,483	15.5%
Inland Waterway	\$2,503,386	26.9%
Atlantic	\$3,160,120	33.9%
Pacific	\$1,615,317	17.4%
Western Inland	\$591,673	6.4%
U.S. Total	\$9,308,979	100.0%

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data, Gross State Product Data, www.bea.doc.gov/bea/regional/gsp.

Table A-4 - Page 1 of 2

**Regional/State Distribution of the Total Economic Benefits in 2001
Created by the U.S. Commercial Shipbuilding Industry's Activities
(Billion 2001 Dollars)**

Region/State	Billion 2001 Dollars	Percent
Gulf Coast	\$3.970	36.0%
Alabama	\$0.513	4.7%
Florida	\$0.473	4.3%
Louisiana	\$1.515	13.8%
Mississippi	\$0.616	5.6%
Texas	\$0.853	7.7%
Inland Waterway	\$2.474	22.5%
Arkansas	\$0.118	1.1%
Illinois	\$0.285	2.6%
Indiana	\$0.302	2.7%
Iowa	\$0.063	0.6%
Kansas	\$0.038	0.3%
Kentucky	\$0.159	1.4%
Michigan	\$0.252	2.3%
Minnesota	\$0.093	0.8%
Missouri	\$0.274	2.5%
Nebraska	\$0.026	0.2%
Ohio	\$0.399	3.6%
Oklahoma	\$0.050	0.5%
Tennessee	\$0.186	1.7%
West Virginia	\$0.038	0.3%
Wisconsin	\$0.192	1.7%
Atlantic	\$2.380	21.6%
Connecticut	\$0.136	1.2%
Delaware	\$0.008	0.1%
District of Columbia	\$0.022	0.2%
Georgia	\$0.195	1.8%
Maine	\$0.059	0.5%
Maryland	\$0.153	1.4%
Massachusetts	\$0.182	1.6%
New Hampshire	\$0.028	0.3%
New Jersey	\$0.215	1.9%
New York	\$0.337	3.1%
North Carolina	\$0.133	1.2%
Pennsylvania	\$0.344	3.1%
Rhode Island	\$0.031	0.3%
South Carolina	\$0.150	1.4%
Vermont	\$0.009	0.1%
Virginia	\$0.378	3.4%

Table A-4 - Page 2 of 2
Regional/State Distribution of the Total Economic Benefits in 2001 of
Created by the U.S. Commercial Shipbuilding Industry's Activities
(Billion 2001 Dollars)

Region/State	Billion 2001 Dollars	Percent
Pacific	\$1.908	17.3%
Alaska	\$0.074	0.7%
California	\$0.723	6.6%
Hawaii	\$0.072	0.7%
Oregon	\$0.354	3.2%
Washington	\$0.685	6.2%
Western Inland	\$0.283	2.6%
Arizona	\$0.070	0.6%
Colorado	\$0.064	0.6%
Idaho	\$0.018	0.2%
Montana	\$0.010	0.1%
New Mexico	\$0.024	0.2%
Nevada	\$0.030	0.3%
North Dakota	\$0.008	0.1%
South Dakota	\$0.012	0.1%
Utah	\$0.040	0.4%
Wyoming	\$0.008	0.1%
U.S. Total	\$11.015	100.0%

Table A-5 - Page 1 of 2

**Regional/State Distribution of the Total Jobs in 2001 Created by the
U.S. Commercial Shipbuilding Industry's Activities**

Region/State	Jobs	Percent
Gulf Coast	53,950	36.6%
Alabama	6,967	4.7%
Florida	6,359	4.3%
Louisiana	20,756	14.1%
Mississippi	8,430	5.7%
Texas	11,437	7.8%
Inland Waterway	32,472	22.1%
Arkansas	1,579	1.1%
Illinois	3,706	2.5%
Indiana	3,955	2.7%
Iowa	813	0.6%
Kansas	491	0.3%
Kentucky	2,111	1.4%
Michigan	3,269	2.2%
Minnesota	1,202	0.8%
Missouri	3,687	2.5%
Nebraska	343	0.2%
Ohio	5,190	3.5%
Oklahoma	649	0.4%
Tennessee	2,457	1.7%
West Virginia	486	0.3%
Wisconsin	2,534	1.7%
Atlantic	31,545	21.4%
Connecticut	1,805	1.2%
Delaware	103	0.1%
District of Columbia	290	0.2%
Georgia	2,572	1.7%
Maine	805	0.5%
Maryland	2,040	1.4%
Massachusetts	2,401	1.6%
New Hampshire	367	0.2%
New Jersey	2,841	1.9%
New York	4,448	3.0%
North Carolina	1,717	1.2%
Pennsylvania	4,508	3.1%
Rhode Island	416	0.3%
South Carolina	2,013	1.4%
Vermont	120	0.1%
Virginia	5,100	3.5%

Table A-5 - Page 2 of 2
Regional/State Distribution of the Total Jobs in 2001 Created by the
U.S. Commercial Shipbuilding Industry's Activities
(Number of Jobs)

Region/State	Jobs	Percent
Pacific	25,604	17.4%
Alaska	1,011	0.7%
California	9,474	6.4%
Hawaii	981	0.7%
Oregon	4,811	3.3%
Washington	9,328	6.3%
Western Inland	3,660	2.5%
Arizona	909	0.6%
Colorado	825	0.6%
Idaho	228	0.2%
Montana	135	0.1%
New Mexico	306	0.2%
Nevada	384	0.3%
North Dakota	102	0.1%
South Dakota	152	0.1%
Utah	513	0.3%
Wyoming	106	0.1%
U.S. Total	147,230	100.0%

Table A-6 - Page 1 of 2

**Regional/State Distribution of the Personal Income in 2001 Created by the U.S. Commercial Shipbuilding Industry's Activities
(Billion 2001 Dollars)**

Region/State	Billion 2001 Dollars	Percent
Gulf Coast	\$3.394	36.0%
Alabama	\$0.439	4.7%
Florida	\$0.404	4.3%
Louisiana	\$1.295	13.8%
Mississippi	\$0.527	5.6%
Texas	\$0.729	7.7%
Inland Waterway	\$2.115	22.5%
Arkansas	\$0.101	1.1%
Illinois	\$0.244	2.6%
Indiana	\$0.258	2.7%
Iowa	\$0.054	0.6%
Kansas	\$0.032	0.3%
Kentucky	\$0.136	1.4%
Michigan	\$0.216	2.3%
Minnesota	\$0.079	0.8%
Missouri	\$0.234	2.5%
Nebraska	\$0.023	0.2%
Ohio	\$0.341	3.6%
Oklahoma	\$0.043	0.5%
Tennessee	\$0.159	1.7%
West Virginia	\$0.032	0.3%
Wisconsin	\$0.164	1.7%
Atlantic	\$2.035	21.6%
Connecticut	\$0.116	1.2%
Delaware	\$0.007	0.1%
District of Columbia	\$0.019	0.2%
Georgia	\$0.166	1.8%
Maine	\$0.051	0.5%
Maryland	\$0.131	1.4%
Massachusetts	\$0.155	1.6%
New Hampshire	\$0.024	0.3%
New Jersey	\$0.183	1.9%
New York	\$0.288	3.1%
North Carolina	\$0.113	1.2%
Pennsylvania	\$0.294	3.1%
Rhode Island	\$0.027	0.3%
South Carolina	\$0.129	1.4%
Vermont	\$0.008	0.1%
Virginia	\$0.323	3.4%

Table A-6 - Page 2 of 2
Regional/State Distribution of the Personal Income in 2001 Created by the U.S.
Commercial Shipbuilding Industry's Activities
(Billion 2001 Dollars)

Region/State	Billion 2001 Dollars	Percent
Pacific	\$1.631	17.3%
Alaska	\$0.063	0.7%
California	\$0.618	6.6%
Hawaii	\$0.062	0.7%
Oregon	\$0.303	3.2%
Washington	\$0.586	6.2%
Western Inland	\$0.241	2.6%
Arizona	\$0.060	0.6%
Colorado	\$0.054	0.6%
Idaho	\$0.015	0.2%
Montana	\$0.009	0.1%
New Mexico	\$0.020	0.2%
Nevada	\$0.025	0.3%
North Dakota	\$0.007	0.1%
South Dakota	\$0.010	0.1%
Utah	\$0.034	0.4%
Wyoming	\$0.007	0.1%
U.S. Total	\$9.416	100.0%

Appendix B

The U.S. Commercial Shipbuilders Survey

To obtain a complete picture of the U.S. commercial shipbuilding industry, it is necessary to know the industry's size and location, the amounts that the industry purchases from its suppliers, and the location of these suppliers. Government information sources, such as the Census Bureau and the Bureau of Economic Analysis within the U.S. Department of Commerce, provide much valuable information about the shipbuilding industry in the United States. However, some of the information contained in these published sources cover the entire shipbuilding industry, both commercial and military. Since military shipbuilding is larger than commercial shipbuilding, these information sources do not provide a precise picture of the commercial shipbuilding industry. A study focusing on just commercial shipbuilding requires additional information just on the commercial shipbuilding industry. To meet this need, a survey was designed and conducted to obtain information from companies in the U.S. commercial shipbuilding industry.

The process of obtaining information from the commercial shipbuilders survey had several steps. First, a draft survey was produced incorporating inputs from both the Shipbuilders Council of America (SCA) and LECG. The draft survey contained questions regarding the location of each shipbuilder's yards, the type and amount of work performed at each yard, inputs purchased by the shipbuilder, the amount of inputs purchased, and the location of the input suppliers. Personnel from LECG visited several shipyards in the Gulf Coast and Atlantic regions to gain first-hand information about the industry, solicit information and opinions about the shipbuilding industry, and to obtain reactions and comments on the draft survey. Based on the comments and suggestions received from these shipbuilders, the draft survey was revised to make it easier to complete and more compatible with how the shipbuilders viewed their own business. The final revised survey is attached to this appendix.

The second step in the survey process was to compile a complete list of potential survey recipients. A preliminary list was compiled from the SCA membership list. The preliminary list was augmented based on suggestions from U.S. Maritime Administration (MARAD). The final list of survey recipients covered over fifty shipyards in all four shipbuilding regions: Gulf Coast, Atlantic, Pacific, and Inland Waterway. The revised survey was then sent to these shipyards. A confidentiality agreement was sent with each survey to ensure that no company-specific information revealed in the survey response would be disclosed.

Following receipt of the initial responses, follow-up efforts were made to obtain more responses. These efforts included presentations at SCA meetings, articles in the SCA newsletter, and personal contacts. After numerous follow-ups, we were able to obtain 14

completed detailed survey responses which were sufficient to provide the information necessary for the study. Responses were obtained from all four shipbuilding regions of the United States. Several companies provided information on all of their shipyards, so a company may be represented more than once. Table B-1 compares the geographical distribution of the survey recipients and the completed surveys. As can be seen in Table B-1, most of the survey recipients were located on the Gulf Coast. This is true also for the completed surveys, although the Gulf Coast share of completed surveys is higher than its share of survey recipients. The non-Gulf Coast survey recipients are located in the Pacific region (21.6%), the Atlantic region (17.6%), and Inland Waterway region (17.6%). A roughly proportionately sized response rate was obtained from the survey with the Pacific region being slightly over-represented and the Inland Waterway region being slightly under-represented.

Table B-1

(b) Geographical Distribution of Survey Recipients and Completed Surveys

<u>Region</u>	<u>Survey Recipients</u>	<u>Completed Surveys</u>
Gulf Coast	43.1%	61.1%
Pacific	21.6%	11.1%
Atlantic	17.6%	16.7%
Inland Waterway	17.6%	11.1%
<u>Total</u>	<u>100.0%</u>	<u>100.0%</u>

Attachment

Survey Questionnaire for U.S. Shipbuilders

Objective of the LECG, LLC Work for the Shipbuilders Council of America

To document the major economic contributions made by the U.S. commercial shipbuilding industry and to show that these contributions are spread throughout the U.S. and are not just in the areas immediately around the shipyard locations.

Confidentiality of Information Obtained from Individual Shipbuilders

None of the individual company information will be released. The information obtained from individual shipbuilders will be summed and/or averaged to avoid disclosing any company-specific information. Data for a minimum of three companies will be included in any sum or average reported, and the identification of the specific companies whose data are included in these sums or averages will not be disclosed. The participating shipbuilders will be given these sums and averages which may provide some useful "benchmarking" information.

Information/Data Needed From the Individual Shipbuilders on Their Activities

We need to measure (quantify) the economic contribution of the U.S. shipbuilding industry. This contribution takes the form of direct employment and investment by the shipbuilders at their facilities or the purchase of material, equipment, and service inputs from others by the shipbuilders. We would like data on these contributions for the most recent fiscal year (please define your fiscal year). Also, if you are aware of any abnormalities in the data (e.g., abnormally high or low outlays in a given area), please identify these and, if possible, define a normal value for the item. The economic activities at your shipyard locations (if there are multiple locations) that we wish to measure are employment (both in terms of number of employees and total employee dollar costs including benefits), investment outlays for equipment and new construction, and sales revenue by major type of activity (repair and conversion, construction) with additional detail if available (powered vessels versus barges). In terms of inputs purchased from other companies, we want to know what was purchased (so the industry of the seller can be identified), how much was purchased in dollars (so the size of the economic effect can be determined), and the location (or locations) of the supplying companies (so the location of the economic effects can be determined). We ideally would like to know the location where the purchased items were manufactured, but if only the location of the supplying company is known, please include this information.

Description of the Attached Questionnaire Forms and Instructions for Their Completion

The questionnaire is divided into seven sections (I to VII). Please write your company's name at the top of each response sheet.

Section I: Please indicate the definition of the fiscal year for which data are supplied (e.g., July 1, 1998 through June 30, 1999 or January 1, 1999 through December 31, 1999). Please provide data for the most recent fiscal year.

Note: For responses to Sections II, III, IV, and V: If you have shipyards located in different states, please provide the information requested for all shipyards combined and also separately for the various states where these shipyards are located (i.e., State 1, State 2, . . . , State 6). If you have shipyards in more than six states, please copy the form and provide the data. If all your shipyards are in one state, please just indicate the state under State 1. The state codes are listed on the last page of the questionnaire.

Section II: Sales revenues from repair/conversion and from new construction activities. Please, if possible, supply separate revenues for work on powered ships and for work on barges.

Section III: Employment and employee costs. Please provide average monthly employment during the fiscal year. For employee costs, please include the costs of all employee benefits (e.g., health insurance, life insurance, employer's social security contributions, unemployment insurance, etc.).

Section IV: Major investment outlays for major shipyard construction or improvements. These fiscal year outlays include new construction at the shipyards (e.g., new dry-docks, new work-buildings) and the purchase of shipyard equipment (e.g., cranes, metal working equipment). The smaller ongoing outlays for tools and equipment are included in purchased inputs (see Section VII below). If you recently have completed (or are currently implementing) a major investment program, please complete Section VI.

Section V: Operating costs that often are not considered as parts of purchased inputs (and therefore may be recorded separately) include utility-type services, insurance (excluding employee benefits), banking, legal, accounting, and other business service costs.

Section VI: Description of recent large investment projects at a shipyard. Please identify locations of equipment suppliers and identify dollar amounts by foreign and domestic by state. If there are multiple projects, please duplicate page and describe each project on a separate page.

Section VII: Purchased input costs include ship construction, conversion, or repair activity-specific type costs. For these types of costs, we are seeking not only total amounts spent by type of item purchased (17 types of items are identified), but also where the amounts are spent (i.e., where were the purchased items produced?). If you cannot identify the geographic location of your suppliers (i.e., the state where the supplier is located), please just enter the total amount purchased and, if possible, whether the supplier was foreign or domestic (an estimated percentage of purchases for foreign and domestic

suppliers would be helpful). In terms of the state locations, if you can identify the state locations for some of the purchases, indicate the amount identified as purchased in each state and put the remainder in the "OT" location which is "other (unknown) locations." A list of two-letter state codes is attached to the questionnaire form.

The amount spent in the fiscal year on 17 specific types of items is requested. These types of items are not exhaustive, and all the other purchased inputs are combined into an 18th category denoted as "All Other." If you have a major outlay category that is not part of the 17 identified, we have provided optional categories 18.a, 18.b, 18.c, 18.d, and 18.e, where you can provide information on such components of "All Other." Please include such amounts in "All Other" (18) as well as in the "All Other Detail" (18.a, 18.b, 18.c, 18.d, 18.e). Please define the items included in the "All Other Detail" boxes above each column or add a note describing the content of the columns.

Regarding the 17 identified items, if your shipyard has very small (or no) outlays under a given outlay type, please enter a zero. Any small amounts spent on this item should be put into the "All Other" category (18). The content of the 17 identified items is as follows:

<u>Identified Item</u>	<u>Description/Definition</u>
1. Steel	Steel plates and shapes.
1.a Mill Order Steel	Steel purchased directly from steel mills.
1.b. Service Center Steel	Steel purchased from service centers.
2. Aluminum	Some shipyards work with aluminum instead of or in addition to steel, this item is intended for shipyards that have major outlays on aluminum.
3. Fabricated Metal Products	Ladders, railings, steel doors, door latches, water and fuel storage tanks, etc.
4. Pipes, Valves, and Fittings	
5. Electrical Equipment	Electrical wire, control panels, switches, lights, outlets, electrical supplies, etc.
6. Fasteners and Hardware	
7. Propulsion Unit	Engines, transmissions, drive shafts, propellers (if purchased), steering gear, rudders (if purchased), other propulsion equipment.

Identified Item	Description/Definition
8. Paints and Coatings	
9. Welding Supplies	Welding rods, welding gasses, other welding equipment.
10. Waste Disposal	Disposal of waste generated by shipyard activities.
11. Ships Machinery and Equipment	Wrenches, shipboard cranes, electric motors, compressors, electric generators, refrigeration, galley equipment, freshwater production equipment; etc.
12. Purchased Engineering/ Design Services	
13. Subcontracted Services and Labor	Includes contracting for a job (e.g., paint a ship) and for laborers (e.g., welders).
14. Tools and Equipment	Wrenches, hammers, small power tools, etc.
15. Safety Equipment	
16. Navigation, Communications, and Electronic Equipment	
17. Ventilation Equipment	Includes blowers, fans, A/C units, heating units, heating/cooling/ventilation ducts, heating/cooling/ventilation controls, etc.
18. All Other	Anything not identified above and minor outlays on items in the above categories that are too small to track (category above set to zero). There are some identifiable items that are included in this category such as cable and wire (nonelectrical), miscellaneous office supplies, miscellaneous metals and metal products, and interior furnishings.

Questionnaire for Shipbuilders

Responding Company: _____

Amount (\$) or Number

	All Shipyards Total	Shipyards by State					
		State 1	State 2	State 3	State 4	State 5	State 6
I. Fiscal Year Definition: _____	_____	_____	_____	_____	_____	_____	_____
II. Sales Revenues: Total (\$)	_____	_____	_____	_____	_____	_____	_____
A. Repair and conversion (\$):	_____	_____	_____	_____	_____	_____	_____
1. Powered Ships	_____	_____	_____	_____	_____	_____	_____
2. Barges (dry cargo and tanker)	_____	_____	_____	_____	_____	_____	_____
B. New construction (\$).	_____	_____	_____	_____	_____	_____	_____
1. Powered Ships	_____	_____	_____	_____	_____	_____	_____
2. Barges (dry cargo and tanker).	_____	_____	_____	_____	_____	_____	_____

Page 1 of 9
Please return to:

LECG, LLC.
1725 Eye Street, NW, Suite 800
Washington, DC 20006
Phone: (202) 973-9885
Fax: (202) 466-4487

Questionnaire for Shipbuilders

Responding Company: _____

	All Shipyards Total	Amount (\$) or Number Shipyards by State					
		State 1	State 2	State 3	State 4	State 5	State 6
III. Employees: Number and Cost							
A. Number of employees (average number during the year).	_____	_____	_____	_____	_____	_____	_____
B. Wage and salary costs including benefits (\$).	_____	_____	_____	_____	_____	_____	_____
IV. Major investment projects (\$)							
A. New construction.	_____	_____	_____	_____	_____	_____	_____
B. Major new shipyard equipment purchased (e.g., cranes).	_____	_____	_____	_____	_____	_____	_____
V. Costs That Often Are Not Considered Part of Purchased Inputs (\$)							
A. Electrical service.	_____	_____	_____	_____	_____	_____	_____
B. Telephone service.	_____	_____	_____	_____	_____	_____	_____
C. Water service.	_____	_____	_____	_____	_____	_____	_____
D. Insurance costs (excluding employee benefits).	_____	_____	_____	_____	_____	_____	_____
E. Banking service costs.	_____	_____	_____	_____	_____	_____	_____
F. Legal, accounting, and other business service costs.	_____	_____	_____	_____	_____	_____	_____
G. Other business services.	_____	_____	_____	_____	_____	_____	_____

Questionnaire for Shipbuilders - Continued

Responding Company: _____

	Amount (\$)
VI. Description of Recent Large Investment Project	
Description of Project Including Its Location and Time Frame:	
Total Amount Spent on Project (\$):	_____
New Construction (\$)	_____
(Including all labor costs)	_____
Equipment (\$)	_____
Locations of equipment producers:	_____
Foreign (\$)	_____
Domestic (\$)	_____
State 1: _____	_____
State 2: _____	_____
State 3: _____	_____
State 4: _____	_____
State 5: _____	_____
State 6: _____	_____
State 7: _____	_____
State 8: _____	_____
State 9: _____	_____
State 10: _____	_____
State 11: _____	_____
State 12: _____	_____
State 13: _____	_____

Please enter dollar amounts spent by each location (foreign, domestic, and state) or total domestic and foreign and the percentage spent by each location (mark with %).

Questionnaire for Shipbuilders - Continued

Responding Company: _____

VII. Purchased Input Costs (\$) and Location of Input Producers

	1. Steel.	1.a Mill order steel.	1.b Service center steel.	2. Aluminum.	3. Fabricated metal products.
Total \$					
Foreign					
Domestic					
State 1:					
State 2:					
State 3:					
State 4:					
State 5:					
State 6:					
State 7:					
State 8:					
State 9:					
State 10:					
State 11:					
State 12:					
State 13:					
State 14:					
State 15:					
State 16:					
State 17:					
State 18:					
State 19:					
State 20:					
State 21:					
State 22:					
State 23:					
State 24:					
State 25:					
State 26:					
State 27:					
State 28:					

Questionnaire for Shipbuilders - Continued

Responding Company: _____

VII. Purchased Input Costs (\$) - Continued

	4. Pipes, valves, and fittings.	5. Electrical equipment.	6. Fasteners and hardware.	7. Propulsion unit.	8. Paints and coatings.
Total \$					
Foreign					
Domestic					
State 1:					
State 2:					
State 3:					
State 4:					
State 5:					
State 6:					
State 7:					
State 8:					
State 9:					
State 10:					
State 11:					
State 12:					
State 13:					
State 14:					
State 15:					
State 16:					
State 17:					
State 18:					
State 19:					
State 20:					
State 21:					
State 22:					
State 23:					
State 24:					
State 25:					
State 26:					
State 27:					
State 28:					

Questionnaire for Shipbuilders - Continued

Responding Company: _____

VII. Purchased Input Costs (\$) - Continued

	9. Welding supplies.	10. Waste disposal.	11. Ships' machinery and equipment.	12. Purchased engineering/ design services.	13. Subcontracted services and labor.
Total \$					
Foreign					
Domestic					
State 1:					
State 2:					
State 3:					
State 4:					
State 5:					
State 6:					
State 7:					
State 8:					
State 9:					
State 10:					
State 11:					
State 12:					
State 13:					
State 14:					
State 15:					
State 16:					
State 17:					
State 18:					
State 19:					
State 20:					
State 21:					
State 22:					
State 23:					
State 24:					
State 25:					
State 26:					
State 27:					
State 28:					

Questionnaire for Shipbuilders - Continued

Responding Company: _____

VII. Purchased Input Costs (\$) - Continued

	14. Tools and equipment.	15. Safety equipment.	16. Navigation, communication & electronic equip.	17. Ventilation equipment.	18. All other.
Total \$					
Foreign					
Domestic					
State 1:					
State 2:					
State 3:					
State 4:					
State 5:					
State 6:					
State 7:					
State 8:					
State 9:					
State 10:					
State 11:					
State 12:					
State 13:					
State 14:					
State 15:					
State 16:					
State 17:					
State 18:					
State 19:					
State 20:					
State 21:					
State 22:					
State 23:					
State 24:					
State 25:					
State 26:					
State 27:					
State 28:					

Questionnaire for Shipbuilders - Continued

Responding Company: _____

VII. Purchased Input Costs (\$) - Continued

	18.a All other detail.	18.b All other detail.	18.c All other detail.	18.d All other detail.	18.e All other detail.
Total \$					
Foreign					
Domestic					
State 1:					
State 2:					
State 3:					
State 4:					
State 5:					
State 6:					
State 7:					
State 8:					
State 9:					
State 10:					
State 11:					
State 12:					
State 13:					
State 14:					
State 15:					
State 16:					
State 17:					
State 18:					
State 19:					
State 20:					
State 21:					
State 22:					
State 23:					
State 24:					
State 25:					
State 26:					
State 27:					
State 28:					

Questionnaire for Shipbuilders - Continued

States and Abbreviations

State	Abbreviation	State	Abbreviation
ALABAMA	AL	MONTANA	MT
ALASKA	AK	NEBRASKA	NE
ARIZONA	AZ	NEVADA	NV
ARKANSAS	AR	NEW HAMPSHIRE	NH
CALIFORNIA	CA	NEW JERSEY	NJ
COLORADO	CO	NEW MEXICO	NM
CONNECTICUT	CT	NEW YORK	NY
DELAWARE	DE	NORTH CAROLINA	NC
DISTRICT OF COLUMBIA	DC	NORTH DAKOTA	ND
FLORIDA	FL	OHIO	OH
GEORGIA	GA	OKLAHOMA	OK
GUAM	GU	OREGON	OR
HAWAII	HI	PENNSYLVANIA	PA
IDAHO	ID	PUERTO RICO	PR
ILLINOIS	IL	RHODE ISLAND	RI
INDIANA	IN	SOUTH CAROLINA	SC
IOWA	IA	SOUTH DAKOTA	SD
KANSAS	KS	TENNESSEE	TN
KENTUCKY	KY	TEXAS	TX
LOUISIANA	LA	UTAH	UT
MAINE	ME	VERMONT	VT
MARYLAND	MD	VIRGIN ISLANDS	VI
MASSACHUSETTS	MA	VIRGINIA	VA
MICHIGAN	MI	WASHINGTON	WA
MINNESOTA	MN	WEST VIRGINIA	WV
MISSISSIPPI	MS	WISCONSIN	WI
MISSOURI	MO	WYOMING	WY

OTHER (UNKNOWN) LOCATIONS OT

Appendix C

A Description of the Regional Input-Output Modeling System (RIMS II)¹

Overview

Effective planning for public- and private-sector projects and programs at the State and local levels requires a systematic analysis of the economic impacts of these projects and programs on affected regions. In turn, systematic analysis of economic impacts must account for the interindustry relationships within regions because these relationships largely determine how regional economies are likely to respond to project and program changes. Thus, regional input-output (Input-Output) multipliers, which account for interindustry relationships within regions, are useful tools for conducting regional economic impact analysis.

In the 1970's, the U.S. Department of Commerce's Bureau of Economic Analysis (BEA) developed a method for estimating regional Input-Output multipliers known as RIMS (Regional Industrial Multiplier System), which was based on the work of Garnick and Drake.² In the 1980's, BEA completed an enhancement of RIMS, known as RIMS II (Regional Input-Output Modeling System), and published a handbook for RIMS II users.³ In 1992, BEA published a second edition of the handbook in which the multipliers were based on more recent data and improved methodology. In 1997, BEA published a third edition of the handbook that provides more detail on the use of the multipliers and the data sources and methods for estimating them.

RIMS II is based on an accounting framework called an Input-Output table. For each industry, an Input-Output table shows the industrial distribution of inputs purchased and outputs sold. A typical Input-Output table in RIMS II is derived mainly from two data sources: BEA's national Input-Output table, which shows the input and output structure of nearly 500 U.S. industries, and BEA's regional economic accounts, which are used to adjust the national Input-Output table to show a region's industrial structure and trading patterns.⁴

¹ This appendix is based on material from the U.S. Department of Commerce, Bureau of Economic Analysis.

² See Daniel H. Garnick, "Differential Regional Multiplier Models," *Journal of Regional Science* 10 (February 1970): 35-47; and Ronald L. Drake, "A Short-Cut to Estimates of Regional Input-Output Multipliers," *International Regional Science Review* 1 (Fall 1976): 1-17.

³ See U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Input-Output Modeling System (RIMS II): Estimation, Evaluation, and Application of a Disaggregated Regional Impact Model* (Washington, DC: U.S. Government Printing Office, 1981). Available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; order no. PB-82-168-865; price \$26.

⁴ See U.S. Department of Commerce, Bureau of Economic Analysis, *The Detailed Input-Output Structure of the U.S. Economy, Volume II* (Washington, DC: U.S. Government Printing Office, November 1994); and U.S.

Using RIMS II for impact analysis has several advantages. RIMS II multipliers can be estimated for any region composed of one or more counties and for any industry, or group of industries, in the national Input-Output table. The accessibility of the main data sources for RIMS II keeps the cost of estimating regional multipliers relatively low. Empirical tests show that estimates based on relatively expensive surveys and RIMS II-based estimates are similar in magnitude.⁵

To effectively use the multipliers for impact analysis, users must provide geographically and industrially detailed information on the initial changes in output, earnings, or employment that are associated with the project or program under study. The multipliers can then be used to estimate the total impact of the project or program on regional output, earnings, and employment.

RIMS II is widely used in both the public and private sector. In the public sector, for example, the Department of Defense uses RIMS II to estimate the regional impacts of military base closings. State transportation departments use RIMS II to estimate the regional impacts of airport construction and expansion. In the private-sector, analysts and consultants use RIMS II to estimate the regional impacts of a variety of projects, such as the development of shopping malls and sports stadiums.

RIMS II Methodology

RIMS II uses BEA's 1992 national Input-Output table, which shows the input and output structure for approximately 500 industries. Since a particular region may not contain all the industries found at the national level, some direct input requirements cannot be supplied by that region's industries. Input requirements that are not produced in a study region are identified using BEA's regional economic accounts. Currently, data for 1997 are used.

The RIMS II method for estimating regional Input-Output multipliers can be viewed as a three-step process. In the first step, the producer portion of the national Input-Output table is made region-specific by using four-digit SIC location quotients (LQ's). The LQ's estimate the extent to which input requirements are supplied by firms within the region. RIMS II uses LQ's based on two types of data: BEA's personal income data (by place of residence) are used to calculate LQ's in the service industries; and BEA's wage-and-salary data (by place of work) are used to calculate LQ's in the nonservice industries.

Department of Commerce, Bureau of Economic Analysis, State Personal Income, 1929-93 (Washington, DC: U.S. Government Printing Office, June 1995).

⁵ See U.S. Department of Commerce, Regional Input-Output Modeling System (RIMS II), chapter 5. Also see Sharon M. Brucker, Steven E. Hastings, and William R. Latham III, "The Variation of Estimated Impacts from Five Regional Input-Output Models," *International Regional Science Review* 13 (1990): 119-39.

In the second step, the household row and the household column from the national Input-Output table are made region-specific. The household row coefficients, which are derived from the value-added row of the national Input-Output table, are adjusted to reflect regional earnings leakages resulting from individuals working in the region but residing outside the region. The household column coefficients, which are based on the personal consumption expenditure column of the national Input-Output table, are adjusted to account for regional consumption leakages stemming from personal taxes and savings.

In the last step, the Leontief inversion approach is used to estimate multipliers. This inversion approach produces output, earnings, and employment multipliers, which can be used to trace the impacts of changes in final demand on directly and indirectly affected industries.

Accuracy of RIMS II

Empirical tests indicate that RIMS II yields multipliers that are not substantially different in magnitude from those generated by regional Input-Output models based on relatively expensive surveys. For example, a comparison of 224 industry-specific multipliers from survey-based tables for Texas, Washington, and West Virginia indicates that the RIMS II average multipliers overestimate the average multipliers from the survey-based tables by approximately 5 percent. For the majority of individual industry-specific multipliers, the difference between RIMS II and survey-based multipliers is less than 10 percent. In addition, RIMS II and survey multipliers show statistically similar distributions of affected industries.

Advantages of RIMS II

There are numerous advantages to using RIMS II. First, the accessibility of the main data sources makes it possible to estimate regional multipliers without conducting relatively expensive surveys. Second, the level of industrial detail used in RIMS II helps avoid aggregation errors, which often occur when industries are combined. Third, RIMS II multipliers can be compared across areas because they are based on a consistent set of estimating procedures nationwide. Fourth, RIMS II multipliers are updated to reflect the most recent local-area wage-and-salary and personal income data.

Applications of RIMS II

RIMS II multipliers can be used in a wide variety of impact studies. For example, the U.S. Nuclear Regulatory Commission has used RIMS II multipliers in environmental impact statements required for licensing nuclear electricity-generating facilities. The U.S. Department of Housing and Urban Development has used RIMS II multipliers to estimate the impacts of various types of urban redevelopment expenditures. In addition, BEA has provided RIMS II multipliers to numerous individuals and groups outside the Federal Government. RIMS II

multipliers have been used to estimate the regional economic and industrial impacts of the following: opening or closing military bases, hypothetical nuclear reactor accidents, tourist expenditures, new energy facilities, energy conservation, offshore drilling, opening or closing manufacturing plants, shopping malls, new sports stadiums, and new airport or port facilities.