Industry & Trade Summary

Coal, Coke, and Related Chemical Products

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PREFACE

In 1991 the United States International Trade Commission initiated its current *Industry and Trade Summary* series of informational reports on the thousands of products imported into and exported from the United States. Each summary addresses a different commodity/industry area and contains information on product uses, U.S. and foreign producers, and customs treatment. Also included is an analysis of the basic factors affecting trends in consumption, production, and trade of the commodity, as well as of those bearing on the competitiveness of U.S. industries in domestic and foreign markets.[1]

This report on coal, coke, and related chemical products covers the period 1990 through 1994 and represents one of approximately 250 to 300 individual reports to be produced in this series. Listed below are the individual summary reports published to date on the energy, chemicals, and textiles sectors.

USITC publication number	*Publication date*	*Title*
Energy and Chemicals:		
2458	November 1991	Soaps, Detergents, and Surface-Active Agents
2509	May 1992	Inorganic Acids
2548	August 1992	Paints, Inks, and Related Items
2578	November 1992	Crude Petroleum
2588	December 1992	Major Primary Olefins
2590	February 1993	Polyethylene Resins in Primary Forms
2598	March 1993	Perfumes, Cosmetics, and Toiletries
2736	February 1994	Antibiotics
2739	February 1994	Pneumatic Tires and Tubes
2741	February 1994	Natural Rubber
2743	February 1994	Saturated Polyesters in Primary Forms
2747	March 1994	Fatty Chemicals
2750	March 1994	Pesticide Products and Formulations
2823	October 1994	Primary Aromatics
2826	November 1994	Polypropylene Resins in Primary Forms
2845	March 1994	Polyvinyl Chloride Resins in Primary Forms
2846	December 1994	Medicinal Chemicals, except Antibiotics
2866	March 1995	Hose, Belting, and Plastic Pipe
Textiles:		
2543	August 1992	Nonwoven Fabrics
2580	December 1992	Gloves
2642	June 1993	Yarn
2695	November 1993	Carpets and Rugs
2702	November 1993	Fur Goods
2703	November 1993	Coated Fabrics
2735	February 1994	Knit Fabric
2841	December 1994	Cordage
2853	January 1995	Apparel

[1] The information and analysis provided in this report are for the purpose of this report only. Nothing in this report should be construed to indicate how the Commission would find in an investigation conducted under statutory authority covering the same or similar subject matter.

CONTENTS

INTRODUCTION

This report on coal, coke, and related chemical products contains information regarding product uses, U.S. and foreign producers, tariff and nontariff measures, and U.S. and foreign markets. Most of the information in this report is provided in the context of a 5-year (1990-94) timeframe.

Coal, coke, and related chemical products include anthracite, bituminous, and lignite coals; coke; and chemicals, such as crude coal tar and crude light oil, which are byproducts in the production of coke.[1] Coal is a solid, brittle, combustible, carbonaceous rock composed of carbon, hydrogen, oxygen, nitrogen, sulfur, and small amounts of other chemical elements ranging from arsenic to zirconium. Because coal, being the basic raw material for all of the other products covered in this summary, accounts for most of the production, consumption, and trade, the primary emphasis of this report is on the coal industry.

Coal is formed from decayed remains that were metamorphosed over vast spans of time to produce the different ranks of coal:

(1) Anthracite - a hard, jet-black coal with a high luster, used for generating electricity and space heating;

(2) Bituminous - the most common coal, also known as soft coal, is dense and black, often with well-defined bands of bright and dull material visible, used for generating electricity, making coke, and for space heating;

(3) Sub-bituminous - a type of coal having a dull black color, used for generating electricity and space heating; and

(4) Lignite - a brownish black coal with a high moisture content, used for generating electricity.

The resulting coalbeds or seams are interlayered between beds of sandstone, shale, and limestone. These coal seams range in thickness from less than 1 inch to more than 100 feet.

The primary use of coal is as a fossil fuel, but another important use is for the production of coke and coke byproduct chemicals, such as crude coal tar, coke oven gas, light oil, and ammonia (figure 1). About 92 percent of the coke produced in the United States is used in blast furnaces in the production of steel. Gases produced during the coking cycle are cooled and various byproducts are separated.

Coal tar can be burned for fuel or refined into tar-based products. About 93 percent of the coal tar produced in the United States is further refined into tar acid oil, which is distilled to produce various chemical derivatives, and pitch, which is used for waterproofing, roofing, and paving. Coal tar can also be further distilled to produce pyridine, naphthalene, light oils, creosote oil, road tar, and other products. Light oils are composed of a mixture of aromatic hydrocarbons, which can be further separated to yield intermediate chemical products, such as benzene, toluene, and xylenes. The ammonia (in gaseous form) reacts with sulfuric acid, producing ammonium sulfate, an input to fertilizer production. Once these products are removed, the residual is clean coke oven gas. This gas, which has approximately half the British Thermal Unit (BTU) value of natural gas, is used to fire the coke ovens. U.S. production of coal chemicals satisfies most of the domestic demand, with imports accounting for a relatively small share.

U.S. INDUSTRY PROFILE

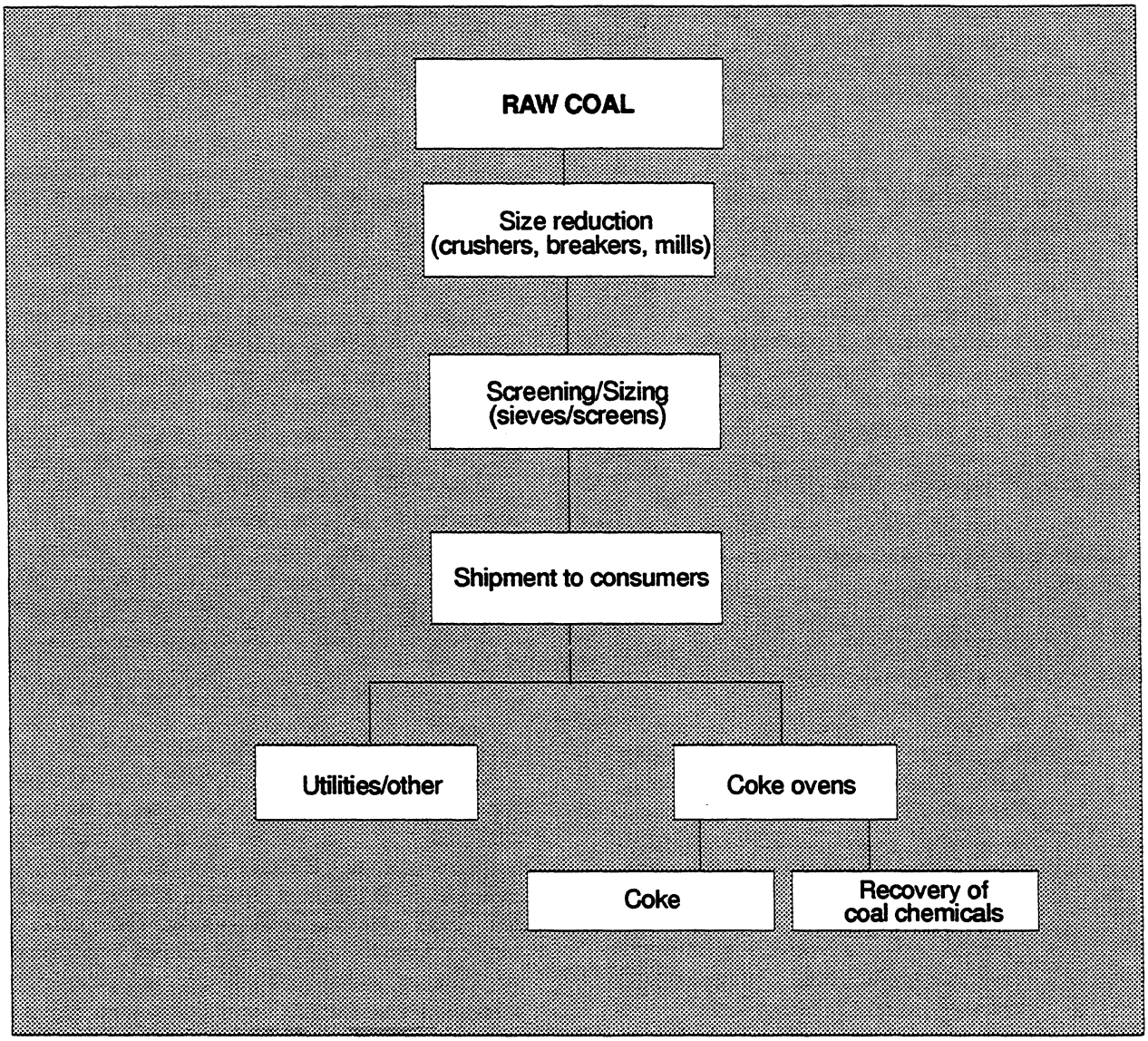
Industry Structure

The U.S. industry is composed of establishments primarily engaged in mining reserves of bituminous coal and lignite in surface mines, as classified in Standard Industrial Classification (SIC) No. 1221. It also consists of bituminous coal in underground mines, SIC 1222, and anthracite mining, SIC 1231. The industry includes underground mining, auger mining, strip mining, culm bank mining, and other surface mining; it also includes coal preparation plants for cleaning, crushing, screening, or sizing of coal. Coke is classified in SIC 3312, and the chemicals produced from coal are classified in SIC 2665.

There are three major coal-producing regions in the United States: Appalachia (Pennsylvania, Ohio, Maryland, Virginia, West Virginia, Eastern Kentucky, Tennessee, and Alabama); the Interior (Iowa, Illinois, Indiana, Kansas, Missouri, Western Kentucky, Oklahoma, Arkansas, Texas, and Louisiana); and the Western Region (Alaska, Washington, Montana, North Dakota, Wyoming, Utah, Colorado, Arizona, and New Mexico). These regions differ in the characteristics of their coal reserves, mining methods, transportation, and marketing situations. The delivered price of coal varies within the United States, depending upon transportation costs, the energy content of the coal per

[1] These byproducts can also be produced from petroleum-refining operations; however, the chemicals discussed in this summary are produced only from coking operations.

Figure 1
Coal, coke, and related chemical products: Primary uses



Source: U.S.International Trade Commission staff

unit of weight, and its sulfur content. The Appalachian region accounts for approximately 48 percent of U.S. production; the Interior region, for about 20 percent; and the Western region, for about 32 percent.

There is a close relationship between coal prices and the number of mines in operation. As coal prices decline, numerous small and relatively inefficient mines, having become unprofitable, are closed. Generally, the mines that remain in operation are those annually producing from 50,000-500,000 tons. Mines producing 1 million tons or more of coal accounted for about 64 percent of total U.S. production in 1992.[2]

The size and number of firms comprising the U.S. coal industry have changed substantially in response to such events as price changes for crude petroleum, the development of western coal reserves, increases in

[2] U.S. Department of Energy, Energy Information Administration, "The U.S. Coal Industry, 1970-1990: Two Decades of Change," November 1992, p. 21.

world coal trade, and changes in the environmental protection regulations. A trend began in 1960 whereby large multinational petroleum companies and electric utilities accounted for an increasing share of the major producers' output while coal and steel companies accounted for a declining share. In 1990, petroleum companies accounted for 44 percent of coal production and electric utility companies accounted for 15 percent.[3] Also, the U.S. coal industry became more international in scope as foreign participation increased from 20 percent in 1989 to 25 percent in 1991 (the most recent year for which data are available).[4] The U.S. coal industry is predominantly controlled by domestic companies, although foreign companies have interests in the U.S. companies. Currently, the top three coal-producing companies are Peabody Holding Company (a British firm), Cyprus Minerals (a U.S. firm), and Consolidation Coal Company (a firm affiliated with DuPont/Rheinbraun AG, which represents U.S., Canadian, and German interests). Small firms account for a declining share of total U.S. coal production. In 1990, the four largest producers accounted for 21.7 percent of total production, compared with 19.7 percent in 1985; the eight largest producers accounted for 32.7 percent in 1990, compared with 31 percent in 1985.[5]

The U.S. coal industry is part of a global industry, and one of the largest producers is the British-owned Peabody Coal Co. Foreign-affiliated producers accounted for about 24 percent of the U.S. coal produced in 1991. European companies have become increasingly interested in U.S. coal mines because of the privatization of power generation in the United Kingdom and the elimination of coal subsidies in Germany. Foreign ownership of U.S. coal reserves continued in 1993 when Kennecott Corp., a wholly-owned subsidiary of RTZ Corp. of the United Kingdom, purchased Nerco, Inc. and Sun Coal Co.'s Cordero mine in Wyoming. U.S. ownership of foreign coal mines is more limited. Exxon Coal holds a 50-percent interest in El Cerrejon North in Colombia, as well as mines in Canada and Australia. Arco owns coal reserves in Australia's largest underground mine.

Since the late 1980s, the number of workers employed in the coal industry declined despite record levels of production. In 1993, there were an average of 101,322 miners working in the United States, compared with nearly 300,000 in the early 1980s.[6]

[3] Ibid., p. 22.
[4] Ibid.
[5] Ibid.
[6] Official statistics of the U.S. Department of Energy.

The drop in the size of the total coal mining workforce has been attributed to the replacement of manual labor by machines in virtually every aspect of mining. At underground mines, improved equipment, such as remote-controlled mining and roof-bolting machines, have reduced crew sizes while improving productivity and safety. At surface mines, larger and faster excavating and transporting equipment run by computers has reduced crew sizes.

U.S. coal producers and users must contend with some of the most stringent health, safety, and environmental regulations affecting U.S. industry; however, most of the regulations affect the consumption of coal rather than its production. Coal mining safety, particularly in the case of underground mining, is an important issue in the industry. During 1990-94, injury incidence rates for mining operations were below those of many sectors of construction and manufacturing industries, according to the U.S. Bureau of Labor Statistics. There are many laws regulating mine safety; one of the more encompassing is the Federal Coal Mine Health and Safety Act of 1969,[7] which covers virtually every aspect of coal mining.

When coal is burned, the sulfur in the coal produces gaseous sulfur oxides, including sulfur dioxide, which is a precursor to acid rain.[8] The coal industry is affected by various provisions of the Clean Air Act Amendments of 1990,[9] which are expected to affect demand in the future.[10] Other laws affecting the coal industry are the Energy Policy Act of 1992[11] and the Omnibus Budget Reconciliation Act of 1993.[12] One provision of the Energy Policy Act of 1992 provides health and death benefits for as many as 200,000 retirees and their dependents. Funding comes from annual premiums paid by operators, transfers of assets from the United Mine Workers pension plan, and the Abandoned Mine Reclamation Fund. Another provision establishes an advanced clean-coal technology program and provides for the promotion of exports.[13] The Omnibus Budget Reconciliation Act of 1993 imposes a 4.3-cents-per-gallon tax on transportation fuels used on public highways or public waterways, which represents a modest increase in coal transportation costs.[14]

[7] Public Law 91-173, 83 Stat. 742 (1969).
[8] U.S. Department of Energy, *Coal Data: A Reference*, Feb. 1995, pp. 37-40.
[9] Public Law 101-549, 104 Stat. 2399 (1990).
[10] For details, see the section entitled *Consumer Characteristics and Factors Affecting Demand.*
[11] Public Law 102-486, 106 Stat. 2776 (1992).
[12] Public Law 103-66, 107 Stat. 312 (1993).
[13] U.S. Department of Energy, *Coal Data: A Reference*, Feb. 1995, pp. 37-40.
[14] Ibid.

Miners' safety is also monitored by the Mine Safety and Health Administration (MSHA) of the U.S. Department of Labor, which was established in 1978. MSHA is required to inspect underground coal mines four times per year and surface coal mines twice a year. It has the authority to issue citations and stop mining operations when conditions are deemed to be dangerous. As a result of more stringent safety regulations, mechanization, and roof bolting, the record for mine safety has greatly improved over the decades. In 1993, coal mining claimed 47 lives, compared with an average of 79 miners per year during the 1980s. Historically, winter is the most hazardous time for coal mine explosions. From October through March, MSHA issues "winter alerts" warning miners that methane and coal dust explosions are more likely to occur than during the rest of the year.[15]

Consumer Characteristics and Factors Affecting Demand

More than 75 percent of the coal produced in the United States is sold to electric utilities for the generation of more than half of the U.S. electricity needs. An additional 10 percent is exported. Metallurgical coal, used primarily by the steel industry for the production of coke, accounts for about 3 percent of total U.S. coal production. The remaining production is used for industrial purposes, other than steel production, and in residential, commercial, and transportation markets.

Electric power plants are strictly limited in the amount of sulfur dioxide that can be emitted. These plants must install flue-gas desulfurizers (called scrubbers) or burn low-sulfur coals. Controls in the Clean Air Act Amendments of 1990 set new requirements for sulfur emissions: (1) for the 110 power plants built since 1978, emissions will be limited to 2.5 pounds of sulfur dioxide per million BTU of energy consumed, and (2) in 2000, limits on emissions for all power plants, regardless of age, will be limited to 1.2 pounds of sulfur dioxide per million BTU of energy consumed.

[15] Hazards increase at that time because dry winter air entering the mine becomes warm and absorbs the moisture from mine workings. As the mine "dries out," more coal dust becomes suspended in the mine air and increases the risk of ignition. In addition, sudden drops of barometric pressure causes methane to expand and flow from inactive areas of the mine to areas where the miners are working.

FOREIGN INDUSTRY PROFILE

The nations of the former Soviet Union (FSU),[16] primarily the Russian Federation (Russia), together possess the largest volume of recoverable coal reserves, followed closely by the United States (table 1). Most of the coal reserves in Russia are located in areas with severe climates that prevent mining for several months of the year. The United States is considered by most consuming nations to be a secure source of high-quality coals. Other nations with reserves are China, Australia, Germany, South Africa, and Poland

. China and the United States are the leading world producers of coal, followed by the FSU. In China, coal supplies 76 percent of the nation's domestic energy needs. In its most recent 5-year plan, China's Ministry of Coal Industry aims to increase coal production to 1,500 million short tons per year by 2000. As part of this effort, the plan calls for greater cooperation and technical exchange with foreign countries and the closure of mines that are not economically viable.[17]

The FSU has seen coal production declines over the last several years because of inefficient mining, decreased productivity, and dangerous working conditions.[18] The industry is highly fragmented. The state-owned Rosugol comprises 232 mines and 68 coal preparation plants. However, there are 28 coal mining associations controlling from 3 to 20 mines each, as well as several independent mines, which rival Rosugol's power in terms of responsibility and authority. The industry is also plagued with labor unrest, strikes, layoffs, and defaults on workers' salary payments.[19] By 2004, plans call for the modernization of the industry, with the closing of inefficient mines.

The industries in the United Kingdom, Germany, and Spain continued to experience declines in coal production during 1992-94 as they shut down low-producing mines. Poland recently closed seven unprofitable mines. Unrest and strikes have caused production declines in Ukraine, Russia, and in other East European nations.[20] Also, political changes in South Africa have resulted in changing export patterns. South Africa, which historically sold its coal on the

[16] For this report, FSU is being used to refer to the nations that once comprised the Soviet Union because historical data needed to provide a baseline analysis were, and in some cases continue to be, compiled under the name Soviet Union.

[17] U.S. Department of Energy, *Country Analysis Briefs: 1994*, May 1995, p. 19.

[18] Ibid., p. 62.

[19] Ibid.

[20] "World Coal," *Mining Magazine*, Sept. 1994.

Table 1
Worldwide recoverable reserves and production of coal, 1992

Country	Reserves	Production
	(billion short tons)	*(million short tons)*
Former Soviet Union	265.6	671.7
United States	265.2	997.5
China	126.1	1,230.3
Australia	100.3	248.2
Germany	88.3	346.0
South Africa	61.0	195.9
Poland	45.4	218.6
Other	193.3	118.5
Total	1,145.2	4,026.7

Source: U.S. Department of Energy, Energy Information Administration, *International Energy Annual 1993*, May 1995.

spot market, is now seeking contracts with new clients around the world.[21]

U.S. TRADE MEASURES

Tariff Measures

Table 2 shows the rates of duty for U.S. imports of the products covered in this summary under the *Harmonized Tariff Schedule of the United States (HTS)*. The column 1 rates of duty for countries considered for general or most-favored-nation (MFN) treatment, as well as duty rates under column 1 for countries qualifying for special tariff programs, are, in most cases, free.[22] The rates of duty for the chemicals produced from coal range from free to compound rates of duty on phenols and certain other oils and on distilled products produced from coal tar.

U.S. Government Trade-Related Investigations

The Commission conducted one investigation in recent years with respect to metallurgical coke. At the request of the Committee on Ways and Means of the U.S. House of Representatives, the Commission conducted an investigation and published a report that provided a baseline analysis of the U.S. metallurgical coke industry, with an analysis on the effect of increasing imports from major world producers, specifically Japan, China, and the former Eastern bloc nations. The report evaluated the impact of significant market and trade issues related to the consuming industries on the availability of coke in the United States, Japan, and in other producing nations.[23]

[21] Ibid.

[22] See app. A for an explanation of rate of duty columns.

[23] U.S. International Trade Commission (USITC), *Metallurgical Coke: Baseline Analysis of the U.S. Industry and Imports* (inv. No. 332-342), USITC publication No. 2745, Mar. 1994.

FOREIGN TRADE MEASURES

The United States is one of the world's leading producers and exporters of coal and other carbonaceous material. The principal markets for U.S. coal include Canada, the European Union, and Japan. U.S. coal enters these markets free of duty. There are no identified nontariff measures hindering U.S. exports of the products covered in this summary from entering these markets. Canada is the primary market for U.S. exports of coal, coke, and related chemical products partly because of its proximity. Another major market is Japan, which has no indigenous coal reserves and buys coal from major coal exporting nations for its energy needs and to produce coke for its steel industry.

U.S. MARKET

Consumption

Coal is consumed in all 50 States and the District of Columbia. Texas, Indiana, Ohio, and Pennsylvania consumed the largest amounts of coal, with a combined share of about 30 percent of total U.S. production during 1990-94. The use of coal has risen steadily since the early 1970s, spurred by the Arab oil embargoes and subsequent high prices for crude. Total consumption of coal increased from 895.5 million short tons in 1990 to 930 million short tons in 1994 (table 3 and figure 2). The share of U.S. consumption accounted for by imports was less than 1 percent for coal and the byproduct chemicals; imports accounted for 3 to 7 percent of U.S. coke consumption during 1990-94.

The primary use for coal is the generation of electricity. Coal is used to produce high-pressure steam for driving electrical generators. Nearly 500 of the 3,000 power plants in the United States use coal.

Table 2
Coal, coke, and related chemical products: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1995; U.S. exports, 1994; and U.S. imports, 1994

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1995		U.S. exports, 1994	U.S. imports, 1994
		General	Special[1]		
				— 1,000 dollars —	
2701	Coal; briquettes, ovoids and similar solid fuels made from coal:				
	Coal, whether or not pulverized, but not agglomerated:				
2701.11.00	Anthracite	Free	Free	33,153	10,736
2701.12.00	Bituminous coal (includes metallurgical and other coal)	Free	Free	2,815,171	211,867
2701.19.00	Other coal	Free	Free	8,664	2,025
2701.20.00	Briquettes, ovoids and similar solid fuels made from coal	Free	Free	1,088	2,501
2702	Lignite, whether or not agglomerated, excluding jet:				
2702.10.00	Lignite, whether or not pulverized, but not agglomerated	Free	Free	917	4,475
2702.20.00	Agglomerated lignite	Free	Free	132	0
2703.00.00	Peat (including peat litter), whether or not agglomerated	Free	Free	2,172	126,411
2704.00.00	Coke and semicoke, of lignite or of peat, whether or not agglomerated; retort carbon (includes coke and semicoke of coal commercially suitable for fuel use in briquettes or other forms and includes other coke)	Free	Free	100,922	288,008
2705.00.00	Coal gas, water gas, producer gas and similar gases, other than petroleum gases and other gaseous hydrocarbons	Free	Free	638	0
2706.00.00	Tar distilled from coal, lignite, or peat, and other mineral tars whether or not dehydrated or partially distilled, including reconstituted tars	Free	Free	7,577	10,979
2707	Oils and other products distilled from high temperature coal tar:				
2707.10.00	Benzene	Free	Free	8,114	43,691
2707.20.00	Toluene	Free	Free	19,999	6,458
2707.30.00	Xylenes	Free	Free	161,621	21,479
2707.40.00	Naphthalene	Free	Free	4,120	1,230
2707.50.00	Other aromatic hydrocarbon mixtures of which 65 percent or more by volume (including losses) distilled at 250°C by the ASTM D86 method	Free	Free	26,491	4,844
2707.60.00	Phenols	2.9¢/kg + 12.5%	Free (A, CA, E, IL, J, MX)	3,363	41
	Other:				
2707.91.00	Creosote oils	Free	Free	3,707	2,391
2707.99	Other:				
2707.99.10	Light oil	Free	Free	20,674	0
2707.99.20	Picolines	Free	Free	413	163
2707.99.30	Metacresol, orthocresol, paracresol, and metaparcresol having a purity of 75% or more by weight	1.1¢/kg + 3.6%	Free (A, CA, E, IL, J, MX)	9,071	2,299
2707.99.40	Carbazole having a purity of 65% or more by weight	1.6¢/kg + 5.5%	Free (A, CA, E, IL, J, MX)	1,109	2,301
2707.99.50	Other (including carbon black feedstocks)	Free	Free	195,943	39,371

See footnotes at end of table.

Table 2—*Continued*
Coal, coke, and related chemical products: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1995; U.S. exports, 1994; and U.S. imports, 1994

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1995		U.S. exports, 1994	U.S. imports, 1994
		General	Special[1]		
				— *1,000 dollars* —	
2708	Pitch and pitch coke, obtained from coal tar or other mineral tars:				
2708.10.00	Pitch	Free	Free	36,595	16,421
2708.20.00	Pitch coke	Free	Free	2,592	1,470

[1] Programs under which special tariff treatment may be provided, and the corresponding symbols for such programs as they are indicated in the "Special" subcolumn, are as follows: Generalized System of Preferences (A); Automotive Products Trade Act (B); Agreement on Trade in Civil Aircraft (C); North American Free Trade Agreement, Goods of Canada (CA), Goods of Mexico (MX); Caribbean Basin Economic Recovery Act (E); United States–Israel Free Trade Area (IL); Andean Trade Preference Act (J); and Uruguay Round Concessions on Intermediate Chemicals for Dyes (L).

Source: USITC, Harmonized Tariff Schedule of the United States (1995). U.S. exports and imports compiled from official statistics of the U.S. Department of Commerce.

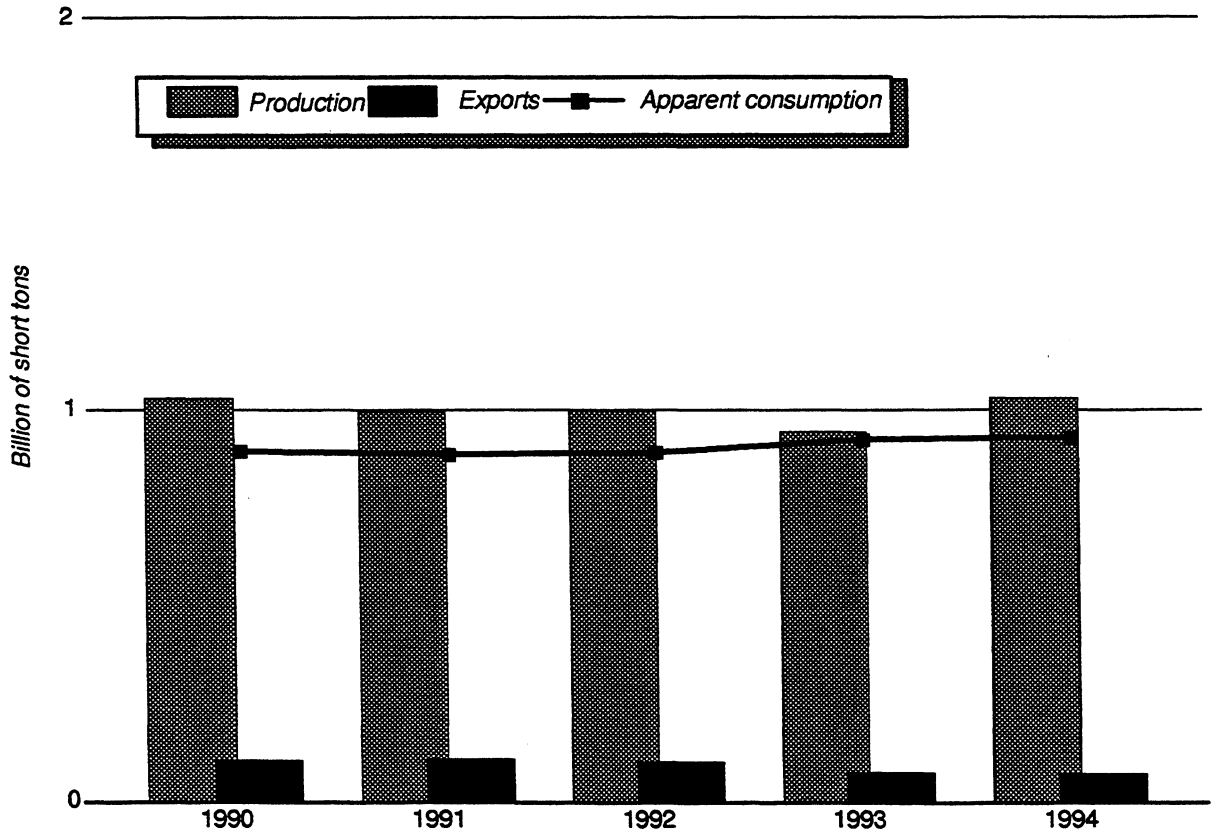
Table 3
Coal: U.S. consumption, by sector, 1990-94

(1,000 short tons)

Year	Electric utilities	Coke plant	Other industrial	Residential/ commercial	Total
1990	773,549	38,877	76,330	6,724	895,480
1991	772,268	33,854	75,405	6,094	887,621
1992	779,860	32,366	74,042	6,153	892,421
1993	813,508	31,323	74,892	6,221	925,944
1994	817,270	31,740	75,004	6,013	930,027

Source: Compiled from official statistics of the U.S. Department of Energy.

Figure 2
Coal: U.S. production, exports, and apparent consumption, 1990-94[1]



[1] Imports during 1990-94 were relatively low, (see table 5 for data).
Source: Compiled from official statistics of the U.S. Department of Energy.

Most of the coal used to generate electricity is burned in pulverized-coal-fired boilers, where the coal is ground as fine as flour, blown into the furnace, and ignited instantly to burn in suspension. Another use of coal is in the production of coke for the iron and steel industries, foundries, and other industries. Coke is produced from metallurgical coal and is chiefly used to smelt iron ore and other iron-bearing materials in blast furnaces, acting both as a source of heat and as a chemical reducing agent to produce pig iron.

As an insurance against disruptions in deliveries, large coal consumers generally maintain a 45-to-60 day stockpile of coal. Large quantities of coal are generally stored in open stockpiles on the ground or in bins, bunkers, or silos. Year-end stocks were about 202 million short tons in 1990 declining to 167 million short tons in 1994 (table 4).

Production

U.S. Coal Reserves

Coal is the nation's most abundant fossil fuel. In terms of recoverable reserves of coal, the United States ranks second in the world, behind the collective nations of the FSU. U.S. recoverable reserves of coal are estimated at 265.2 billion short tons, of which bituminous and anthracite accounted for 124.2 billion short tons. Reserves are nearly equally distributed in terms of being low-, medium-, and high-sulfur content. Approximately 86 percent of U.S. low- sulfur-content coals are located in the West, while nearly 70 percent of the high-sulfur content coals are located in the interior section of the nation.

U.S. coals are generally considered by world markets as the best coking coals because of their low-sulfur, high volatility, and low ash. Many companies, both domestic and foreign, blend different coals to achieve the desired coking coal. By blending, coke producers can lower their raw material input costs. For example, coals from Alabama, West Virginia, and Pennsylvania can be blended to produce a particular specification of coke. In Japan, coke producers blend U.S. coals with coals from China and Australia; these coals are lower in quality than U.S. coals and, therefore, less expensive.

U.S. Production

Coal has been mined in the United States for more than 200 years, beginning in 1748 near Richmond, VA. Coal is produced in 26 States, but more than half of the total output is from three States, namely, Wyoming, Kentucky, and West Virginia. U.S. production of coal remained relatively stable during 1990-94, averaging about 1 billion short tons per year (table 5). About 60 percent of the coal produced was bituminous coal; most of the remaining production was subbituminous and lignite coals. Anthracite production accounted for less than 1 percent of total U.S. production in 1993 and 1994.

U.S. production of coke decreased from 27.6 million short tons in 1990 to 22.7 million short tons in 1994 (table 6). This decline is due to decreases in the production of steel and rising imports of inexpensive coke from Japan.[24] At the beginning of

[24] USITC, *Metallurgical Coke: Baseline Analysis of the U.S. Industry and Imports* (inv. No. 332-342), USITC publication No. 2745, Mar. 1994.

Table 4
U.S. coal stocks, by sector, as of December 31, 1990-94

(1,000 short tons)

Year	Coal consumers			Coal producers and distributors	Total
	Electric utilities	Coke plants	Other industrial		
1990	156,166	3,329	8,716	33,418	201,629
1991	157,876	2,773	7,061	32,971	200,682
1992	154,130	2,597	6,965	33,993	197,684
1993	111,341	2,401	6,716	25,284	145,742
1994	127,270	2,308	6,089	31,000	166,667

Source: Compiled from official statistics of the U.S. Department of Energy.

Table 5
Coal: U.S. production, exports of domestic merchandise, imports for consumption, and consumption, 1990-94

Year	Production	Exports	Imports	Consumption[1]	Ratio of imports to consumption
			1,000 short tons		*Percent*
1990	1,029,076	105,804	2,699	895,480	0.3
1991	995,984	108,969	3,390	887,621	0.4
1992	997,545	102,516	3,803	892,421	0.4
1993	945,424	74,519	7,309	925,944	0.8
1994	1,030,649	71,359	7,584	930,027	0.8

[1] Consumption data were not derived from the standard formula of production minus exports plus imports; the data include changes in producer, distributor, and consumer stocks.

Source: Compiled from official statistics of the U.S. Department of Energy.

Table 6
Coke: U.S. production, exports of domestic merchandise, imports for consumption, and consumption, 1990-94

Year	Production	Exports	Imports	Consumption[1]	Ratio of imports to consumption
			1,000 short tons		*Percent*
1990	27,617	572	765	27,811	3
1991	24,046	740	1,099	24,216	5
1992	23,410	642	1,739	24,690	7
1993	23,182	835	1,534	24,303	6
1994	22,686	660	1,612	24,163	7

[1] Consumption data were not derived from the standard formula of production minus exports plus imports; the data include changes in producer, distributor, and consumer stocks.

Source: Compiled from official statistics of the U.S. Department of Energy.

1994, only 31 coke plants were in operation, less than half the number of plants in the 1980s.[25] Some plants were closed because of the decline of the steel industry, but many older plants closed because of the high cost of refurbishing them to meet air pollution standards. As a result, production of coal chemicals (byproducts of the coking process) has also declined (table 7).

Table 7
Coal chemicals: Value of U.S. production, 1990-94

	(1,000 dollars)
1990	94,692
1991	75,399
1992	84,812
1993	94,022
1994	(1)

[1] Not available.

Source: USITC, *Synthetic Organic Chemicals, United States Production and Sales*, annual.

[25] U.S. Department of Energy, *Coal Data: A Reference*, Feb. 1995, pp. 40-48.

Because of the abundant coal reserves in the United States, annual production is projected to remain at about 1 billion short tons into the next century.[26] Nearly 90 percent of this production is projected to be consumed domestically, principally for electricity generation. The remaining 10 percent is expected to be exported. Research and development are underway to make coal a more competitive and cleaner-burning fuel, as well as a greater source of coal chemicals production. Much of this research and development is the result of stringent State and Federal pollution control standards.

Imports

U.S. imports of coal, coke, and related chemical products increased from $583.8 million in 1990 to $799.2 million in 1994 (table 8). Canada and Japan remained the primary sources of these imports during 1990-94.

[26] Ibid.

Table 8
Coal, coke, and related chemical products: U.S. imports for consumption by principal sources, 1990-94

(1,000 dollars)

Source	1990	1991	1992	1993	1994
Canada	242,189	171,956	175,816	179,524	203,090
Japan	73,264	82,735	155,741	148,252	183,182
Colombia	52,650	61,849	56,866	114,301	97,036
Venezuela	13,331	21,948	19,207	39,033	52,850
Indonesia	1,602	596	10,369	30,238	38,214
China	2,129	3,042	2,050	4,084	37,134
Australia	21,702	20,028	31,670	22,818	27,327
Netherlands	44,543	21,353	23,980	5,121	26,687
Poland	0	1,071	1,189	1,658	25,520
Mexico	4,440	3,858	7,092	9,580	13,655
All Other	127,992	64,914	51,278	48,655	94,464
Total Imports	583,842	453,351	535,258	603,264	799,160

Source: Compiled from official statistics of the U.S. Department of Commerce.

Coal imports are relatively insignificant, when contrasted with exports. Coal imported from Canada, the principal source of U.S. imports, was primarily used to meet the needs of domestic areas not easily supplied by domestic sources. The coal imported from Colombia and Venezuela was delivered to electric power plants in the Southeast and blended with domestic coal for use in the electric power industry. Coke imports were primarily from Japan. Steel production in Japan, as in the United States, has declined in recent years, leaving Japanese coke producers with excess capacity.[27]

FOREIGN MARKETS

The United States is considered to be the most secure source of coal in the world. The coal is of a high quality, in terms of heat value and percentage of sulfur and ash. Despite its higher price, U.S. coal is highly demanded on the world market. The price of U.S. coal varies by coal rank, mining method, geographic location, and coal quality. Surface-mined coal is generally lower priced than underground-mined coal. Coals with a high-heat content are generally higher priced as are low-sulfur and low-ash coals. Transportation costs add significantly to the delivered price of coal. In some cases, shipping long distances can more than double the price of the coal.

U.S. coal exports comprise a small but important market for U.S. coal production. The level of coal exports, consisting almost entirely of Appalachian bituminous coal, is influenced by a number of factors, such as changes in the economic conditions in the coal-importing nations, coalminers' strikes in the United States and other coal-exporting countries, and price competition. U.S. coal is currently exported to more than 30 countries. Exports declined from $5 billion in 1990 to $3.5 billion in 1994 (table 9), largely because of the continuing availability of relatively cheap crude oil on the world market.

Metallurgical coal[28] is the mainstay of U.S. coal exports, accounting for more than 67 percent of total coal exports. As stated previously, world demand for metallurgical coal has declined in response to the downturn in steel production worldwide. Exports of bituminous steam coal have increased because many foreign electric power plants, cement plants, and other industries converted boilers from oil to coal in the late 1970s. Canada, historically, has been the principal market for U.S. exports, including some anthracite for use in a smelting process. Japan and Western Europe are the other main markets. About 50 percent of total U.S. coal exports are shipped from the Norfolk, VA, customs district. Other large coal exporting ports are New Orleans, LA; Cleveland, OH; Baltimore, MD; and Mobile, AL. U.S. exports of coal chemicals were insignificant during 1990-94.

[27] USITC, *Metallurgical Coke: Baseline Analysis of the U.S. Industry and Imports* (inv. No. 332-342), USITC publication No. 2745, Mar. 1994.

[28] Metallurgical coal, or coking coal, is a coal that can be converted into coke. It must have a low ash and sulfur content and form a coke that is strong enough to support the weight of iron ore and limestone in a blast furnace. A blend of two or more ranks of coal (preferably bituminous coals) is usually required to make coke.

Table 9
Coal, coke, and related chemical products: U.S. exports by principal markets, 1990-94

(1,000 dollars)

Market	1990	1991	1992	1993	1994
Canada	597,674	441,607	600,126	430,904	448,816
Japan	661,858	571,507	557,106	511,524	433,606
Italy	538,614	533,988	464,770	330,487	355,333
Brazil	278,560	341,686	304,474	240,227	235,803
Netherlands	405,971	434,015	440,835	260,762	228,882
Republic of Korea	255,105	207,955	195,032	195,560	224,224
Belgium	390,655	341,710	322,617	231,063	210,007
Spain	183,864	206,504	206,931	188,907	181,968
United Kingdom	246,657	288,395	263,602	200,336	162,201
Taiwan	213,203	215,028	177,350	165,416	160,833
All other	1,232,173	1,407,131	1,190,022	831,696	822,575
Total Exports	5,004,333	4,989,526	4,722,863	3,586,883	3,464,247

Source: Compiled from official statistics of the U.S. Department of Commerce.

U.S. TRADE BALANCE

During 1990-94, the United States maintained a positive balance of trade in terms of coal, coke, and related chemical products. The positive trade balance has, however, deteriorated from $4.4 billion in 1990 to $2.7 billion in 1994 (table 10), primarily attributed to the decline in exports of coal.

Table 10
Coal, coke, and related chemical products: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries and country groups, 1990-94[1]

(Million dollars)

Item	1990	1991	1992	1993	1994
U.S. exports of domestic merchandise:					
Canada	598	442	600	431	449
Japan	662	572	557	512	434
Italy	539	534	465	330	355
Netherlands	406	434	441	261	229
Brazil	279	342	304	240	236
Korea	255	208	195	196	224
Belgium	391	342	323	231	210
Spain	184	207	207	189	182
United Kingdom	247	288	264	200	162
France	298	386	336	189	150
All other	1,147	1,236	1,031	808	833
Total	5,004	4,990	4,723	3,587	3,464
EU-12	2,352	2,535	2,317	1,525	1,390
OPEC	114	83	48	34	35
ASEAN	12	10	31	31	44
CBERA	18	18	15	6	12
Eastern Europe	130	137	76	84	111
U.S. imports for consumption:					
Canada	242	172	176	180	203
Japan	73	83	156	148	183
Italy	20	2	0	0	6
Netherlands	45	21	24	5	27
Brazil	17	18	11	12	11
Korea	9	13	8	9	14
Belgium	1	2	0	0	6
Spain	12	0	1	3	1
United Kingdom	14	8	6	3	7
France	1	2	4	2	11
All other	150	132	150	243	331
Total	584	453	535	603	799
EU-12	102	45	43	17	63
OPEC	23	23	30	69	91
ASEAN	2	1	13	30	43
CBERA	0	0	0	1	0
Eastern Europe	0	1	1	2	26
U.S. merchandise trade balance:					
Canada	356	270	424	251	246
Japan	589	489	401	364	251
Italy	519	532	465	330	349
Netherlands	361	413	417	256	202
Brazil	262	324	293	228	225
Korea	246	195	187	187	210
Belgium	390	340	323	231	204
Spain	172	207	206	186	181
United Kingdom	233	280	258	197	155
France	297	384	332	187	139
All other	997	1,104	881	565	503
Total	4,420	4,537	4,188	2,984	2,665
EU-12	2,250	2,490	2,274	1,508	1,327
OPEC	91	60	18	-35	-56
ASEAN	10	9	18	1	1
CBERA	18	18	15	5	12
Eastern Europe	130	136	75	82	85

[1] Import values are based on customs value; export values are based on f.a.s. value, U.S. port of export. U.S. trade with East Germany is included in "Germany" but not "Eastern Europe."

Source: Compiled from official statistics of the U.S. Department of Commerce.

APPENDIX A
TARIFF AND TRADE AGREEMENT TERMS

The ***Harmonized Tariff Schedule of the United States*** (HTS) replaced the *Tariff Schedules of the United States* (TSUS) effective January 1, 1989. Chapters 1 through 97 incorporate the internationally adopted Harmonized Commodity Description and Coding System through the 6-digit level of product description and have U.S. product subdivisions at the 8-digit level. Chapters 98 and 99 contain special U.S. classifications and temporary rate provisions, respectively.

Duty rates in the ***general*** subcolumn of HTS column 1 are most-favored-nation (MFN) rates, many of which have been eliminated or are being reduced as concessions resulting from the Uruguay Round of Multilateral Trade Negotiations. Column 1-general duty rates apply to all countries except those enumerated in HTS general note 3(b) (Afghanistan, Azerbaijan, Cuba, Kampuchea, Laos, North Korea, and Vietnam), which are subject to the rates set forth in ***column 2***. Albania, Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, the People's Republic of China, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan are accorded MFN treatment. Specified goods from designated MFN-eligible countries may be eligible for reduced rates of duty or for duty-free entry under one or more preferential tariff programs. Such tariff treatment is set forth in the ***special*** subcolumn of HTS column 1 or in the general notes. If eligibility for special tariff rates is not claimed or established, goods are dutiable at column 1-general rates. The HTS does not enumerate those countries as to which a total or partial embargo has been declared.

The ***Generalized System of Preferences*** (GSP) affords nonreciprocal tariff preferences to developing countries to aid their economic development and to diversify and expand their production and exports. The U.S. GSP, enacted in title V of the Trade Act of 1974 for 10 years and extended three times thereafter, applies to merchandise imported on or after January 1, 1976 and before the close of July 30, 1995. Indicated by the symbol "A" or "A*" in the special subcolumn, the GSP provides duty-free entry to eligible articles the product of and imported directly from designated beneficiary developing countries, as set forth in general note 4 to the HTS.

The ***Caribbean Basin Economic Recovery Act*** (CBERA) affords nonreciprocal tariff preferences to developing countries in the Caribbean Basin area to aid their economic development and to diversify and expand their production and exports. The CBERA, enacted in title II of Public Law 98-67, implemented by Presidential Proclamation 5133 of November 30, 1983, and amended by the Customs and Trade Act of 1990, applies to merchandise entered, or withdrawn from warehouse for consumption, on or after January 1, 1984. Indicated by the symbol "E" or "E*" in the special subcolumn, the CBERA provides duty-free entry to eligible articles, and reduced-duty treatment to certain other articles, which are the product of and imported directly from designated countries, as set forth in general note 7 to the HTS.

Free rates of duty in the special subcolumn followed by the symbol "IL" are applicable to products of Israel under the ***United States-Israel Free Trade Area Implementation Act*** of 1985 (IFTA), as provided in general note 8 to the HTS.

Preferential nonreciprocal duty-free or reduced-duty treatment in the special subcolumn followed by the symbol "J" or "J*" in parentheses is afforded to eligible articles the product of designated beneficiary countries under the ***Andean Trade Preference Act*** (ATPA), enacted as title II of Public Law 102-182 and implemented by Presidential Proclamation 6455 of July 2, 1992 (effective July 22, 1992), as set forth in general note 11 to the HTS.

Preferential or free rates of duty in the special subcolumn followed by the symbol "CA" are applicable to eligible goods of Canada, and those followed by the symbol "MX" are applicable to eligible goods of Mexico, under the ***North American Free Trade Agreement***, as provided in general note 12 to the HTS, implemented effective January 1, 1994 by Presidential Proclamation 6641 of December 15, 1993.

Other special tariff treatment applies to particular ***products of insular possessions*** (general note 3(a)(iv)), goods covered by the ***Automotive Products Trade Act*** (APTA) (general note 5) and the ***Agreement on Trade in Civil Aircraft*** (ATCA) (general note 6), ***articles imported from freely associated states*** (general note 10), ***pharmaceutical products*** (general note 13), and ***intermediate chemicals for dyes*** (general note 14).

The ***General Agreement on Tariffs and Trade 1994*** (GATT 1994), annexed to the Agreement Establishing the World Trade Organization, replaces an earlier agreement (the GATT 1947 [61 Stat. (pt. 5) A58; 8 UST (pt. 2) 1786]) as the

primary multilateral system of disciplines and principles governing international trade. Signatories' obligations under both the 1994 and 1947 agreements focus upon most-favored-nation treatment, the maintenance of scheduled concession rates of duty, and national (nondiscriminatory) treatment for imported products; the GATT also provides the legal framework for customs valuation standards, "escape clause" (emergency) actions, antidumping and countervailing duties, dispute settlement, and other measures. The results of the Uruguay Round of multilateral tariff negotiations are set forth by way of separate schedules of concessions for each participating contracting party, with the U.S. schedule designated as Schedule XX.

Pursuant to the ***Agreement on Textiles and Clothing*** (ATC) of the GATT 1994, member countries are phasing out restrictions on imports under the prior "Arrangement Regarding International Trade in Textiles" (known as the ***Multifiber Arrangement*** (MFA)). Under the MFA, which was a departure from GATT 1947 provisions, importing and exporting countries negotiated bilateral agreements limiting textile and apparel shipments, and importing countries could take unilateral action in the absence or violation of an agreement. Quantitative limits had been established on imported textiles and apparel of cotton, other vegetable fibers, wool, man-made fibers or silk blends in an effort to prevent or limit market disruption in the importing countries. The ATC establishes notification and safeguard procedures, along with other rules concerning the customs treatment of textile and apparel shipments, and calls for the eventual complete integration of this sector into the GATT 1994 over a ten-year period, or by Jan. 1, 2005.