5. PRODUCTION, IMPORT/EXPORT, USE, AND DISPOSAL

5.1 PRODUCTION

No information is available in the TRI database on facilities that manufacture or process JP-5, JP-8, and Jet A fuels because these chemicals are not required to be reported under Section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986) (EPA 2005).

As discussed in Chapter 4, most jet fuels are derived from petroleum. During the 1970s and 1980s, shale oil had been used to manufacture jet fuels, but this is no longer economically feasible (Chevron 2006). Figure 4-1 provides a general schematic for the straight-run production of jet fuels from crude oil. Heated crude oil is introduced into an atmospheric pressure distillation unit and the liquefied petroleum gasses (propane and butane) are boiled off from the top of the distillation column and eventually recondensed by a condenser unit. Middle distillates such as kerosene and diesel are drawn off the distillation column and treated by various processes that remove or reduce undesirable components before becoming jet fuels (API 2010b; Chevron 2006). The sweetening process removes corrosive mercaptans from the kerosene fraction by the mercapton oxidation (Merox) process in which mercaptans are converted to disulfides using a catalyst and an alkaline solution. The disulfides are noncorrosive and may be left in the final product or removed by additional treatment to lower the sulfur content of the resultant jet fuel. Hydroprocessing employs hydrogen and an appropriate catalyst to remove olefins, sulfur, and nitrogen-containing compounds from the distilled kerosene. Jet fuel manufactured by a particular refinery may be derived exclusively from straight-run processing or it may be a blend of straight-run, hydroprocessed, and/or hydrocracked product (as depicted in Figure 4-1); however, the finished product must meet all of the performance and regulatory requirements of the specific fuel as discussed in Chapter 4.

Concern that diminishing oil supplies could disrupt production of jet fuels from traditional petroleum sources has prompted research into alternative production methods. The Fischer-Tropsch process has been used to develop synthetic jet fuels from feedstocks other than petroleum (Chevron 2006; FAA 2009). In this process, Syngas (synthesis gas), a mixture of carbon monoxide and hydrogen, is reacted with catalysts to produce a variety of hydrocarbons. These hydrocarbons are then blended to produce a highly paraffinic synthetic jet fuel that contains virtually no sulfur, nitrogen, or aromatic compounds. The benefits and disadvantages of producing jet fuels using the Fischer-Tropsch process and other methods compared to traditional manufacturing methods using petroleum feedstock have been reviewed in a

technical report produced by the Rand Corporation and the Massachusetts Institute of Technology (MIT) (FAA 2009).

Domestic production, import, and export data for kerosene is summarized in Tables 5-1 and 5-2. These data were derived from the EPA Inventory Update Reporting (IUR) system (EPA 2010) and the newly developed Chemical Data Reporting (CDR) database (EPA 2012a). According to the CDR website (http://www.epa.gov/oppt/cdr/), approximately $2.07x10^{11}$ pounds (93,725,241 tonnes) of kerosene was manufactured in 2012; however, several companies claimed this information as confidential business information (CBI) and therefore, the actual production volume is expected to be greater than what is indicated in Table 5-1 (EPA 2012a).

While the demand for kerosene has gradually declined over the previous 4 decades, demand for jet fuels has steadily increased. As a result, many refiners have chosen to produce Jet A-1 as their basic product and to simply divert a portion of the product for marketing as kerosene (IARC 1989). In the United States, production of jet fuels, including both kerosene-type (JP-5 and JP-8) and wide-cut fuels, increased from 37,636,000 tonnes (293,560,800 barrels) in 1970 to 56,939,000 tonnes (444,124,200 barrels) in 1985 (IARC 1989). In the countries of the Organisation for Economic Cooperation and Development (OECD), production increased from 57,659,000 tonnes (449,740,200 barrels) to 90,280,000 tonnes (704,184,000 barrels) during the same time period (IARC 1989). According to the Department of Energy, the consumption of jet fuels in the United States in 2010 and 2011 was 1.43 and 1.42 million barrels per day, respectively, for an annual consumption rate of 521,950,000 barrels consumed in 2010 and 518,300,000 barrels consumed in 2011 (EIA 2013c). The consumption rate is projected to increase to 1.52 million barrels per day (554,800,000 barrels annually) by 2020, 1.60 million barrels per day (584,000,000 barrels annually) by 2030, and 1.66 million barrels per day (605,900,000 barrels annually) by 2040 (EIA 2013c).

Data regarding the weekly production of jet fuels by U.S. refineries since 2010 are provided in Tables 5-3 (commercial jet fuels) and 5-4 (military jet fuels) from the U.S. Energy Information Administration (EIA 2014a).

5.2 IMPORT/EXPORT

Imports of distillate fuels have varied from year to year since the 1970s. Since 1975, imports of distillate jet fuels such as jet fuel no. 1 into the United States have been low compared to the amount of distillate jet fuels produced in the United States (API 1991). Imports of kerosene fluctuated between 1975 and 1984

Table 5-1. Domestic Production, Import, and Export Volumes of Kerosene in 2012[a]

Domestic manufacturing (pounds)	Imported (pounds)	Volume used	Volume exported	Parent company name	Parent company city
2,400,000,000		0	0	Sunoco, Inc.	Philadelphia
109,000,000,000		109,000,000,000	0	Sunoco, Inc.	Philadelphia
2,530,000,000		0	0	ConocoPhillips Co.	Linden
3,739,372,000		0	0	Motiva Enterprises LLC	Houston
1,055,839,514		1,055,839,514	0	Equilon Enterprises LLC	Houston
2,946,370,260		2,946,370,260	0	Shell Deer Park Refining Limited Partnership	Deer Park
6,442,919,000		0	0	Motiva Enterprises LLC	Houston
	2,945,948,325	N/A	0	Shell Trading US Co.	Houston
1,185,666,446		1,185,666,446	0	Shell Chemical Company LP	Houston
5,537,432,425		0	0	Motiva Enterprise LLC	Houston
389,977,246		389,977,246	0	Hunt Consolidated, Inc.	Dallas
CBI	CBI	CBI	CBI	CBI	CBI
1,600,000,000		400,000,000	0	Western Refining Southwest, Inc.	El Paso
	490,030,931	N/A	0	Citgo Petroleum Corporation	Houston
	141,484	N/A	0	Equilon Enterprises LLC DBA Shell Oil	Houston
66,697,537		0	0	Calumet Specialty Products Partners LP	Princeton
405,477,132		0	0	Calumet Specialty Products Partners LP	Shreveport
25,920,768		0	0	Calumet Specialty Products Partners LP	Indianapolis
66,000,000		62,000,000	0	Citgo Petroleum Corporation	Lemont
2,691,000,000		2,691,000,000	0	Marathon Oil Corporation	Findlay
620,000,000		0	0	ConocoPhillips Co.	Houston
42,000,000		42,000,000	0	Calumet Specialty Products Partners LP	Indianapolis
857,000,000		0	0	Alon USA LP	Dallas
	105,362	105,362	0	United Refining Co.	Warren
CBI	CBI	CBI	CBI	Lyondell Chemical Co.	Houston
2,213,000,000		1,223,000,000	0	Marathon Oil Corporation	Findlay
126,000,000		126,000,000	0	Murphy Oil USA, Inc.	El Dorado
696,175,997		696,175,997	0	PPB Energy	Parsippany
1,511,255,360		1,511,255,360	0	Total Petrochemicals and Refining USA, Inc.	Houston
CBI		CBI	CBI	Exxon Mobil Corporation	Irving
2,698,292		2,698,292	0	Solvchem, Inc.	Pearland
CBI		CBI	CBI	BASF Corporation	Florham Park
2,830,000,000		2,830,000,000	0	Marathon Oil Corporation	Findlay
97,754,939		97,754,939	0	ConocoPhillips Co.	Anchorage
2,000,000,000		2,000,000,000	0	ConocoPhillips Co.	Ferndale
CBI		CBI	CBI	Koch Industries, Inc.	Wichita

Table 5-1. Domestic Production, Import, and Export Volumes of Kerosene in 2012[a]

Domestic manufacturing (pounds)	Imported (pounds)	Volume used	Volume exported	Parent company name	Parent company city
1,500,000,000		0	0	Tesoro Corporation	Kapolei
CBI		CBI	CBI	Exxon Mobil Corporation	Irving
CBI		CBI	CBI	Chalmette Refining LLC	Chalmette
	200,000,000	N/A	0	Chevron Corporation	Houston
CBI		CBI	CBI	Exxon Mobil Corporation	Irving
2,400,000,000		2,400,000,000	0	Chevron Corporation	San Ramon
71,298,667		0	0	Nustar Energy LP	Brooks City-Base
1,359,000,000		1,359,000,000	0	Marathon Oil Corporation	Findlay
410,000,000		77,000,000	0	Tesoro Corporation	Mandan
1,500,000,000		590,000,000	910,000,000	Petrobras America, Inc.	Pasadena
1,313,155,341		1,313,155,341	0	Valero Services, Inc.	San Antonio
549,000,000		549,000,000	0	Marathon Oil Corporation	Findlay
CBI	CBI	CBI	CBI	Innospec, Inc.	Littleton
	1	N/A	0	ConocoPhillips Co.	Houston
	CBI	N/A	0	Ethyl Corporation	Richmond
940,000,000		0	0	Tesoro Corporation	Wilmington
	330,000,000	N/A	0	Tesoro Corporation	San Antonio
CBI		CBI	0	Exxon Mobil Corporation	Irving
2,809,664,659		2,809,664,659	0	Citgo Petroleum Corporation	Corpus Christi
540,000,000		540,000,000	0	Hollyfrontier Corporation	Dallas
CBI	CBI	CBI	CBI	Valero Energy Corporation	San Antonio
1,600,000,000		1,600,000,000	0	Hollyfrontier Corporation	Dallas
CBI	CBI	CBI	CBI	Valero Energy Corporation	San Antonio
CBI		CBI	0	Alon USA LP	Paramount
CBI	CBI	CBI	CBI	Valero Energy Corporation	Texas City
40,000,000		0	0	Marathon Oil Corporation	Findlay
1,300,000,000		1,300,000,000	0	ConocoPhillips Co.	Houston
CBI	CBI	CBI	CBI	BP Products North America, Inc.	Naperville
1,200,000,000		1,200,000,000	0	Tesoro Corporation	San Antonio
575,862,000		0	72,413,000	Astra West Coast Refining, Inc.	Huntington Beach
1,300,000,000		129,930,445	0	Tesoro Corporation	Kenai
870,000,000		660,000,000	0	Tesoro Corporation	San Antonio
CBI		CBI	CBI	Koch Industries Inc.	Wichita
2,539,212,856		2,539,212,856	0	PBF Energy	Paulsboro
	CBI	N/A	CBI	Dorf Ketal Chemicals LLC	Stafford
1,700,000,000		1,700,000,000	0	ConocoPhillips Co.	Houston
720,000,000		718,496,972	0	Delek Us Holdings Inc.	Brentwood
1,356,000,000		1,356,000,000	0	Husky Energy, Inc.	Wilmington
CBI	CBI	CBI	0	Ocean Investments Corp.	Portsmouth
CBI	CBI	CBI	CBI	Premcor Refining Group	San Antonio

Table 5-1. Domestic Production, Import, and Export Volumes of Kerosene in 2012[a]

Domestic manufacturing (pounds)	Imported (pounds)	Volume used	Volume exported	Parent company name	Parent company city
130,000,000		130,000,000	0	Hollyfrontier Corporation	Dallas
CBI	CBI	CBI	CBI	Valero Services, Inc.	San Antonio
998,799,401		0	0	Suncor Energy USA, Inc.	Commerce City
5,100,000,000		0	0	ConocoPhillips Co.	Houston
500,000,000		500,000,000	0	Countrymark	Indianapolis
220,000,000		0	0	Gary-Williams Energy Corporation	Wynnewood
CBI	CBI	CBI	CBI	Hovensa LLC	Christiansted
	CBI	N/A	0	3M Co.	St. Paul
267,994,032		267,994,032	0	Alon USA LP	Dallas
1,100,000,000		0	0	Hollyfrontier Corporation	Dallas
320,000,000		220,000,000	0	Hollyfrontier Corporation	Dallas
CBI	CBI	CBI	CBI	Casey Co.	Long Beach
770,000,000		9,500,000	0	Tesoro Corporation	Salt Lake City
	45,420,783	N/A	0	Lukoil Pan Americas LLC	New York
CBI	CBI	CBI	CBI	The Premcor Refining Group, Inc.	Memphis
2,464,937,141		2,464,937,141	0	PBF Energy	Oregon
6,332,180,492	1,440,978	6,333,621,470	0	Citgo Petroleum Corporation	Houston
1,925,000,000		1,925,000,000	0	Murphy Oil USA, Inc.	El Dorado
66,000,000		36,000,000	0	Hollyfrontier Corporation	Dallas
930,000,000		930,000,000	0	ConocoPhillips Co.	Houston
19,000,000		18,000,000	0	American Refining Group	Bradford
CBI	CBI	CBI	CBI	Valero Services, Inc.	Corpus Christi
CBI	CBI	CBI	CBI	Sinclair Oil Corporation	Salt Lake City
CBI	CBI	CBI	CBI	CBI	CBI
100,000,000		100,000,000	0	Montana Refining Co.	Great Falls
927,477,168		0	0	Transworld Oil	Lake Charles
CBI	CBI	CBI	CBI	CBI	CBI
3,082,443,279		805,012,637	2,277,430,642	ConocoPhillips Co.	Houston
145,475,223		0	0	CVR Refining, LLC	Coffeyville
390,000,000		390,000,000	0	Western Refining Southwest, Inc.	Gallup
120,000,000		120,000,000	0	WRB Refining LP	Houston
162,100,000		0	162,100,000	Black Elk Refining, LLC	Houston
CBI	CBI	CBI	CBI	Valero Ultramar Holdings, Inc.	Ardmore
841,000,000		841,000,000	0	Northern Tier Energy LLC	Ridgefield
CBI	CBI	CBI	CBI	Valero Energy Corporation	San Antonio
1,600,000,000		1600,000,000	0	National Cooperative Refinery Association	McPherson
CBI		CBI	CBI	Exxon Mobil Corporation	Irving
CBI	CBI	CBI	CBI	CBI	CBI

Table 5-1. Domestic Production, Import, and Export Volumes of Kerosene in 2012[a]

Domestic manufacturing (pounds)	Imported (pounds)	Volume used	Volume exported	Parent company name	Parent company city
CBI	CBI	CBI	CBI	Valero Energy Corporation	San Antonio
480,000,000		240,000,000	0	CHS, Inc.	Inver Grove Heights

[a]Data obtained from the EPA Chemical Data Reporting database (EPA 2012a).

CBI = confidential business information

Table 5-2. Non-confidential 2006 Inventory Update Reporting Records by Chemical, Including Manufacturing, Processing, and Use Information for Kerosene (Petroleum); CAS Registry No. 8008-20-6; Aggregated National Production Volume: ≥1 Billion Pounds

Company and site information						
Company	Site	City	State[a]	Manufacture	Import	Site limited
AGE Refining, Inc.	San Antonio	San Antonio	TX	Yes	No	Yes
Alon USA LP	Big Spring Refinery	Big Spring	TX	Yes	No	Yes
American Refining Group, Inc.	American Refining Group, Inc.	Bradford	PA	Yes	No	No
BP America, Inc.	BP, Prudhoe Bay Crude Oil Topping Plant	Prudhoe Bay	AK	Yes	No	No
BP America, Inc.	Los Angeles (Carson) Refinery	Carson	CA	Yes	No	No
BP America, Inc.	Texas City Refinery	Texas City	TX	Yes	No	No
BP America, Inc.	BP Products North America Inc., IST	Warrenville	IL	No	Yes	N/A
BP America, Inc.	Whiting Refinery	Whiting	IN	Yes	No	No
BP America, Inc.	Toledo Refinery	Oregon	OH	Yes	No	No
Big West Oil, LLC	North Salt Lake Refinery	North Salt Lake	UT			
CHS, Inc.	Laurel Refinery	Laurel	MT	Yes	No	No
CITGO Petroleum Corporation	Corporate Office	Houston	TX	No	Yes	N/A
CITGO Petroleum Corporation	CITGO Refining and Chemicals Company East Plant	Corpus Christi	TX	Yes	No	No
CITGO Petroleum Corporation	PDV Midwest Refining, L.L.C., Lemont Refinery (operated by CITGO Petroleum Corporation)	Lemont	IL	Yes	No	No
CITGO Petroleum Corporation	Port Everglades Terminal	Fort Lauderdale	FL	No	Yes	N/A
CITGO Petroleum Corporation	Tampa Terminal	Tampa	FL	No	Yes	N/A
CITGO Petroleum Corporation	Lake Charles Manufacturing Complex	Lake Charles	LA	Yes	No	Yes
CITGO Petroleum Corporation	Linden Terminal	Linden	NJ	No	Yes	N/A

Table 5-2. Non-confidential 2006 Inventory Update Reporting Records by Chemical, Including Manufacturing, Processing, and Use Information for Kerosene (Petroleum); CAS Registry No. 8008-20-6; Aggregated National Production Volume: ≥1 Billion Pounds

Company and site information						
Company	Site	City	State[a]	Manufacture	Import	Site limited
Calumet Lubricants Co., L.P.	Shreveport Refinery	Shreveport	LA	Yes	No	No
Calumet Lubricants Co., L.P.	Princeton Refinery	Princeton	LA	Yes	No	Yes
Calumet Lubricants Co., L.P.	Cotton Valley Refinery	Cotton Valley	LA	Yes	No	Yes
Chalmette Refining LLC	Chalmette Refining LLC	Chalmette	LA	Yes	No	No
Chevron U.S.A., Inc.	Global Supply and Trading	Houston	TX	No	Yes	N/A
Chevron U.S.A., Inc.	El Segundo	El Segundo	CA	Yes	No	Yes
Coffeyville Resources Refining and Marketing, LLC	Coffeyville Resources Refining and Marketing, LLC	Coffeyville	KS	Yes	No	No
ConocoPhillips Company	Ferndale Refinery	Ferndale	WA	Yes	No	Yes
ConocoPhillips Company	Kaparuk River Unit	Anchorage	AK	Yes	No	No
ConocoPhillips Company	Kaparuk River Unit	Anchorage	AK	Yes	No	Yes
ConocoPhillips Company	Los Angeles Refinery Carson Plant	Carson	CA	Yes	No	No
ConocoPhillips Company	Ponca City Refinery	Ponca City	OK	Yes	No	No
ConocoPhillips Company	Sweeny Refinery	Old Ocean	TX	Yes	No	No
ConocoPhillips Company	Lake Charles Refinery	Westlake	LA	Yes	No	No
ConocoPhillips Company	Ferndale Refinery	Ferndale	WA	Yes	No	No
ConocoPhillips Company	Borger Refinery	Borger	TX	Yes	No	No
ConocoPhillips Company	Bayway Refinery	Linden	NJ	Yes	No	No
ConocoPhillips Company	Alliance Refinery	Belle Chasse	LA	Yes	No	No
Countrymark Cooperative, LLP	Refinery	Mt. Vernon	IN	Yes	No	Yes
Diamond Shamrock Refining Co., L.P.	Valero Three Rivers Refinery	Three Rivers	TX	Yes	No	No

Table 5-2. Non-confidential 2006 Inventory Update Reporting Records by Chemical, Including Manufacturing, Processing, and Use Information for Kerosene (Petroleum); CAS Registry No. 8008-20-6; Aggregated National Production Volume: ≥1 Billion Pounds

Company and site information						
Company	Site	City	State[a]	Manufacture	Import	Site limited
Ethyl Corporation	Houston Plant	Pasadena	TX			
Exxon Mobil Corporation	Baton Rouge Refinery	Baton Rouge	LA	Yes	No	No
Exxon Mobil Corporation	Baytown Refinery	Baytown	TX	Yes	No	No
Exxon Mobil Corporation	Billings Refinery	Billings	MT	Yes	No	Yes
ExxonMobil Oil Corporation	Fairfax	Fairfax	VA	No	Yes	N/A
ExxonMobil Oil Corporation	Torrance Refinery	Torrance	CA	Yes	No	No
ExxonMobil Oil Corporation	Beaumont Refinery	Beaumont	TX	Yes	No	No
ExxonMobil Oil Corporation	Joliet Refinery	Channahon	IL	Yes	No	Yes
Flint Hills Resources, Alaska LLC	North Pole Refinery	North Pole	AK	Yes	No	No
Flint Hills Resources, LP	East Plant	Corpus Christi	TX	Yes	No	No
Flint Hills Resources, LP	West Plant	Corpus Christi	TX	Yes	No	No
Frontier El Dorado Refining Company	Frontier El Dorado Refining Company	El Dorado	KS	Yes	No	No
Giant Refining Company	Ciniza	Jamestown	NM	Yes	No	No
Giant Yorktown, Inc.	Refinery	Grafton	VA	Yes	No	No
Glencore Ltd.	Glencore Ltd.	Stamford	CT			
Holly Refining & Marketing Company	Woods Cross Refinery	Woods Cross	UT	Yes	No	No
Hunt Refining Company	Tuscaloosa Refinery	Tuscaloosa	AL	Yes	No	Yes
Irving Oil, Inc.	Irving Oil Terminals Inc. - PADD 1	Portsmouth	NH			
Marathon Oil Corporation	Catlettsburg Refining, LLC	Catlettsburg	KY	Yes	No	No
Marathon Oil Corporation	Garyville	Garyville	LA	Yes	No	No
Marathon Petroleum Company LLC	Minnesota Refining Division	St. Paul Park	MN	Yes	No	No

Table 5-2. Non-confidential 2006 Inventory Update Reporting Records by Chemical, Including Manufacturing, Processing, and Use Information for Kerosene (Petroleum); CAS Registry No. 8008-20-6; Aggregated National Production Volume: ≥1 Billion Pounds

Company and site information						
Company	Site	City	State[a]	Manufacture	Import	Site limited
Marathon Petroleum Company LLC	Michigan Refining Division	Detroit	MI	Yes	No	Yes
Marathon Petroleum Company LLC	Texas Refining Division	Texas City	TX	Yes	No	No
Midland Asphalt Materials Inc.	Tonawanda	Tonawanda	NY	Yes	No	No
Motiva Enterprises, LLC	Port Arthur Refinery	Port Arthur	TX	Yes	No	No
Motiva Enterprises, LLC	Convent Refinery	Convent	LA	Yes	No	No
Motiva Enterprises, LLC	Norco Refinery	Norco	LA	Yes	No	No
Murphy Oil Corporation	Meraux Refinery	Meraux	LA	Yes	No	No
Murphy Oil USA, Inc.	Superior Refinery	Superior	WI	Yes	No	No
Navajo Refining Company, L.P.	Lovington Refinery	Lovington	NM	Yes	No	No
Navajo Refining Company, L.P.	Artesia Refinery	Artesia	NM	Yes	No	No
Paramount Petroleum Corporation	Paramount	Paramount	CA	Yes	No	No
Paramount Petroleum Corporation	Wilibridge Asphalt Facility	Portland	OR	Yes	No	No
Penreco	Karns City	Karns City	PA	Yes	No	No
Premcor USA Inc.	The Premcor Refining Group Inc. DBA Valero Memphis Refinery	Memphis	TN	Yes	No	No
Premcor USA Inc.	Port Arthur Refinery	Port Arthur	TX	Yes	No	No
Safety-Kleen Systems, Inc.	Safety-Kleen Oil Recovery Co.	East Chicago	IN	Yes	No	No
San Juan Refining Company	Giant Refining, Bloomfield	Bloomfield	NM	Yes	No	No
Shell Chemical LP	Mobile Site	Saraland	AL	Yes	No	No
Shell Chemical LP	St. Rose Site	St. Rose	LA	Yes	No	No
Shell Chemical LP	Yabucoa, Inc.	Yabucoa	PR	Yes	No	No
Shell Deer Park Refining Company	Shell Deer Park Refining Company	Deer Park	TX	Yes	No	No

Table 5-2. Non-confidential 2006 Inventory Update Reporting Records by Chemical, Including Manufacturing, Processing, and Use Information for Kerosene (Petroleum); CAS Registry No. 8008-20-6; Aggregated National Production Volume: ≥1 Billion Pounds

Company and site information						
Company	Site	City	State[a]	Manufacture	Import	Site limited
Shell Oil Products US	Los Angeles Refinery	Los Angeles	CA	Yes	No	No
Shell Oil Products US	Puget Sound Refinery	Anacortes	WA	Yes	No	No
Shell Trading (US) Company	Main office	Houston	TX	No	Yes	N/A
Sigmor Corporation	Diamond Shamrock Refining, L.P., Valero McKee Refinery	Sunray	TX	Yes	No	No
Sinclair Refining Company	Casper Refinery	Casper	WY	Yes	No	Yes
Sinclair Refining Company	Tulsa Refining Company	Tulsa	OK	Yes	No	No
Sinclair Wyoming Refining Company	Sinclair Wyoming Refining Company	Sinclair	WY	Yes	No	No
Suncor Energy (U.S.A.) Inc.	Commerce City Refinery	Commerce City	CO	Yes	No	No
Sunoco, Inc.	Tulsa Refinery	Tulsa	OK	Yes	No	No
Tesoro Corporation	Tesoro Alaska Company - Kenai Refinery	Kenai	AK	Yes	No	No
Tesoro Petroleum Corporation	Hawaii Refinery	Kapolei	HI	Yes	No	No
Tesoro Refining and Marketing Company	Anacortes	Anacortes	WA	Yes	No	No
Tesoro Refining and Marketing Company	Golden Eagle Refinery	Martinez	CA	Yes	No	Yes
Tesoro Refining and Marketing Company	Mandan Refinery	Mandan	ND	Yes	No	No
Tesoro Refining and Marketing Company	Salt Lake City Refinery	Salt Lake City	UT	Yes	No	No
Texaco Downstream LLC	Fuel and Marine Marketing LLC	San Ramon	CA	No	Yes	N/A
The Dow Chemical Company	Headquarters	Midland	MI	No	Yes	N/A
Tremco Incorporated	Beachwood	Beachwood	OH	No	Yes	N/A
U.S. Oil and Refining Co.	Tacoma	Tacoma	WA	Yes	No	No

Table 5-2. Non-confidential 2006 Inventory Update Reporting Records by Chemical, Including Manufacturing, Processing, and Use Information for Kerosene (Petroleum); CAS Registry No. 8008-20-6; Aggregated National Production Volume: ≥1 Billion Pounds

Company and site information						
Company	Site	City	State[a]	Manufacture	Import	Site limited
Valero Energy Corporation	Premcor Refining Group Inc.	Delaware City	DE	Yes	No	Yes
Valero Refining Company	Valero Marketing and Supply Company	San Antonio	TX	No	Yes	N/A
Valero Refining Company	Paulsboro Refinery	Paulsboro	NJ	Yes	No	No
Valero Refining Company	Benicia Refinery and Asphalt Plant	Benicia	CA	Yes	No	Yes
Valero Refining Company	Wilmington	Wilmington	CA	Yes	No	Yes
Valero Refining Company	St. Charles Refinery	Norco	LA	Yes	No	No
Valero Unit Investments, LLC	Houston Refinery	Houston	TX	Yes	No	No
Valero Unit Investments, LLC	Texas City Refinery	Texas City	TX	Yes	No	No
Western Refining Company	Western Refining Company	El Paso	TX	Yes	No	No
Wynnewood Refining Company	Wynnewood Refining Company	Wynnewood	OK	Yes	No	No
Wyoming Refining Company	Newcastle Refinery	Newcastle	WY	Yes	No	Yes

[a]Post Office abbreviations used.

CAS = Chemical Abstracts Service; N/A = not applicable

Source: EPA 2010

Table 5-3. Weekly U.S. Production of Commercial Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2010[a]

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2010-January	01/01	1,335	01/08	1,354	01/15	1,334	01/22	1,264	01/29	1,215
2010-February	02/05	1,157	02/12	1,134	02/19	1,159	02/26	1,141		
2010-March	03/05	1,160	03/12	1,171	03/19	1,147	03/26	1,170		
2010-April	04/02	1,190	04/09	1,209	04/16	1,244	04/23	1,289	04/30	1,319
2010-May	05/07	1,328	05/14	1,342	05/21	1,323	05/28	1,296		
2010-June	06/04	1,290	06/11	1,280	06/18	1,279	06/25	1,291		
2010-July	07/02	1,329	07/09	1,353	07/16	1,381	07/23	1,399	07/30	1,382
2010-August	08/06	1,357	08/13	1,339	08/20	1,308	08/27	1,287		
2010-September	09/03	1,285	09/10	1,281	09/17	1,299	09/24	1,282		
2010-October	10/01	1,269	10/08	1,251	10/15	1,223	10/22	1,219	10/29	1,216
2010-November	11/05	1,199	11/12	1,217	11/19	1,249	11/26	1,248		
2010-December	12/03	1,280	12/10	1,270	12/17	1,266	12/24	1,278	12/31	1,287
2011-January	01/07	1,313	01/14	1,297	01/21	1,288	01/28	1,270		
2011-February	02/04	1,243	02/11	1,215	02/18	1,225	02/25	1,217		
2011-March	03/04	1,223	03/11	1,255	03/18	1,243	03/25	1,262		
2011-April	04/01	1,272	04/08	1,277	04/15	1,293	04/22	1,270	04/29	1,272
2011-May	05/06	1,253	05/13	1,250	05/20	1,278	05/27	1,288		
2011-June	06/03	1,331	06/10	1,347	06/17	1,363	06/24	1,396		
2011-July	07/01	1,381	07/08	1,400	07/15	1,415	07/22	1,394	07/29	1,413
2011-August	08/05	1,389	08/12	1,363	08/19	1,346	08/26	1,362		
2011-September	09/02	1,381	09/09	1,389	09/16	1,415	09/23	1,401	09/30	1,419
2011-October	10/07	1,417	10/14	1,372	10/21	1,342	10/28	1,282		
2011-November	11/04	1,238	11/11	1,228	11/18	1,223	11/25	1,217		
2011-December	12/02	1,250	12/09	1,276	12/16	1,290	12/23	1,309	12/30	1,293
2012-January	01/06	1,310	01/13	1,311	01/20	1,324	01/27	1,319		
2012-February	02/03	1,302	02/10	1,292	02/17	1,296	02/24	1,307		
2012-March	03/02	1,293	03/09	1,279	03/16	1,265	03/23	1,247	03/30	1,257
2012-April	04/06	1,271	04/13	1,263	04/20	1,292	04/27	1,291		
2012-May	05/04	1,280	05/11	1,280	05/18	1,270	05/25	1,280		
2012-June	06/01	1,339	06/08	1,378	06/15	1,425	06/22	1,456	06/29	1,456
2012-July	07/06	1,485	07/13	1,460	07/20	1,447	07/27	1,471		
2012-August	08/03	1,486	08/10	1,502	08/17	1,528	08/24	1,504	08/31	1,448
2012-September	09/07	1,404	09/14	1,367	09/21	1,339	09/28	1,357		
2012-October	10/05	1,358	10/12	1,340	10/19	1,326	10/26	1,313		
2012-November	11/02	1,319	11/09	1,302	11/16	1,297	11/23	1,260	11/30	1,244
2012-December	12/07	1,290	12/14	1,308	12/21	1,339	12/28	1,378		
2013-January	01/04	1,374	01/11	1,381	01/18	1,357	01/25	1,318		
2013-February	02/01	1,299	02/08	1,290	02/15	1,302	02/22	1,305		

Table 5-3. Weekly U.S. Production of Commercial Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2010[a]

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2013-March	03/01	1,312	03/08	1,293	03/15	1,300	03/22	1,347	03/29	1,387
2013-April	04/05	1,423	04/12	1,443	04/19	1,429	04/26	1,389		
2013-May	05/03	1,405	05/10	1,408	05/17	1,373	05/24	1,370	05/31	1,350
2013-June	06/07	1,344	06/14	1,385	06/21	1,416	06/28	1,437		
2013-July	07/05	1,461	07/12	1,460	07/19	1,470	07/26	1,479		
2013-August	08/02	1,482	08/09	1,475	08/16	1,478	08/23	1,475	08/30	1,483
2013-September	09/06	1,516	09/13	1,512	09/20	1,489	09/27	1,451		
2013-October	10/04	1,405	10/11	1,371	10/18	1,364	10/25	1,362		
2013-November	11/01	1,368	11/08	1,380	11/15	1,374	11/22	1,385	11/29	1,401
2013-December	12/06	1,436	12/13	1,475	12/20	1,501	12/27	1,527		
2014-January	01/03	1,543	01/10	1,527	01/17	1,495	01/24	1,444	01/31	1,384
2014-February	02/07	1,375	02/14	1,360	02/21	1,369	02/28	1,384		
2014-March	03/07	1,375	03/14	1,365	03/21	1,362	03/28	1,361		
2014-April	04/04	1,378	04/11	1,395	04/18	1,404	04/25	1,418		
2014-May	05/02	1,416	05/09	1,430	05/16	1,429	05/23	1,413	05/30	1,419
2014-June	06/06	1,417	06/13	1,440	06/20	1,433	06/27	1,419		
2014-July	07/04	1,440	07/11	1,457	07/18	1,510		1,548		

[a]Data obtained from EIA (2014a).

Table 5-4. Weekly U.S. Production of Military Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2010[a]

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2010-January	01/01	128	01/08	105	01/15	109	01/22	134	01/29	148
2010-February	02/05	154	02/12	153	02/19	128	02/26	137		
2010-March	03/05	127	03/12	139	03/19	161	03/26	157		
2010-April	04/02	175	04/09	162	04/16	152	04/23	148	04/30	142
2010-May	05/07	144	05/14	136	05/21	143	05/28	147		
2010-June	06/04	142	06/11	147	06/18	143	06/25	142		
2010-July	07/02	149	07/09	143	07/16	151	07/23	153	07/30	153
2010-August	08/06	153	08/13	138	08/20	140	08/27	141		
2010-September	09/03	147	09/10	161	09/17	144	09/24	132		
2010-October	10/01	124	10/08	108	10/15	105	10/22	118	10/29	109
2010-November	11/05	123	11/12	125	11/19	111	11/26	116		
2010-December	12/03	100	12/10	112	12/17	116	12/24	126	12/31	121
2011-January	01/07	117	01/14	107	01/21	102	01/28	114		
2011-February	02/04	113	02/11	122	02/18	116	02/25	110		
2011-March	03/04	118	03/11	121	03/18	139	03/25	154		
2011-April	04/01	147	04/08	159	04/15	147	04/22	135	04/29	146
2011-May	05/06	144	05/13	140	05/20	138	05/27	131		
2011-June	06/03	126	06/10	137	06/17	142	06/24	135		
2011-July	07/01	148	07/08	143	07/15	149	07/22	160	07/29	137
2011-August	08/05	147	08/12	149	08/19	163	08/26	165		
2011-September	09/02	165	09/09	151	09/16	135	09/23	139	09/30	134
2011-October	10/07	136	10/14	132	10/21	134	10/28	136		
2011-November	11/04	136	11/11	135	11/18	132	11/25	133		
2011-December	12/02	129	12/09	128	12/16	127	12/23	122	12/30	134
2012-January	01/06	130	01/13	129	01/20	125	01/27	118		
2012-February	02/03	110	02/10	110	02/17	103	02/24	98		
2012-March	03/02	103	03/09	106	03/16	102	03/23	118	03/30	129
2012-April	04/06	125	04/13	139	04/20	122	04/27	123		
2012-May	05/04	133	05/11	119	05/18	128	05/25	128		
2012-June	06/01	128	06/08	149	06/15	141	06/22	137	06/29	124
2012-July	07/06	121	07/13	139	07/20	132	07/27	140		
2012-August	08/03	127	08/10	126	08/17	126	08/24	115	08/31	113
2012-September	09/07	110	09/14	120	09/21	130	09/28	131		
2012-October	10/05	131	10/12	132	10/19	142	10/26	142		
2012-November	11/02	134	11/09	135	11/16	117	11/23	117	11/30	134
2012-December	12/07	123	12/14	134	12/21	134	12/28	117		
2013-January	01/04	125	01/11	125	01/18	130	01/25	134		
2013-February	02/01	123	02/08	112	02/15	115	02/22	112		

Table 5-4. Weekly U.S. Production of Military Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2010[a]

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2013-March	03/01	108	03/08	110	03/15	92	03/22	81	03/29	82
2013-April	04/05	86	04/12	87	04/19	93	04/26	112		
2013-May	05/03	113	05/10	118	05/17	139	05/24	136	05/31	134
2013-June	06/07	138	06/14	117	06/21	103	06/28	105		
2013-July	07/05	108	07/12	109	07/19	109	07/26	98		
2013-August	08/02	89	08/09	99	08/16	101	08/23	104	08/30	116
2013-September	09/06	104	09/13	105	09/20	108	09/27	103		
2013-October	10/04	106	10/11	102	10/18	93	10/25	81		
2013-November	11/01	81	11/08	89	11/15	94	11/22	98	11/29	102
2013-December	12/06	98	12/13	96	12/20	98	12/27	93		
2014-January	01/03	89	01/10	89	01/17	91	01/24	99	01/31	97
2014-February	02/07	96	02/14	92	02/21	85	02/28	89		
2014-March	03/07	97	03/14	100	03/21	98	03/28	95		
2014-April	04/04	89	04/11	90	04/18	88	04/25	86		
2014-May	05/02	87	05/09	88	05/16	90	05/23	98	05/30	94
2014-June	06/06	82	06/13	82	06/20	81	06/27	91		
2014-July	07/04	100	07/11	99	07/18	94		99		

[a]Data obtained from EIA (2014b).

and then showed a steady increase from 1985 to 1987, attaining an annual maximum of 6,935,000 barrels in 1987. Between 1988 and 1990, imports of kerosene decreased to a low of 1,825,000 barrels (API 1991). Table 5-1 shows that approximately 2,399,093 tonnes of kerosene (18,712,925 barrels) were imported into the United States in 2012; however, several companies claimed these data as CBI and did not report any import volumes publically. Table 5-5 shows the weekly import volume of kerosene-type jet fuels since 2000 as reported by the U.S. Energy Information Administration (EIA 2014b).

Kerosene exportation between 1987 and 1989 remained relatively constant with a yearly export average of approximately 547,500 barrels. However, by 1990, the annual export of kerosene was 2,190,000 barrels (API 1991), an increase of approximately 400%. Table 5-1 shows that approximately 1,609,977 tonnes (12,557,821 barrels) of kerosene were exported from the United States in 2012; however, several companies claimed these data as CBI and did not report any export volumes publically. Table 5-6 provides the U.S. exports of kerosene-type jet fuels since 1981 as reported by EIA (2014c).

5.3 USE

Aviation turbine fuels were not used until the 1930s when the first turbojet engine was developed. Jet-powered aircraft had only limited use in World War II, but further military and commercial developments allowed jet engines to dominate as power sources for aircraft by the 1960s. JP-1 was the first U.S. specification for jet fuel (AN-F-32A, 1944). JP-1 was a kerosene fuel with a maximum freeze point of -60°C and a minimum flash point of 43°C established for operability and safety (Air Force 1987). The flash and freeze points establish boundaries on the minimum and maximum size, respectively, of the hydrocarbon molecules in jet fuel. As fuel specifications evolved, trading off producibility and cost versus performance and safety, the U.S. Air Force settled on JP-4 (MIL-F-5624A, a gasoline-kerosene mix) in the 1950s–1970s, the Navy has used JP-5 (a minimum 60°C flash point kerosene also listed in MIL-F-5624) shipboard since the 1950s, and commercial aviation has used Jet A/Jet A-1 (ASTM D1655, minimum 38°C flash point) since its rapid growth in the 1960s (Air Force 1987b; Dukek and Winans 1969; Edwards 2003). Heavier losses in JP-4 fueled aircraft in Vietnam (versus JP-5) caused the U.S. Air Force to convert to JP-8 in 1980s. As discussed in Chapter 4, JP-8 is the military equivalent to Jet A-1, but contains additive packages that may not be required for commercial jet fuels. Recent studies in the United States have indicated that use of Jet A with its -40°C maximum freeze point was an acceptable and cost-effective alternative to JP-8, so the Air Force is scheduled to complete the conversion to F-24 (Jet A + the additive package) in 2014 for use in the continental United States (Air Force 2013). Thus, setting aside the military additive package, jet fuels world-wide consist almost entirely of the very similar

Table 5-5. Weekly U.S. Imports of Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2000

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2000-January	01/07	53	01/14	68	01/21	95	01/28	189		
2000-February	02/04	120	02/11	162	02/18	109	02/25	100		
2000-March	03/03	165	03/10	127	03/17	126	03/24	90	03/31	79
2000-April	04/07	77	04/14	113	04/21	109	04/28	106		
2000-May	05/05	149	05/12	76	05/19	103	05/26	163		
2000-June	06/02	134	06/09	141	06/16	131	06/23	104	06/30	142
2000-July	07/07	118	07/14	115	07/21	152	07/28	76		
2000-August	08/04	177	08/11	121	08/18	174	08/25	52		
2000-September	09/01	125	09/08	122	09/15	76	09/22	140	09/29	190
2000-October	10/06	128	10/13	177	10/20	183	10/27	173		
2000-November	11/03	145	11/10	205	11/17	89	11/24	125		
2000-December	12/01	100	12/08	162	12/15	82	12/22	225	12/29	181
2001-January	01/05	250	01/12	133	01/19	250	01/26	220		
2001-February	02/02	238	02/09	192	02/16	231	02/23	221		
2001-March	03/02	116	03/09	237	03/16	188	03/23	155	03/30	91
2001-April	04/06	148	04/13	156	04/20	148	04/27	165		
2001-May	05/04	175	05/11	318	05/18	97	05/25	167		
2001-June	06/01	144	06/08	151	06/15	137	06/22	94	06/29	147
2001-July	07/06	168	07/13	50	07/20	240	07/27	241		
2001-August	08/03	133	08/10	176	08/17	111	08/24	168	08/31	120
2001-September	09/07	117	09/14	212	09/21	69	09/28	120		
2001-October	10/05	42	10/12	155	10/19	130	10/26	49		
2001-November	11/02	36	11/09	174	11/16	88	11/23	71	11/30	57
2001-December	12/07	85	12/14	104	12/21	131	12/28	68		
2002-January	01/04	88	01/11	105	01/18	39	01/25	193		
2002-February	02/01	113	02/08	77	02/15	146	02/22	76		
2002-March	03/01	105	03/08	28	03/15	48	03/22	135	03/29	116
2002-April	04/05	106	04/12	192	04/19	105	04/26	87		
2002-May	05/03	144	05/10	78	05/17	99	05/24	89	05/31	59
2002-June	06/07	153	06/14	127	06/21	105	06/28	104		
2002-July	07/05	73	07/12	89	07/19	53	07/26	104		
2002-August	08/02	69	08/09	124	08/16	29	08/23	166	08/30	59
2002-September	09/06	145	09/13	93	09/20	166	09/27	86		
2002-October	10/04	156	10/11	143	10/18	160	10/25	243		
2002-November	11/01	192	11/08	86	11/15	123	11/22	101	11/29	218
2002-December	12/06	188	12/13	108	12/20	68	12/27	84		
2003-January	01/03	192	01/10	115	01/17	224	01/24	75	01/31	111
2003-February	02/07	82	02/14	48	02/21	110	02/28	107		

Table 5-5. Weekly U.S. Imports of Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2000

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2003-March	03/07	67	03/14	164	03/21	118	03/28	35		
2003-April	04/04	100	04/11	70	04/18	97	04/25	105		
2003-May	05/02	143	05/09	118	05/16	154	05/23	99	05/30	128
2003-June	06/06	165	06/13	53	06/20	128	06/27	216		
2003-July	07/04	174	07/11	168	07/18	175	07/25	187		
2003-August	08/01	156	08/08	216	08/15	118	08/22	68	08/29	153
2003-September	09/05	122	09/12	122	09/19	149	09/26	48		
2003-October	10/03	108	10/10	298	10/17	49	10/24	90	10/31	91
2003-November	11/07	86	11/14	54	11/21	57	11/28	69		
2003-December	12/05	82	12/12	128	12/19	53	12/26	146		
2004-January	01/02	139	01/09	100	01/16	108	01/23	86	01/30	77
2004-February	02/06	65	02/13	136	02/20	86	02/27	57		
2004-March	03/05	101	03/12	131	03/19	37	03/26	68		
2004-April	04/02	30	04/09	59	04/16	81	04/23	121	04/30	59
2004-May	05/07	102	05/14	173	05/21	159	05/28	166		
2004-June	06/04	172	06/11	211	06/18	80	06/25	234		
2004-July	07/02	160	07/09	86	07/16	81	07/23	67	07/30	136
2004-August	08/06	179	08/13	98	08/20	257	08/27	103		
2004-September	09/03	76	09/10	95	09/17	60	09/24	77		
2004-October	10/01	56	10/08	157	10/15	153	10/22	94	10/29	164
2004-November	11/05	51	11/12	235	11/19	163	11/26	105		
2004-December	12/03	110	12/10	121	12/17	119	12/24	85	12/31	198
2005-January	01/07	30	01/14	107	01/21	134	01/28	76		
2005-February	02/04	57	02/11	143	02/18	66	02/25	127		
2005-March	03/04	63	03/11	77	03/18	88	03/25	145		
2005-April	04/01	200	04/08	51	04/15	111	04/22	49	04/29	75
2005-May	05/06	170	05/13	100	05/20	116	05/27	39		
2005-June	06/03	48	06/10	75	06/17	86	06/24	107		
2005-July	07/01	56	07/08	22	07/15	165	07/22	81	07/29	68
2005-August	08/05	80	08/12	39	08/19	31	08/26	165		
2005-September	09/02	105	09/09	143	09/16	185	09/23	191	09/30	159
2005-October	10/07	179	10/14	221	10/21	319	10/28	301		
2005-November	11/04	444	11/11	249	11/18	139	11/25	183		
2005-December	12/02	183	12/09	400	12/16	138	12/23	258	12/30	167
2006-January	01/06	122	01/13	154	01/20	182	01/27	42		
2006-February	02/03	174	02/10	66	02/17	143	02/24	87		
2006-March	03/03	104	03/10	106	03/17	102	03/24	161	03/31	123
2006-April	04/07	70	04/14	254	04/21	190	04/28	262		

Table 5-5. Weekly U.S. Imports of Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2000

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2006-May	05/05	209	05/12	112	05/19	256	05/26	345		
2006-June	06/02	221	06/09	100	06/16	183	06/23	188	06/30	263
2006-July	07/07	225	07/14	172	07/21	167	07/28	224		
2006-August	08/04	205	08/11	300	08/18	399	08/25	266		
2006-September	09/01	119	09/08	124	09/15	292	09/22	158	09/29	200
2006-October	10/06	215	10/13	399	10/20	182	10/27	201		
2006-November	11/03	186	11/10	78	11/17	127	11/24	96		
2006-December	12/01	141	12/08	247	12/15	107	12/22	163	12/29	249
2007-January	01/05	270	01/12	137	01/19	196	01/26	261		
2007-February	02/02	203	02/09	232	02/16	221	02/23	286		
2007-March	03/02	188	03/09	372	03/16	238	03/23	263	03/30	165
2007-April	04/06	294	04/13	336	04/20	297	04/27	233		
2007-May	05/04	324	05/11	264	05/18	162	05/25	294		
2007-June	06/01	237	06/08	312	06/15	191	06/22	230	06/29	293
2007-July	07/06	305	07/13	194	07/20	189	07/27	265		
2007-August	08/03	247	08/10	231	08/17	283	08/24	203	08/31	224
2007-September	09/07	194	09/14	200	09/21	268	09/28	112		
2007-October	10/05	246	10/12	191	10/19	235	10/26	174		
2007-November	11/02	191	11/09	152	11/16	196	11/23	220	11/30	240
2007-December	12/07	146	12/14	190	12/21	153	12/28	135		
2008-January	01/04	166	01/11	85	01/18	56	01/25	182		
2008-February	02/01	209	02/08	157	02/15	71	02/22	132	02/29	87
2008-March	03/07	258	03/14	298	03/21	41	03/28	111		
2008-April	04/04	203	04/11	318	04/18	178	04/25	114		
2008-May	05/02	131	05/09	300	05/16	161	05/23	116	05/30	162
2008-June	06/06	109	06/13	86	06/20	114	06/27	66		
2008-July	07/04	34	07/11	98	07/18	63	07/25	119		
2008-August	08/01	59	08/08	74	08/15	95	08/22	67	08/29	50
2008-September	09/05	26	09/12	79	09/19	68	09/26	145		
2008-October	10/03	151	10/10	73	10/17	85	10/24	38	10/31	136
2008-November	11/07	36	11/14	88	11/21	77	11/28	45		
2008-December	12/05	26	12/12	45	12/19	111	12/26	54		
2009-January	01/02	56	01/09	10	01/16	69	01/23	101	01/30	16
2009-February	02/06	111	02/13	23	02/20	60	02/27	59		
2009-March	03/06	47	03/13	155	03/20	56	03/27	150		
2009-April	04/03	29	04/10	76	04/17	115	04/24	56		
2009-May	05/01	123	05/08	58	05/15	170	05/22	73	05/29	102
2009-June	06/05	67	06/12	51	06/19	98	06/26	61		

Table 5-5. Weekly U.S. Imports of Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2000

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2009-July	07/03	99	07/10	76	07/17	93	07/24	68	07/31	161
2009-August	08/07	76	08/14	67	08/21	98	08/28	112		
2009-September	09/04	93	09/11	85	09/18	123	09/25	115		
2009-October	10/02	93	10/09	89	10/16	74	10/23	107	10/30	86
2009-November	11/06	35	11/13	82	11/20	102	11/27	63		
2009-December	12/04	96	12/11	57	12/18	77	12/25	65		
2010-January	01/01	102	01/08	87	01/15	108	01/22	140	01/29	116
2010-February	02/05	109	02/12	64	02/19	102	02/26	61		
2010-March	03/05	99	03/12	20	03/19	77	03/26	92		
2010-April	04/02	55	04/09	86	04/16	99	04/23	91	04/30	128
2010-May	05/07	67	05/14	36	05/21	67	05/28	86		
2010-June	06/04	64	06/11	62	06/18	51	06/25	54		
2010-July	07/02	118	07/09	59	07/16	78	07/23	86	07/30	65
2010-August	08/06	70	08/13	77	08/20	93	08/27	69		
2010-September	09/03	94	09/10	136	09/17	98	09/24	120		
2010-October	10/01	28	10/08	64	10/15	80	10/22	37	10/29	74
2010-November	11/05	53	11/12	31	11/19	113	11/26	35		
2010-December	12/03	130	12/10	29	12/17	60	12/24	41	12/31	81
2011-January	01/07	79	01/14	63	01/21	16	01/28	127		
2011-February	02/04	61	02/11	61	02/18	24	02/25	51		
2011-March	03/04	16	03/11	14	03/18	27	03/25	101		
2011-April	04/01	64	04/08	68	04/15	79	04/22	128	04/29	54
2011-May	05/06	72	05/13	102	05/20	73	05/27	63		
2011-June	06/03	98	06/10	86	06/17	72	06/24	53		
2011-July	07/01	53	07/08	73	07/15	114	07/22	80	07/29	108
2011-August	08/05	75	08/12	18	08/19	18	08/26	39		
2011-September	09/02	15	09/09	4	09/16	14	09/23	55	09/30	7
2011-October	10/07	86	10/14	48	10/21	45	10/28	32		
2011-November	11/04	116	11/11	58	11/18	49	11/25	79		
2011-December	12/02	29	12/09	10	12/16	9	12/23	39	12/30	36
2012-January	01/06	7	01/13	1	01/20	4	01/27	7		
2012-February	02/03	5	02/10	87	02/17	28	02/24	52		
2012-March	03/02	34	03/09	4	03/16	3	03/23	7	03/30	55
2012-April	04/06	11	04/13	98	04/20	11	04/27	10		
2012-May	05/04	5	05/11	36	05/18	93	05/25	56		
2012-June	06/01	3	06/08	57	06/15	4	06/22	4	06/29	0
2012-July	07/06	3	07/13	2	07/20	52	07/27	59		
2012-August	08/03	33	08/10	57	08/17	33	08/24	105	08/31	95

Table 5-5. Weekly U.S. Imports of Kerosene-Type Jet Fuel (Thousand Barrels per Day) Since 2000

	Week 1		Week 2		Week 3		Week 4		Week 5	
Year-month	End date	Value	End date	Value	End date	Value	End date	Value	End date	Value
2012-September	09/07	73	09/14	142	09/21	35	09/28	113		
2012-October	10/05	16	10/12	111	10/19	153	10/26	136		
2012-November	11/02	16	11/09	51	11/16	5	11/23	25	11/30	26
2012-December	12/07	53	12/14	25	12/21	0	12/28	0		
2013-January	01/04	63	01/11	0	01/18	2	01/25	96		
2013-February	02/01	54	02/08	47	02/15	45	02/22	77		
2013-March	03/01	23	03/08	34	03/15	44	03/22	4	03/29	0
2013-April	04/05	0	04/12	83	04/19	37	04/26	0		
2013-May	05/03	21	05/10	35	05/17	35	05/24	46	05/31	136
2013-June	06/07	76	06/14	70	06/21	108	06/28	73		
2013-July	07/05	47	07/12	99	07/19	46	07/26	6		
2013-August	08/02	63	08/09	193	08/16	55	08/23	117	08/30	148
2013-September	09/06	85	09/13	67	09/20	96	09/27	73		
2013-October	10/04	45	10/11	50	10/18	52	10/25	80		
2013-November	11/01	53	11/08	55	11/15	77	11/22	123	11/29	18
2013-December	12/06	25	12/13	63	12/20	46	12/27	31		
2014-January	01/03	61	01/10	48	01/17	59	01/24	77	01/31	16
2014-February	02/07	98	02/14	94	02/21	58	02/28	10		
2014-March	03/07	84	03/14	8	03/21	96	03/28	107		
2014-April	04/04	129	04/11	218	04/18	130	04/25	15		
2014-May	05/02	124	05/09	73	05/16	78	05/23	137	05/30	34
2014-June	06/06	92	06/13	28	06/20	196	06/27	154		
2014-July	07/04	103	07/11	71	07/18	122				

[a]Data obtained from EIA (2014b).

Table 5-6. Monthly U.S. Exports of Kerosene-Type Jet Fuel (Thousand Barrels per Month) Since 1981[a]

Year	January	February	March	April	May	June	July	August	September	October	November	December
1981	28	21	10	18	16	12	19	22	20	14	23	222
1982	255	245	80	44	27	38	32	32	41	35	269	692
1983	272	223	27	17	40	21	37	193	270	24	373	458
1984	318	68	21	148	22	191	306	52	27	158	329	738
1985	79	624	182	149	147	102	106	660	133	773	848	559
1986	1,188	429	333	371	428	184	300	138	420	778	668	626
1987	1,404	565	214	121	117	146	139	74	1,029	1,086	1,336	2,287
1988	2,524	974	1,624	392	119	463	107	440	265	54	271	2,470
1989	2,297	566	19	477	36	35	287	467	1,018	849	1,183	1,309
1990	668	1,393	515	331	238	207	302	927	1,349	2,246	4,218	1,854
1991	2,265	4,393	1,197	758	1,047	391	840	326	295	1,342	137	1,273
1992	1,375	1,168	194	368	202	583	1,623	500	333	1,266	1,125	3,439
1993	2,976	451	2,575	1,833	1,460	1,035	1,799	1,017	414	396	765	1,063
1994	561	722	445	71	282	305	340	311	784	541	524	1,002
1995	766	545	528	138	221	311	572	535	587	1,774	387	1,940
1996	3,443	1,929	1,543	333	414	325	837	1,040	1,525	821	1,340	3,418
1997	2,407	635	342	621	275	1,146	1,004	819	471	1,214	1,325	2,429
1998	1,137	710	899	957	702	737	796	225	751	663	722	506
1999	785	225	697	736	997	792	1,073	246	995	800	1,825	1,585
2000	408	503	1,030	1,111	1,095	798	641	583	1,008	1,289	1,902	1,221
2001	839	437	1,262	506	513	544	722	743	620	966	1,917	1,426
2002	264	1,130	62	38	94	29	67	50	424	39	351	447
2003	1,125	519	1,067	1,018	603	200	373	214	588	883	295	549
2004	678	556	1,211	571	916	850	318	1,600	2,314	1,566	1,641	2,579
2005	878	1,875	2,235	2,927	3,575	2,040	1,428	1,706	469	351	1,068	651
2006	742	712	1,105	1,263	1,005	1,005	1,050	1,518	1,789	1,724	1,481	1,477
2007	1,213	870	1,631	1,024	602	754	1,641	826	1,257	1,017	2,750	1,427
2008	1,836	1,956	1,984	959	2,346	2,590	2,899	1,910	860	1,876	1,547	1,627
2009	2,379	1,171	1,899	1,981	2,656	1,270	1,505	1,688	1,901	2,949	2,226	3,605
2010	3,514	1,852	2,173	2,281	2,441	1,701	2,539	2,630	2,426	1,973	3,082	4,141
2011	3,906	2,786	2,715	3,059	1,733	2,221	3,390	2,806	3,089	2,419	3,173	4,027
2012	3,562	3,650	3,090	2,697	3,864	4,562	4,390	3,410	3,920	4,637	4,801	5,874
2013	5,014	3,188	4,093	4,129	4,150	5,407	4,938	6,020	4,217	4,304	6,419	6,262
2014	4,268	4,058	4,322	3,414								

[a]Data obtained from EIA (2014c).

Jet A and Jet A-1, which essentially only differ in freeze point. The composition of these two fuels is very similar, as can be seen in fuel property collections such as the World Fuel Sampling Program (Hadaller and Johnson 2006) and the annual Petroleum Quality Information Service (PQIS) reports by DLA-Energy. For example, in 2012, the PQIS database reported on thousands of samples of Jet A, JP-8, and Jet A-1. The weighted mean freeze points of Jet A/JP-8/Jet A-1 were -49.8, -51.3, and -52.7°C, respectively—much smaller variations than those present within each class of itself. The weighted mean aromatic content of the three fuels were 17.3, 17.1, and 17.6 vol%, respectively—again, much smaller variations than seen within each fuel. Thus, for all intents and purposes, Jet A, JP-8, F-24, and Jet A-1 can be treated as the same fuel in terms of composition and fuel properties, aside from the presence of the military additive package in JP-8 and F-24.

5.4 DISPOSAL

Vapors generated in tank truck loading of jet fuels can be disposed of by the installation of a vapor recovery system (NIOSH 1989). Runoff of jet fuels from loading and unloading aircraft operations can be separated by an on-site oil/water separation system.

Several methods have been investigated for the disposal of jet fuels spilled onto soil from normal aircraft operations or from accidental spills. One method, in situ soil venting, involves using vacuum blowers to pull large amounts of air through soil contaminated with jet fuels (Elliot and DePaoli 1990). The vacuum pulls out the soil gas, and the jet fuel contaminants volatilize as a result of disrupted equilibrium. Incineration of free-product extracted from contaminated media is another method of disposal proposed for soils and water contaminated with jet fuels (OHM/TADS 1985). Incineration of soils contaminated with jet fuels has also been investigated (OHM/TADS 1985). Other methods include absorption (straw, polyurethane foam, activated carbon, and peat have been used as absorbents), gelling agents, combustion promoters, dispersants, and mechanical systems (OHM/TADS 1985). Biodegradation has also been suggested as a means of disposal for spills onto soil (OHM/TADS 1985). Hydrocarbon-degrading bacteria have been shown to degrade petroleum products into smaller units and eventually into nonseparable particles (Butt et al. 1988). Soil contaminated with jet fuel no. 1 was found to have a growth response of 10^6 colony-forming units per mL in 7 out of 21 types of bacteria isolated for sample study (Butt et al. 1988). For more information on biodegradation, refer to Chapter 5.

Wastes containing Jet A, JP-5, and JP-8 are considered hazardous if they meet certain criteria specified by law. Hazardous wastes are subject to the handling, transport, treatment, storage, and disposal regulations

as promulgated under the Resource Conservation and Recovery Act (IRPTC 1985). Regulations governing the treatment and disposal of wastes containing JP-5, JP-8, and Jet A fuels are detailed in Chapter 7.