Exhibit 10.1.7

Nexant, Inc.
Sulfur/Sulfuric Acid Market Analysis

Final Report

U.S. Sulfur/Sulfuric Acid Market Analysis

Supply/Demand and Pricing

June 2009

Prepared For:

Tenaska Taylorville LLC

Nexant

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1.1 MARKET ANALYSIS

1.1.1 United States

1.1.1.1 Sulfur

Sulfur is a large volume chemical with a wide range of markets. The largest market, accounting for 60 percent of domestic sulfur demand, is the production of phosphate fertilizers. The petroleum refining and metal mining industries used approximately 25 and 3 percent, respectively. The remaining 12 percent of United States sulfur demand was used for various industrial products that require sulfur in different stages of their manufacturing process.

Table 1.1 summarizes historical and forecast U.S. sulfur supply and demand. Demand totaled 12.8 million metric tons in 2008, but has declined sharply in 2009. Except for the increase in 2008, demand has been declining since 2000. It is projected to rebound from the current depressed level but decline modestly beyond 2015.

Over 90 percent of domestic U.S. sulfur supply is sulfur recovered during oil refining. The balance is sulfur recovered from natural gas. U.S. sulfur supply is forecast to increase about 0.7 percent per year to 2030. Increased recovery of domestic elemental sulfur production from petroleum refineries is expected to drive growth in future supply, reflecting modest increases in refinery throughput as well as a projected increase in the average sulfur content of crude oil processes in United States refineries.

The U.S. is a net importer of sulfur and is projected to remain in that position over the forecast period.

Table 1.1 United States Sulfur Supply and Demand Balance

Thousand Metric Tons

	Actual					Est.	Forecast					AAGR, %		
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
Supply	10,500	9,500	9,050	9,090	9,200	9,228	9,135	9,675	9,974	10,282	10,600	-1.4%	0.7%	0.6%
Demand	12,700	12,400	12,000	11,900	12,800	10,971	10,663	11,940	11,775	11,612	11,451	-1.6%	-1.0%	-0.3%
Net Trade	(2,200)	(2,900)	(2,950)	(2,810)	(3,600)	(1,744)	(1,528)	(2,265)	(1,801)	(1,330)	(852)			

1.1.1.2 Sulfuric Acid

Sulfuric acid is the single most widely used chemical in the world today. It has uses as a reactant, catalyst, and for pH adjustment. Table 1.2 presents the range of end uses for sulfuric acid. Sulfuric acid is a key component in the manufacture of a wide range of products, especially phosphate fertilizers. Agricultural chemicals, mainly fertilizers, consumed about 70 percent of domestic sulfuric acid demand. The petroleum refining and metal mining industries used approximately 10 percent, combined.

Table 1.2 Sulfuric Acid End Uses

End Use	%
Phosphoric Acid and Fertilizer Production	70
Copper Leaching	5
Petroleum Alkylation	4
Pulp and Paper	3
Ammonium Sulfate	2
Aluminum Sulfate	1
Other	15

The U.S. is the world's largest sulfur and sulfuric acid producing country. Sulfur supply declined over the 2000 to 2008 period due to the demise of sulfur recovery from Frasche mining. With the exception of 2001 and 2003-2005, sulfuric acid supply in the United States has generally been in the range of 32.5-33 million metric tons. The years 2003-2005 experienced supply in excess of 35 million metric tons, following supply of 31 million metric tons in 2001, caused by the economic downturn following the September 11th terrorist attacks. Future supply is forecast to decline over the forecast period at the same rate as demand with the exception of the additional capacity brought online by the Taylorville Project during 2014.

As presented in Table 1.3, the United States is a significant net importer of sulfuric acid, primarily from Canada, Mexico, and Venezuela, and is expected to remain a net importer in the future. Approximately 10 percent of sulfuric acid used for domestic consumption comes from imports.

Table 1.3 United States Sulfuric Acid Supply and Demand Balance

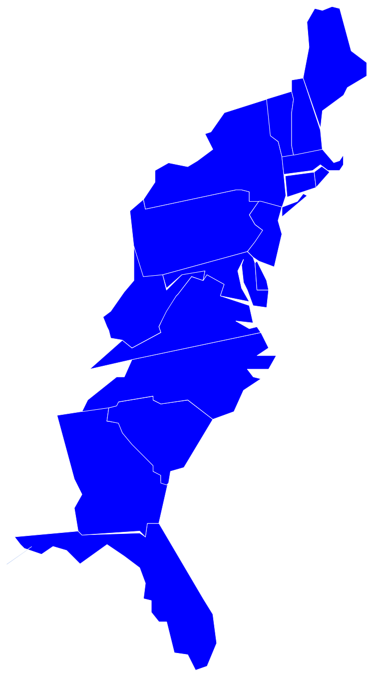
Thousand Metric Tons

	Actual			Est	Forecast					AAGR%		
	2000	2005	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
Capacity	36,400	36,400	36,400	36,400	36,400	37,200	37,200	37,200	37,200			
Supply	33,063	34,190	32,463	28,457	27,658	31,440	31,165	30,892	30,622	-0.2%	-0.5%	-0.2%
Demand	36,827	36,532	35,280	30,927	30,059	34,169	33,870	33,573	33,279	-0.5%	-0.5%	-0.2%
Net Trade	(3,764)	(2,342)	(2,818)	(2,470)	(2,401)	(2,729)	(2,705)	(2,681)	(2,658)			

1.1.2 PADD I

The Petroleum Administration for Defense District (PADD) I, the East Coast, is defined in Figure 4.1. PADD I is a significant consumer of both sulfur and sulfuric acid. The area is dominated by the phosphate fertilizer industry with facilities in North Carolina and Florida. PADD I imports most of its sulfur to produce sulfuric acid, which in turn is used to manufacture fertilizers. Elemental sulfur, mainly from petroleum refining, as well as through natural gas processing, is imported into PADD I primarily from PADD III (the U.S. Gulf Coast) and foreign imports. Sulfuric acid is mainly produced from elemental sulfur in PADD I, through the recovery of off-gasses, along with the recycling of sulfuric acid from refineries.

Figure 1.1 PADD I Map

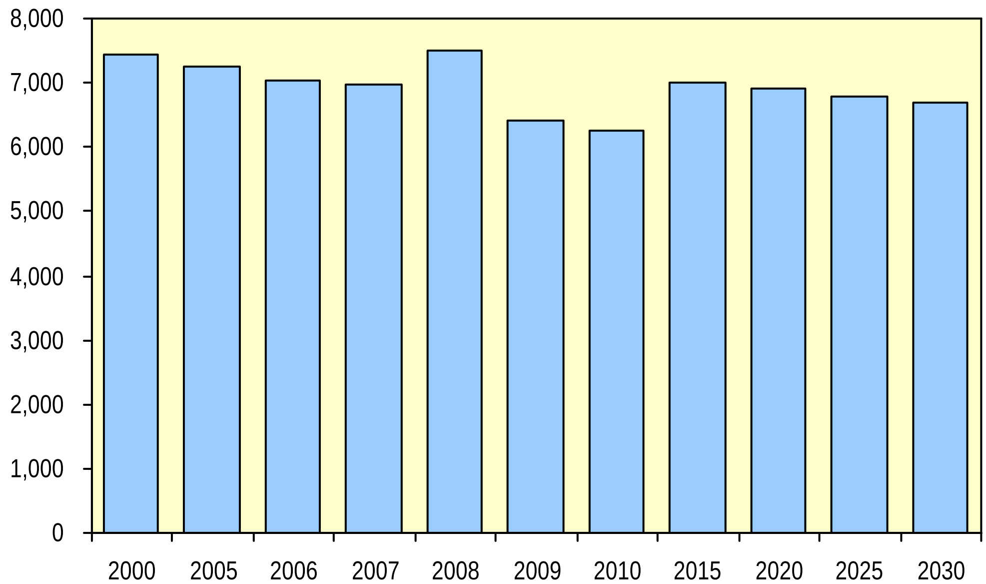


1.1.2.1 Sulfur

PADD I accounts for about 60 percent of national sulfur demand, and is expected to maintain this market share throughout the study period. Sulfur consumption in PADD I is dominated by the phosphate fertilizer industry in Florida and North Carolina.

Sulfur demand in PADD I is expected to average 0.2 percent growth per year over the 2009 to 2030 period, compared to the 0.1 percent annual growth over the last eight years. Figure 1.2 displays the historical and forecast trends for sulfur demand in PADD I.

Figure 1.2 PADD I Sulfur Demand
Thousand Metric Tons



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Sulfur production in PADD I declined over the past decade, but is forecast to grow 0.7 percent annually over the 2009 to 2030 period. Future supply growth will be driven by an increase in the recovery of sulfur from petroleum refineries, in part due to the projected increase in the average sulfur content of crude oil that will be processed in United States refineries.

Historical and forecast trends of sulfur supply in PADD I are presented in Figure 1.3.

Figure 1.3 PADD I Sulfur Supply
Thousand Metric Tons

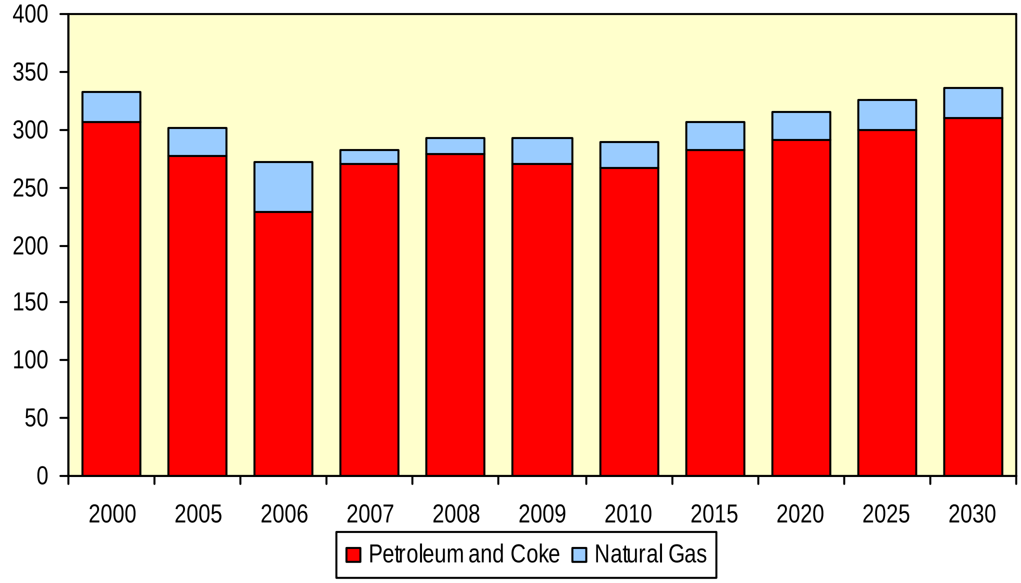

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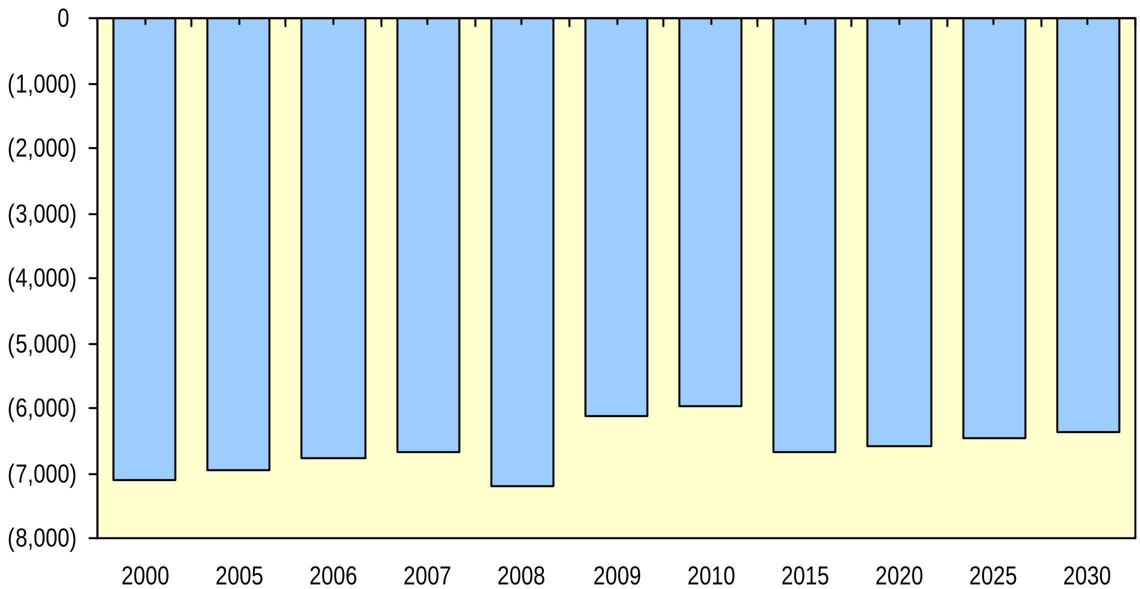
Table 1.4 summarizes historical and forecast sulfur supply and demand. PADD I is a major net importer of sulfur, primarily from PADD III (the Gulf Coast) and foreign imports. The net deficit of sulfur in PADD I was significant over the last eight years, reaching about 7.2 million metric tons in 2008. PADD I is forecast to remain a major net importer of sulfur over the forecast period, as illustrated in Figure 1.4.

Table 1.4 PADD I Sulfur Supply and Demand Balance
Thousand Metric Tons

		Actual					Est.	Forecast					AAGR, %		
		2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
	Petroleum and Coke	307	277	229	270	279	269	267	283	291	300	310			
Supply	Natural Gas	26	24	42	13	13	23	23	24	25	26	26			
	Total	333	301	271	283	292	292	289	307	316	326	336	-1.6%	0.7%	0.6%
Demand		7,438	7,262	7,028	6,970	7,497	6,426	6,245	6,993	6,896	6,801	6,707	0.1%	-1.0%	-0.3%
Net Trade		(7,105)	(6,961)	(6,757)	(6,687)	(7,205)	(6,133)	(5,956)	(6,687)	(6,580)	(6,475)	(6,371)			

Figure 1.4 PADD I Sulfur Supply and Demand Balance

Thousand Metric Tons



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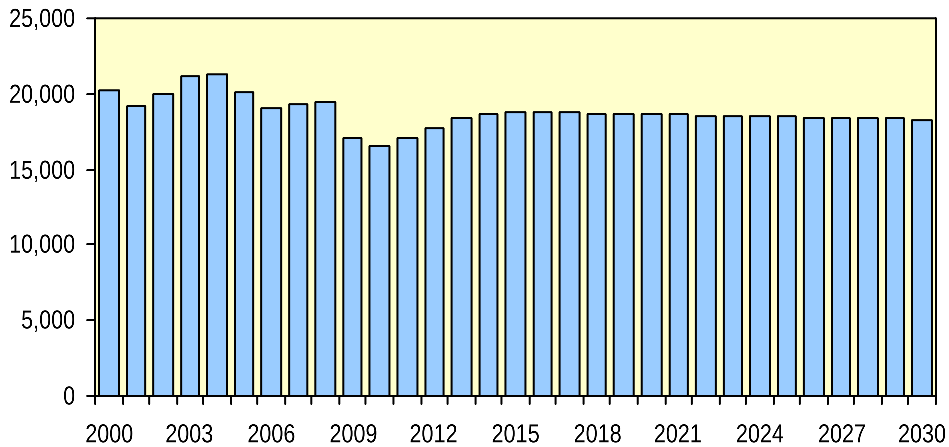
1.1.2.2 Sulfuric Acid

Figure 1.5 presents historical and forecast trends for sulfuric acid demand in PADD I. Demand for sulfuric acid in PADD I grew to 19.4 million metric tons in 2008, an increase of around 140 thousand metric tons from 2007. Demand fell at an annual rate of 0.5 percent during the historical period 2000-2008, and is forecast to continue to modestly decline during the forecast period.

Figure 1.5 PADD I Sulfuric Acid Demand
Thousand Metric Tons



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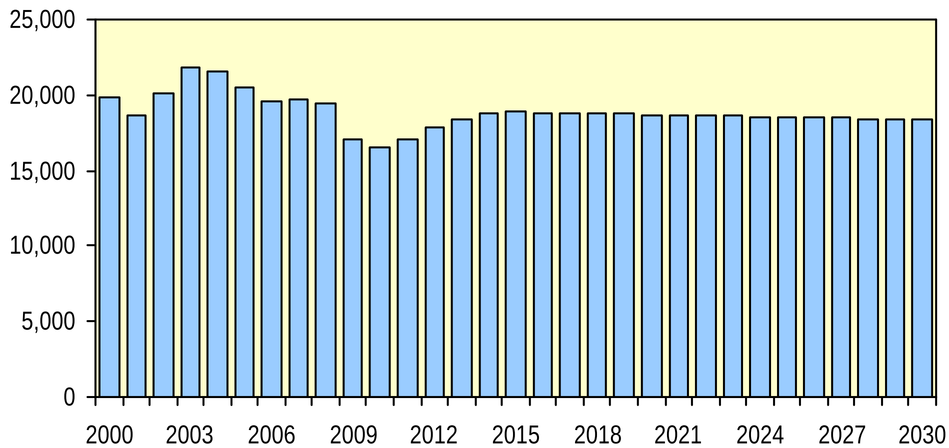
Consumption in PADD I is dominated by the phosphate fertilizer industry in Florida and North Carolina. However, these operations generally produce their own supply. Pulp and paper companies, pickling operations in steel mills, chemical companies, and to a much smaller degree than PADD II, ethanol production make up most of the remainder of the market for sulfuric acid. Petroleum refining is another significant consumer of sulfuric acid. However this sulfuric acid is generally recycled into new supply so net demand is relatively small.

The bulk of sulfuric acid supply in PADD I is produced from elemental sulfur. The remaining supply is from the recovery of off gasses in smelters, and recycling of sulfuric acid from refineries. The United States Geological Survey (USGS) estimates that 3-5 million tons of sulfuric acid is recycled from the petroleum refining industry in the United States every year. The historical and forecast trend of sulfuric acid supply is presented in Figure 1.6. Sulfuric acid supply in PADD I was 19.5 million metric tons in 2008, a decrease of about 200 thousand metric tons from 2007. The period 2003-2005 was a time of oversupply, following the undersupply of 2001 which was brought about by the economic downturn following the September 11th terrorist attacks. Sulfuric acid supply declined 0.2 percent annually in the historical period from 2000-2008 and is expected to decline slowly at the same rate as demand through the forecast period, even though supply has been volatile in recent years.

Figure 1.6 PADD I Sulfuric Acid Supply

Thousand Metric Tons



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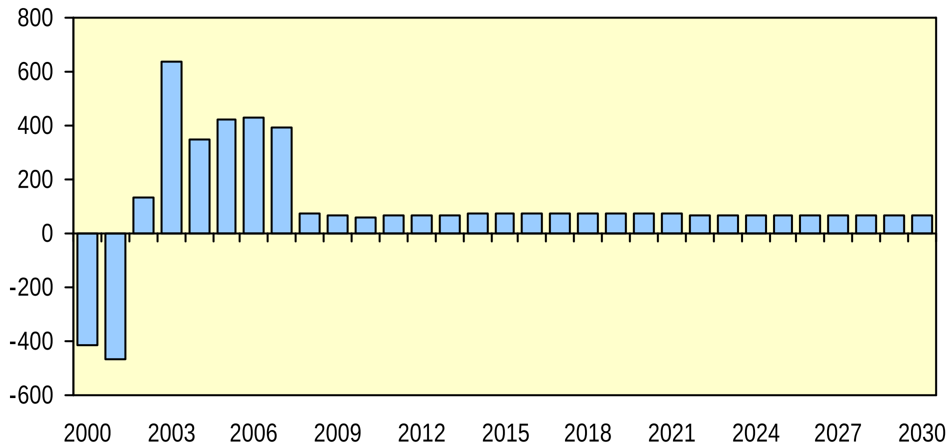
PADD I has been a net exporter of sulfuric acid to outside the region since 2002 and is forecast to remain a modest net exporter during the forecast period. Driven by demand deterioration and the resulting supply decline, net trade (net shipments outside the region) is forecast to remain relatively low, staying less than 100 thousand tons per year, as shown in Table 1.5 and Figure 1.7.

Table 1.5 PADD I Sulfuric Acid Supply and Demand

Thousand Metric Tons

	Actual			Est	Forecast					AAGR%		
	2000	2005	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
Capacity	21,300	21,300	21,300	21,300	21,300	21,300	21,300	21,300	21,300			
Supply	19,838	20,514	19,478	17,074	16,595	18,864	18,699	18,535	18,373	-0.2%	-0.5%	-0.2%
Demand	20,255	20,093	19,404	17,010	16,532	18,793	18,628	18,465	18,304	-0.5%	-0.5%	-0.2%
Net Trade	(417)	421	74	64	63	71	71	70	69			

Figure 1.7 PADD I Sulfuric Acid Supply and Demand Balance
Thousand Metric Tons



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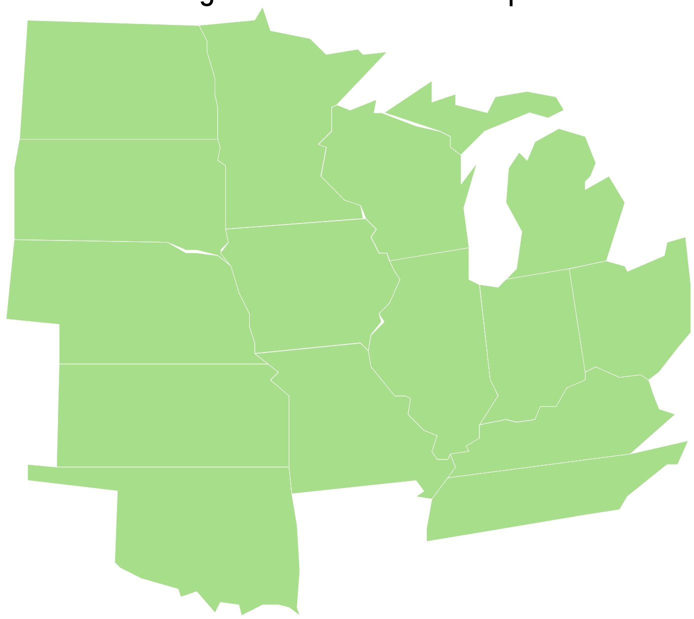
1.1.3 PADD II

Figure 1.8 displays the definition of PADD II in map form. Figures 1.9 through 1.11 andt Table 1.6 present historical and forecast trends for sulfur in PADD II. Figures 1.12 through 1.14 and Table 1.6 present historical and forecast trends for sulfuric acid in PADD II.

Figure 1.8 PADD II Map



Demand in PADD II is lower and more fragmented than PADD I, due mostly to the absence of the phosphate fertilizer industry's concentration in PADD I.

The region had approximately 11 percent of the United States domestic sulfur supply in 2008. The majority of the sulfur supply, as seen also in PADD I, comes from petroleum refineries and coking plants. The remaining supply has been from the recovery in natural gas plants.

Sulfur production in PADD II declined 1.9 percent annually from 2000 to 2008 but is expected to grow 0.7 percent per year over the 2009 to 2030 forecast period due to the increase in the recovery of domestic elemental sulfur production from petroleum refineries and the increase in the average sulfur content of crude oil that will be processed in United States refineries. Figure 1.9 displays the historical and forecast sulfur supply in PADD II.

Figure 1.9 PADD II Sulfur Supply
Thousand Metric Tons

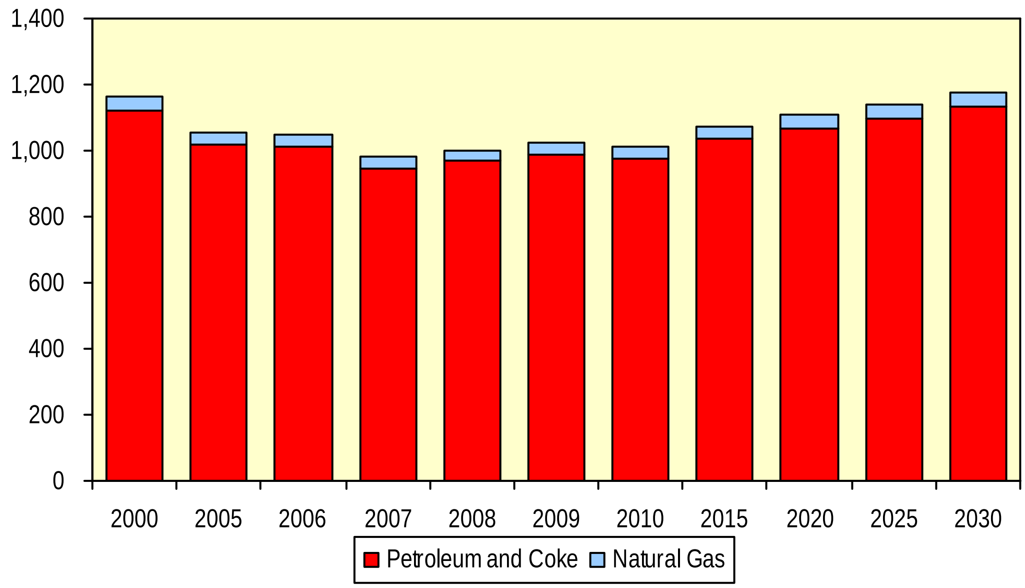


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Figure 1.10 PADD II Sulfur Demand

Thousand Metric Tons

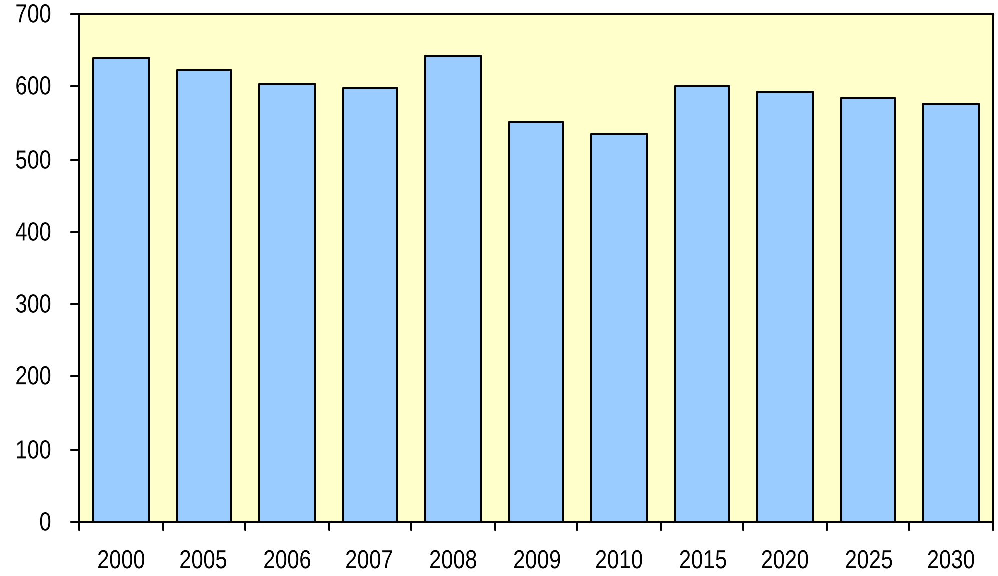

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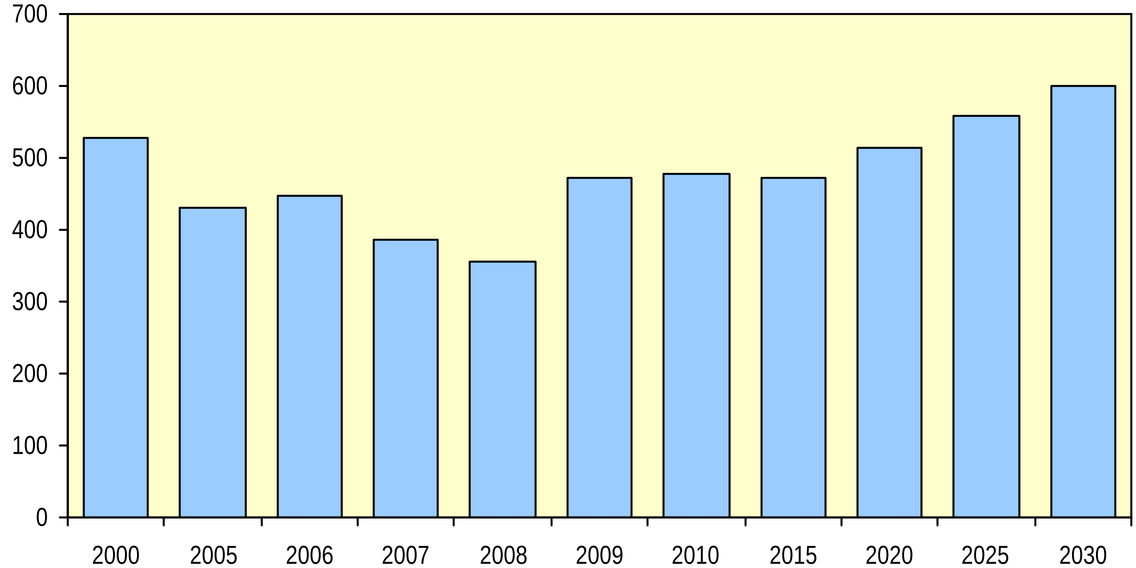
Table 1.6 PADD II Sulfur Supply and Demand

Thousand Metric Tons

		Actual					Est.	Forecast					AAGR, %		
		2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
	Petroleum and Coke	1,123	1,016	1,010	944	969	987	977	1,035	1,067	1,099	1,133			
Supply	Natural Gas	42	38	40	40	30	37	37	39	40	41	43			
	Total	1,165	1,054	1,050	984	999	1,024	1,014	1,074	1,107	1,141	1,176	-1.9%	1.0%	0.6%
Demand		638	623	603	598	643	551	536	600	592	584	576	0.1%	-1.0%	-0.3%
Net Trade		527	431	447	386	356	472	478	473	515	557	601			

Figure 1.11 PADD II Sulfur Supply and Demand Balance
Thousand Metric Tons



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Demand for sulfuric acid in the PADD II was approximately 2.47 million metric tons in 2008, an increase of 20 thousand metric tons from 2007. Sulfuric acid demand within PADD II has remained relatively constant in the historical period from 2000-2008, declining at 0.5 percent annually in the historic period, similar to the case with PADD I. Demand is forecast to continue to decline modestly during the forecast period.

Figure 1.12 PADD II Sulfuric Acid Demand
Thousand Metric Tons

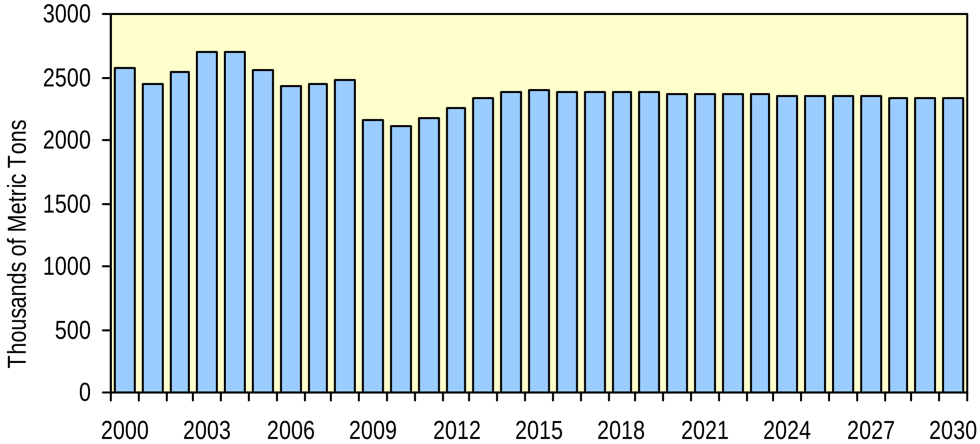

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Figure 1.13 PADD II Sulfuric Acid Supply
Thousand Metric Tons

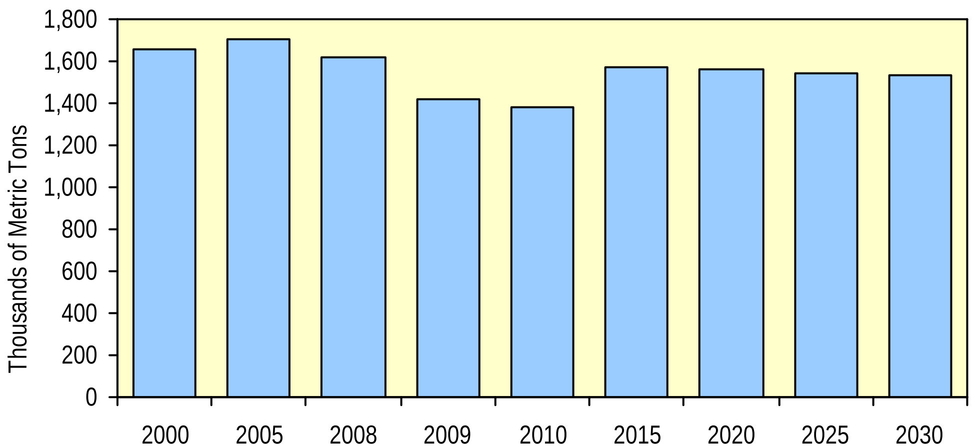

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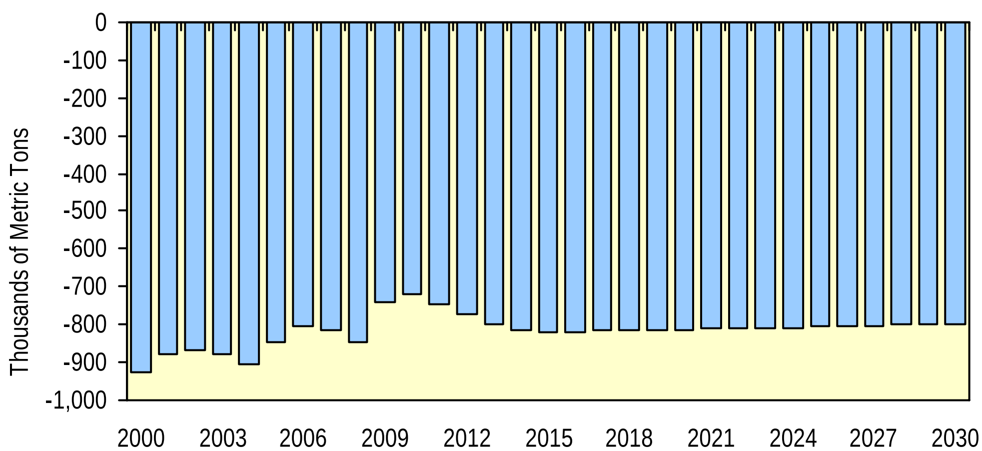
Table 1.7 summarizes historical and forecast PADD II sulfuric acid supply and demand. PADD II has been a net importer of sulfuric acid. The net sulfuric acid deficit in the region has varied slightly over the years, remaining under 1,000 thousand metric tons, as shown in Figure 1.14. With supply slowly declining at the same rate as demand in the forecast period, PADD II will remain a net importer of sulfuric acid.

Table 1.7 PADD II Sulfuric Acid Supply and Demand
Thousand Metric Tons

	Actual			Est	Forecast					AAGR%		
	2000	2005	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
Capacity	1,800	1,800	1,800	1,800	1,800	2,600	2,600	2,600	2,600			
Supply	1,653	1,710	1,623	1,423	1,383	1,572	1,558	1,545	1,531	-0.2%	-0.5%	-0.2%
Demand	2,578	2,557	2,470	2,165	2,104	2,392	2,371	2,350	2,330	-0.5%	-0.5%	-0.2%
Net Trade	(925)	(848)	(846)	(742)	(721)	(820)	(813)	(806)	(798)			

Figure 1.14 PADD II Sulfuric Acid Supply and Demand Balance
Thousand Metric Tons



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1.2 TENASKA SULFUR AND SULFURIC ACID PRODUCTION

1.2.1 Introduction

Tenaska is considering two coals as feed to its coal-to-SNG (CTS) project located in central Illinois. The coal being considered is expected to fall between the upper and lower limits of quality given by Coal “A” and Coal “Z”. As part of its study to consider the market potential of producing concentrated sulfuric acid instead of molten sulfur as a byproduct, Tenaska requested Nexant to determine the amount of sulfur byproduct generated from each of the two coal feeds when used to make the same amount of SNG. This task was evaluated based on producing the same total amount of CO and H2 in syngas exiting the gasifiers as an indication of identical SNG production.

Following is the current CTS plant design basis specified by Tenaska:

- Type of Gasifier — Slurry Feed Total Quench
- Gasifier Sizes — 900 ft^3 each
- Number of Gasifiers — 3 operating + 1 spare
- Gasification Pressure — 1,000 psig
- Total $CO+H_2$ Needed — 360 MMSCFD from 3 gasifiers
- Oxygen Concentration — 99.0 percent by volume
- Oxygen Temperature — 300 °F at gasifier inlet
- Slurry Feed Preheat — None

For Coal "A", the CTS plant is capable of the following process performances:

- Coal Feed — 6,785 STPD (AR basis) total for 3 gasifiers
- Slurry Feed Concentration — 65 wt percent (dry solid basis)
- Oxygen Feed Rate — 5,354 STPD total for 3 gasifiers
- Carbon Conversion — 98 percent
- Gasification Temperature — 2,600 °F

1.2.2 Molten Sulfur Production

The estimated maximum molten sulfur production rates are presented in Table 1.8.

Table 1.8 Estimated Molten Sulfur Production

	Coal "A"	Coal "Z"
Total AR Coal Feed, STPD	6,785	7,721
Total Sulfur in Syngas Exit Gasifiers, STPD	213.3	231.3
Sulfur in Treated Syngas, STPD	0.2	0.2
Sulfur in TGTU Incinerator Vent, STPD	0.4	0.5
Net Molten Sulfur Production, STPD	212.7	230.6

The estimates of maximum molten sulfur production were based on the following assumptions:

- Sweet syngas from Acid Gas Removal (AGR) system contains 10-ppmv residual sulfur, which will be removed in downstream zinc oxide guard beds;
- Sulfur recovery from AGR acid gas in Claus sulfur recovery and Tail Gas Treatment systems is assumed to be 99.8 percent. The 0.2 percent un-recovered sulfur is vented to atmosphere via tail gas incinerator flue gas.

1.2.3 Sulfuric Acid Production

The estimated maximum sulfuric acid production rates are presented in Table 1.9.

Table 1.9 Estimated Sulfuric Acid Production

	Coal "A"	Coal "Z"
Total AR Coal Feed, STPD	6,785	7,721
Total Sulfur in Syngas Exit Gasifiers, STPD	213.3	231.3
Sulfur in Treated Syngas, STPD	0.2	0.2
Sulfur in Acid Plant Exhaust, STPD	2.1	2.2
Net Sulfur in Sulfuric Acid, STPD Sulfur	211.0	228.9
Total Sulfuric Acid Production, STPD (98 wt%)	658.7	714.6

The estimates of maximum sulfuric acid production were based on the following assumptions:

- Sweet syngas from Acid Gas Removal (AGR) system contains 10-ppmv residual sulfur, which will be removed in downstream zinc oxide guard beds;
- Sulfur recovery from AGR acid gas in Sulfuric Acid Plant is assumed to be 99 percent. The 1 percent un-recovered sulfur is vented with Acid Plant Exhaust.

1.3 INDUSTRY PROFILES

The report identifies consumers and producers of both sulfur and sulfuric acid in PADDs I and PADD II, covering the following sectors: sulfur dioxide, elemental sulfur, pulp and paper, steel mills, ethanol and chemicals. Target customers and competitors for the project in Taylorville in PADD II, as well as in PADD I, have been identified and discussed in this section.

1.3.1 Sulfur

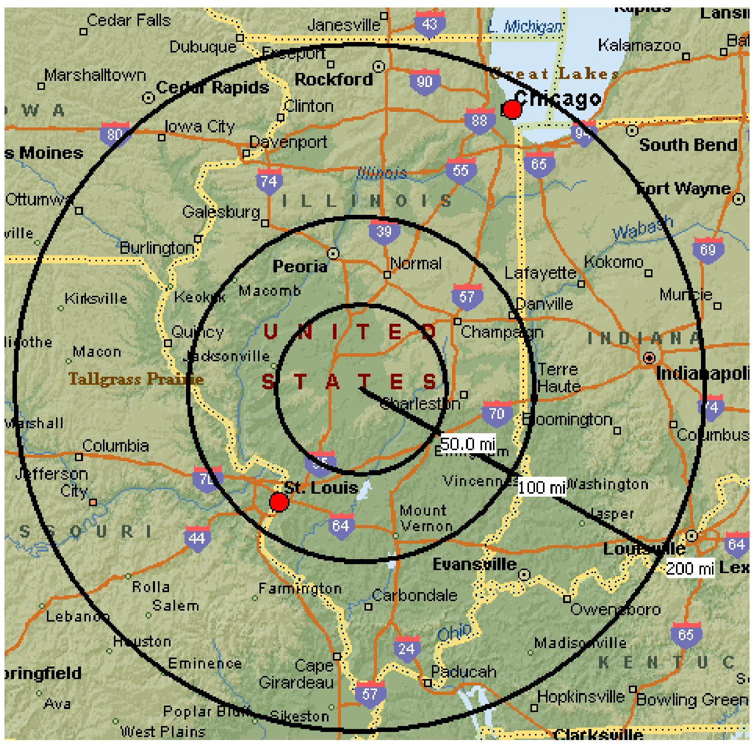
1.3.1.1 Potential Customers

A listing of potential sulfur consumers in Illinois is presented in Table 1.10, and as a map in Figure 1.15. Nexant has identified only 2 possible customers for sulfur produced at Taylorville, both of which are sulfuric acid producers. One is almost 200 miles away in Chicago, while the other is about 70 miles away in Sauget, just outside of St. Louis.

Table 1.10 Sulfur Consumers in Illinois

Company	Location
Big River Zinc	Sauget
PVS Chemical Solutions	Chicago

Figure 1.15 Sulfur Consumers in Illinois



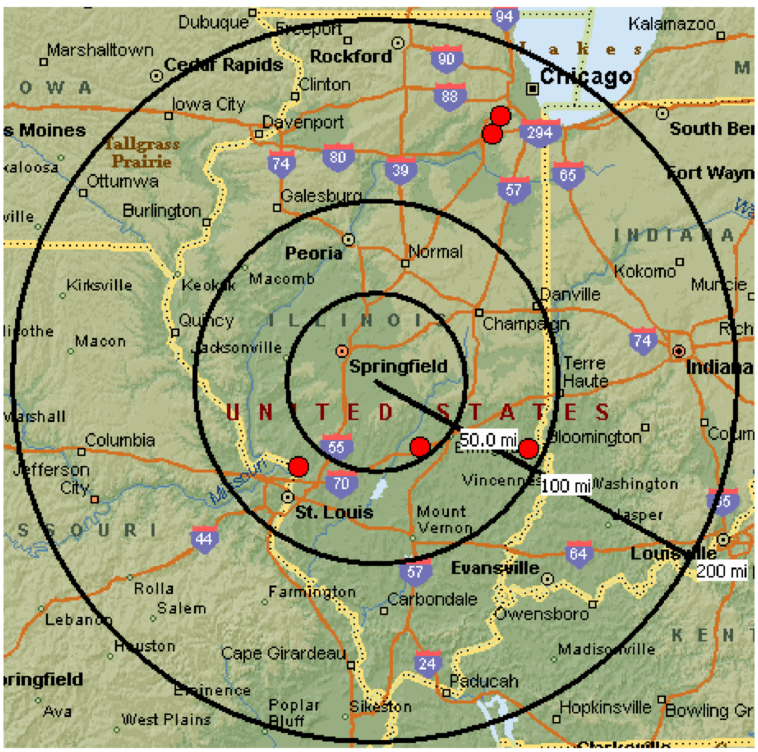
1.3.1.2 *Potential Competition*

A listing of potential competitors in Illinois is presented in Table 1.11 and in Figure 1.16. These possible competitors are generally closer to the possible customers than the Taylorville plant, allowing for a potential logistical advantage over Tenaska.

Table 1.11 Potential Key Competitors

Company	Location
CITGO	Lemont
ConocoPhillips	Wood River
Exxon Mobil	Joliet
Marathon Petroleum	Robinson
Natural Gas Pipeline Company of America	St. Elmo

Figure 1.16 Potential Key Competitors



1.3.2 Sulfuric Acid

1.3.2.1 Potential Customers

A listing of potential sulfuric acid consumers in Illinois is presented in Tables 1.12 through 1.15, and is displayed in Figure 1.17. Chemical companies are clustered near Chicago, almost 200 miles from Taylorville, while other consumers are spread throughout the state.

Table 1.12 Chemical Companies in Illinois

Company	City
Steiner Electric Co. - Multiple Locations	Multiple Locations
TRI SECT CORPORATION	Schaumburg
A-Z FACTORY SUPPLY	Schiller Park
EDC Industries, Inc.	Elk Grove Village
Rydlyme: Apex Engineering Products Corp.	Aurora
Elm Grove Industries, Inc.	Mundelein
Slide Products, Inc.	Wheeling
Chem-Impex	Wood Dale
Castrol Industrial North America Inc.	Naperville
Nuance Solutions	Chicago
Velsicol Chemical Corp.	Rosemont
Dow Chemical Co.	Joliet
Wei T'o Index	Matteson
Advanced Asymmetrics	Millstadt
PICO Chemical Corp.	Chicago Heights
Atm America Corp	Morton Grove
Stepan Co.	Northfield
Rycoline Products, Inc.	Chicago
Tru-Test Mfg. Co.	Cary
Rock Valley Oil & Chemical Co.	Rockford
R.I.T.A. Corp.	Woodstock
Spartan Flame Retardants Inc.	Crystal Lake
Graham Chemical, Inc	Barrington
Dow Chemical Co.	Chnnahon
Dober Chemical Corp.	Midlothian
Ivanhoe Industries Inc.	Mundelein
MPG Industries	Joliet
Odor Management, Inc.	Barrington
JLM Chemicals Inc.	Blue Island
Coral Corp.	Waukegan
GC Electronics, Inc.	Rockford
Expomix	Wauconda
Eureka Chemical Lab, Inc.	Chicago
Paket Corp.	Chicago
Akzo Chemicals Inc.	Chicago
Sunnyside Corporation	Wheeling
Techdrive Inc.	Chicago
Bankmark	Mount Prospect
Rho Chemical Co., Inc.	Joliet
Starlite Technical Service Inc.	Chicago
Searle Chemicals, Inc.	Chicago

Table 1.13 Pulp and Paper Mills in Illinois

Company	City
Ahlstrom Paper Group	Taylorville
Alcoa Flexible Packaging Corp.	Joliet
Alcoa Flexible Packaging Corp.	Peoria
BBP America, Inc.(BBP Celotex)	Quincy
Caraustar Industries, Inc.	Chicago
Field Container Co. L.P.	Pekin
Johns-Manville Corp.	Rockdale
Madison Paper Co.	Alsip
SCA Tissue North America L.L.C. (Svenska Cellulose Ab)	Alsip
Rock-Tenn Co.	Aurora

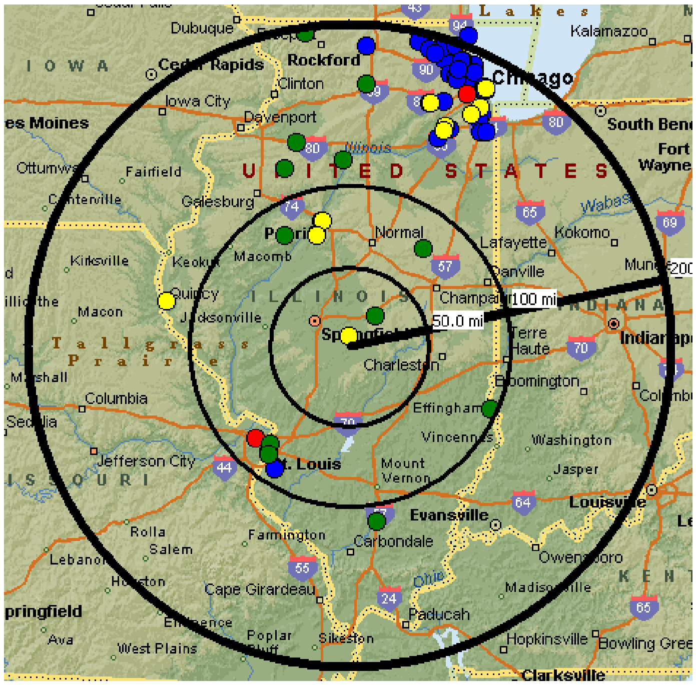
Table 1.14 Integrated Steel Mills in Illinois

Company	City
Interlake	S. Chicago
National	Granite City

Table 1.15 Ethanol Plants in Illinois

Company	City
Abengoa Bioenergy Corp.	Madison
Adkins Energy, LLC*	Lena
Ag Energy Resources, Inc.	Benton
Archer Daniels Midland	Decatur
Archer Daniels Midland	Peoria
Aventine Renewable Energy, LLC	Pekin
Big River Resources Galva, LLC	Galva
Center Ethanol Company	Sauget
Illinois River Energy, LLC	Rochelle
Lincolnland Agri-Energy, LLC*	Palestine
Marquis Energy, LLC	Hennepin
One Earth Energy	Gibson City
Patriot Renewable Fuels, LLC	Annawan
Riverland Biofuels	Canton

Figure 1.17 Sulfuric Acid Consumers in Illinois



Integrated Steel Mills

Ethanol Plants

Pulp and Paper Mills

Chemical Companies

1.3.2.2 Potential Competition

The two competitive sulfuric acid producers in Illinois appear in Table 1.10 above as they are also sulfur consumers. Their locations are shown in Figure 1.17 above.

1.4 PRICING AND TAYLORVILLE NETBACKS

1.4.1 Sulfur

1.4.1.1 Pricing

Historical and forecast sulfur prices in Tampa are summarized in Table 1.16 and Figure 1.18, along with an estimated price for sulfur in Illinois. Benchmark prices in the United States are set at Tampa, and prices for sulfur in Illinois have been set relative to Tampa based on the cost of shipping sulfur from Illinois (which is surplus in sulfur) to Tampa (which is deficit in sulfur). Specifically, prices in Illinois are estimated based on the quoted price differential between Tampa and New Orleans (which is also a commonly available quotation), less the cost to ship sulfur from Illinois to New Orleans by barge. The New Orleans quoted price is marginally lower than the Tampa price, reflecting the fact that PADD 3 is surplus in sulfur. Sulfur prices are forecast to increase about 3 percent annually during the forecast period.

Table 1.16 United States Sulfur Prices

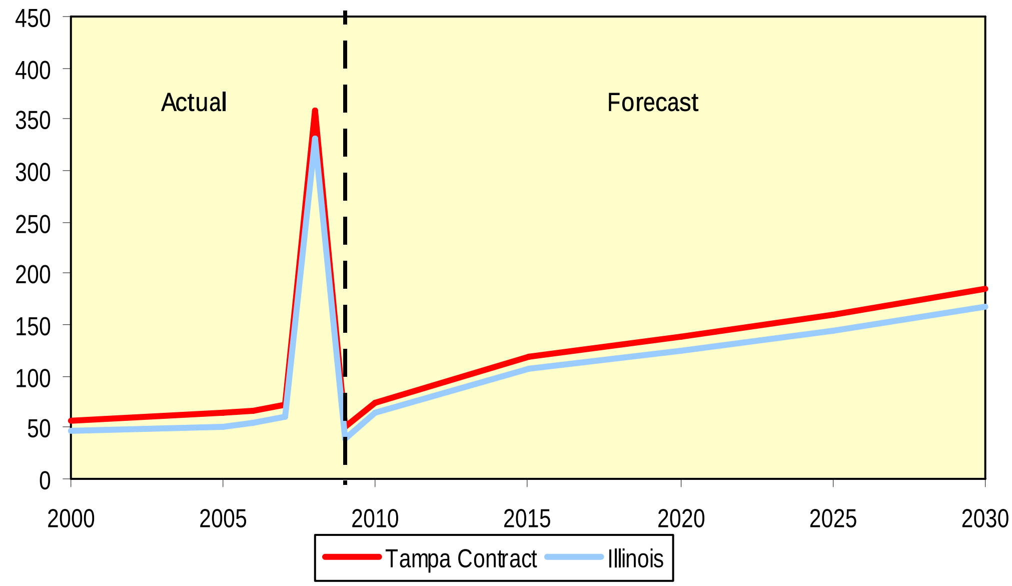
Nominal Dollars per Metric Ton

	Actual					Est.	Forecast				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
Tampa Contract	56	64	66	71	358	50	75	119	138	160	186
Illinois	46	51	55	60	330	40	65	107	125	144	167

Source: Green Markets, Pike and Fisher & Nexant Estimates

Figure 1.18 United States Sulfur Prices

Nominal Dollars per Metric Ton



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1.4.1.2 Taylorville Netbacks

The current sulfur netback to Taylorville is approximately $16 per metric ton. This is about $16 per metric ton lower than the sulfur price in Tampa, based on sulfur transportation costs by barge. If the sulfur were shipped by rail, the current sulfur netback to Taylorville would be about $2 per metric ton. For facilities within 100 miles of Taylorville, the current sulfur netback is approximately $14 per metric ton, compared to the $20 per metric ton netback obtained for a customer within 50 miles.

Nexant's historical and forecast sulfur prices in Tampa and Illinois with netbacks to Taylorville are presented in Figure 1.19 and Table 1.17 for each of the transportation scenarios. The netbacks are slightly different for each scenario, reflecting different fuel surcharge rates for the rail transportation costs and tariffs for the barge transportation costs.

Figure 1.19 Taylorville Sulfur Netbacks
Nominal Dollars per Metric Ton

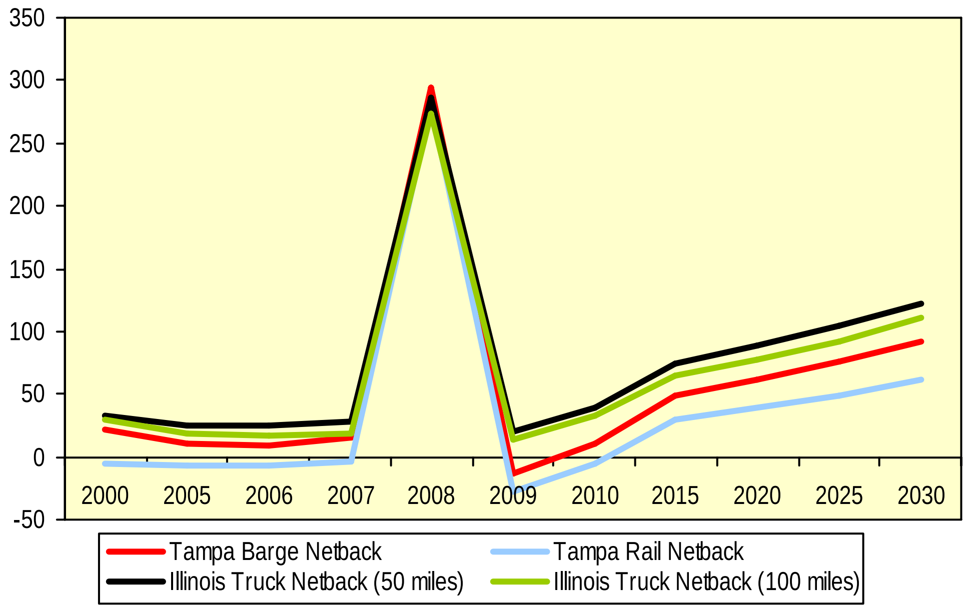

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Table 1.17 Taylorville Sulfur Netbacks Values

Nominal Dollars per Metric Ton

	Actual					Est.	Forecast				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
Tampa Contract Price	56	64	66	71	358	50	75	119	138	160	186
Barge Costs, Rail to St. Louis	35	53	57	55	64	64	65	71	77	85	93
Sulfur Netback, Taylorville	21	11	9	16	294	-14	10	49	61	75	92
Tampa Contract Price	56	64	66	71	358	50	75	119	138	160	186
Rail Costs, Rail to St. Louis	61	71	73	75	78	78	80	89	100	111	125
Sulfur Netback, Taylorville	-5	-7	-7	-4	280	-28	-5	30	39	49	61
Illinois Price - 50 miles	46	51	55	60	330	40	65	107	125	144	167
Truck Costs	13	26	30	32	44	20	25	33	37	40	45
Sulfur Netback, Taylorville	33	25	26	28	286	20	39	74	88	104	123
Illinois Price - 100 miles	46	51	55	60	330	40	65	107	125	144	167
Truck Costs	16	33	38	41	56	25	32	43	47	52	57
Sulfur Netback, Taylorville	30	18	17	19	274	14	32	65	77	93	110

1.4.2 Sulfuric Acid

1.4.2.1 Pricing

The price of sulfuric acid is tied in large part to the supply and price of sulfur. Tampa spot prices, taken over time, for sulfur and sulfuric acid are used as representative of transactions by large buyers and sellers, namely the fertilizer producers. Nexant profiles industry production economies by employing the concept of Leader and Laggard cash cost of production. The Leader plant is a modern double absorption sulfuric acid plant which can take full credit from production of byproduct steam. A Laggard plant is an older single absorption facility which is unable to use any portion of the steam byproduct credit. A Laggard plant typically represents the highest cost component of the industry, and thus can be seen as the marginal source of supply, whereas a Leader plant is more indicative of the economics of a new acid producer. Tampa sulfuric acid prices have generally been set by Laggard production economics, except for 2000/2001 when overcapacity and intense competition drove down prices to approach Leader production economics. The link between sulfur prices and sulfuric acid prices in Tampa is presented in Figure 1.20.

Figure 1.20 Tampa Sulfuric Acid Price Trend

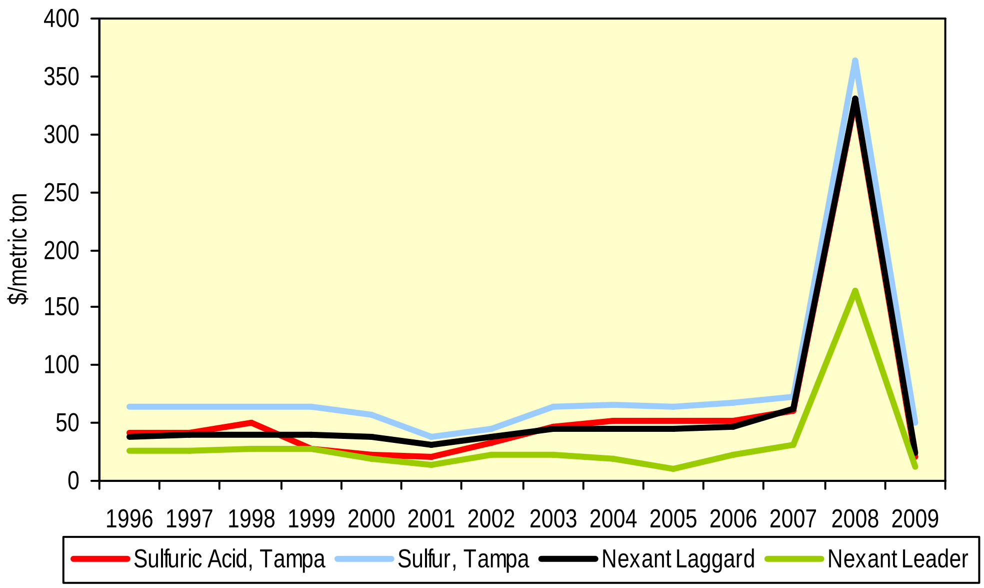

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Figure 1.21 and Table 1.18 present the United States sulfuric acid price forecast for Tampa and the U.S. Midwest.

1.4.2.2 Taylorville Netbacks

Netback values for sulfuric acid to Taylorville, based on shipping by barge, rail and truck are presented in Figure 1.22 and Table 1.19. Barge netbacks to Taylorville are negative in the short term, though becoming increasingly positive towards the end of the forecast period. The historical period, due to wild price fluctuations has both the highest and lowest netbacks. These netbacks also show that there is a cost advantage in shipping sulfuric acid by rail as opposed to barge, in the range of around $15 per ton. Trucking within 100 miles offers a greater netback to Taylorville than either barge or rail, throughout the entire time range of interest.

Figure 1.21 US Sulfuric Acid Price Forecast

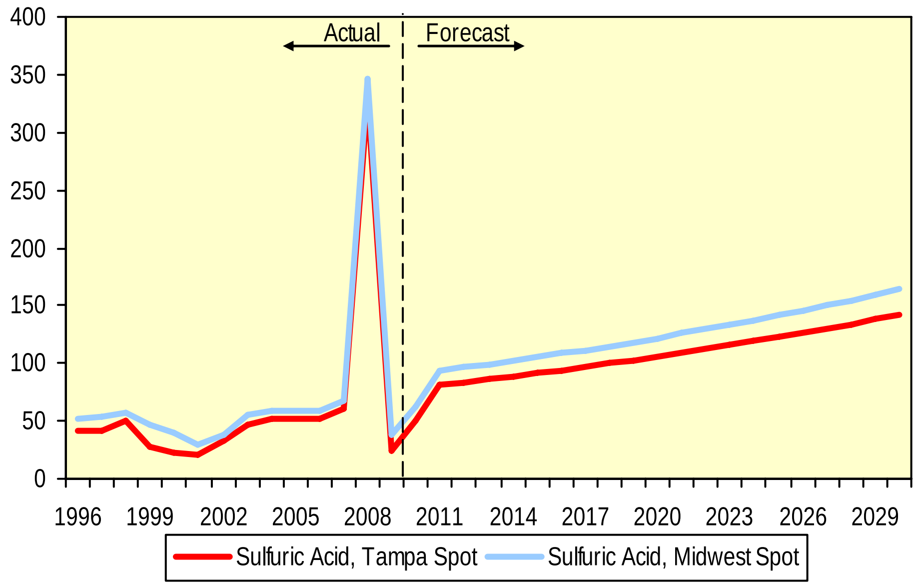

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Table 1.18 United States Sulfuric Acid Price Forecast

Nominal Dollars per Metric Ton

					Actual	Est.	Forecast				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
Sulfuric Acid, Tampa Spot	22	53	52	61	329	25	50	91	106	123	142
Sulfuric Acid, Illinois Spot	40	59	59	67	346	38	63	105	122	141	164

Figure 1.22 Taylorville Sulfuric Acid Netback Values

Nominal Dollars per Metric Ton

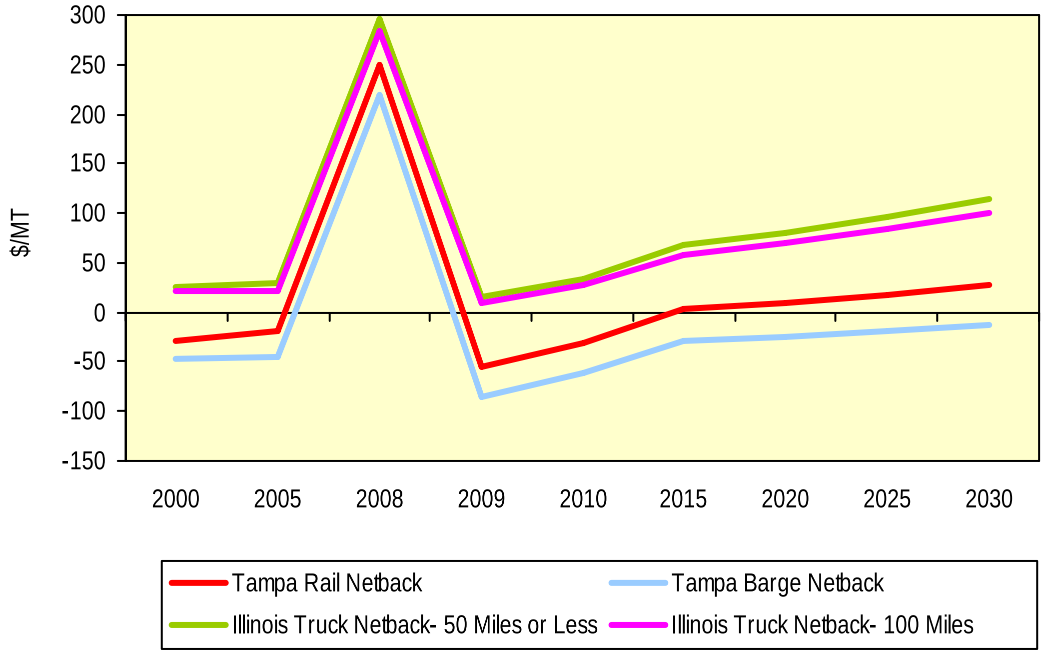

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Table 1.19 Taylorville Sulfuric Acid Netback Values

Nominal Dollars per Metric Ton

		Actual			Est.	Forecast				
	Units	2000	2005	2008	2009	2010	2015	2020	2025	2030
Tampa Price	$/MT	22	53	329	25	50	91	106	123	142
Rail Costs, Rail to St. Louis	$/MT	52	72	80	80	81	88	96	105	115
Sulfuric Acid Netback to Taylorville	$/MT	-30	-19	249	-55	-31	4	10	18	27
Tampa Price	$/MT	22	53	329	25	50	91	106	123	142
Barge Costs, Rail to St. Louis	$/MT	69	98	109	110	111	120	130	142	155
Sulfuric Acid Netback to Taylorville	$/MT	-47	-45	220	-85	-61	-28	-25	-19	-13
Illinois Price	$/MT	40	59	346	38	63	105	122	141	164
Trucking Costs	$/MT	14	29	49	22	28	37	41	45	50
Sulfuric Acid Netback - 50 Miles	$/MT	25	30	297	16	34	68	81	96	114
Illinois Price	$/MT	40	59	346	38	63	105	122	141	164
Trucking Costs	$/MT	18	36	62	28	36	47	52	57	63
Sulfuric Acid Netback - 100 Miles	$/MT	22	22	284	10	27	58	70	84	101

1.5 RELATIVE ATTRACTIVENESS OF SULFUR VERSUS SULFURIC ACID

Tenaska wants to decide whether to recover sulfur or convert the recovered sulfur into sulfuric acid. From a market standpoint, both products have large markets. Nexant concludes that sulfuric acid potentially offers a higher netback than sulfur. This is due to the fact that PADD II is a net importer of acid, but a net exporter of sulfur. Therefore, the netbacks on acid sales will likely be closer to those assuming sales in Illinois presented above, say $30 to $114 per metric ton over the forecast period, but sulfur netbacks may be closer to those assuming sales to Tampa, say $10 to $90 per metric ton.

However, the marketing of sulfuric acid is complicated due to the highly fragmented nature of the market. Tenaska would need to retain an experienced sulfuric acid marketer to perform this task. There are several potential marketers in PADD II, including Chemtrade Logistics and PVS Sulfur Solutions, who also have a national and international sulfuric acid business position. Nexant believes a choice between selling sulfur and sulfuric acid can only be made after negotiating a sulfuric acid marketing agreement. Nexant has had some initial discussions with Chemtrade Logistics and they suggested potential interest in providing the capital for building the sulfuric acid plant.

A 660 to 715 STPD sulfuric acid plant is estimated to cost roughly 25 million dollars in 2009 dollars.

Tenaska will be recovering 255 short tons per day of sulfur from its planned SNG/IGCC project, to be located at Taylorville, Illinois. Tenaska needs to decide whether to recover molten sulfur or to convert the sulfur to sulfuric acid for sale. In order to answer this question, it retained Nexant to conduct this market study for both sulfur and sulfuric acid. Nexant's July 2006 study for Tenaska showed that current sulfur production in the Midwest (PADD 2) is greater than demand. Hence, Tenaska may need to sell outside the Midwest and into the East and Southeast of the U.S. (PADD 1).

This study updates the July 2006 sulfur market and pricing analysis and provides a similar demand and supply and pricing analysis for sulfuric acid. Merchant sulfuric acid demand in the U.S. overall is highly fragmented. Current major merchant suppliers (DuPont, General, Peak Sulfur, Marsulex, and Chemtrade Logistics) all regenerate spent sulfuric acid used for alkylation in refineries as well. Logistics is a key success factor in the sulfuric acid business.

Tenaska has also asked that Nexant provide the incremental costs associated with producing sulfur or sulfuric acid. The results of this market study will be shared and coordinated with the cost analysis.

3.1 INTRODUCTION

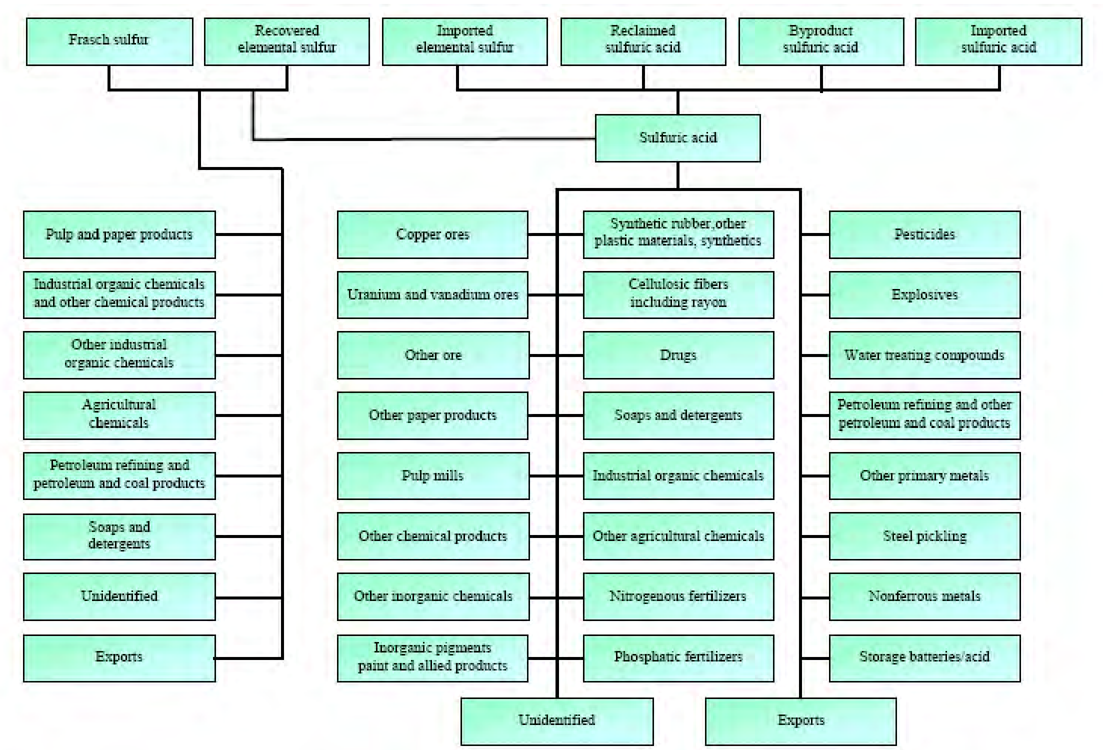
The United States is one of the world's largest markets for sulfur and sulfuric markets. This section presents historical trends and forecast sulfur and sulfuric acid demand and supply to 2030.

3.2 UNITED STATES SULFUR DEMAND AND SUPPLY

3.2.1 Demand

Sulfur is used in many different industries to produce a variety of products. Figure 3.1 displays the range of end uses for sulfur consumption.

Figure 3.1 Sulfur End Uses



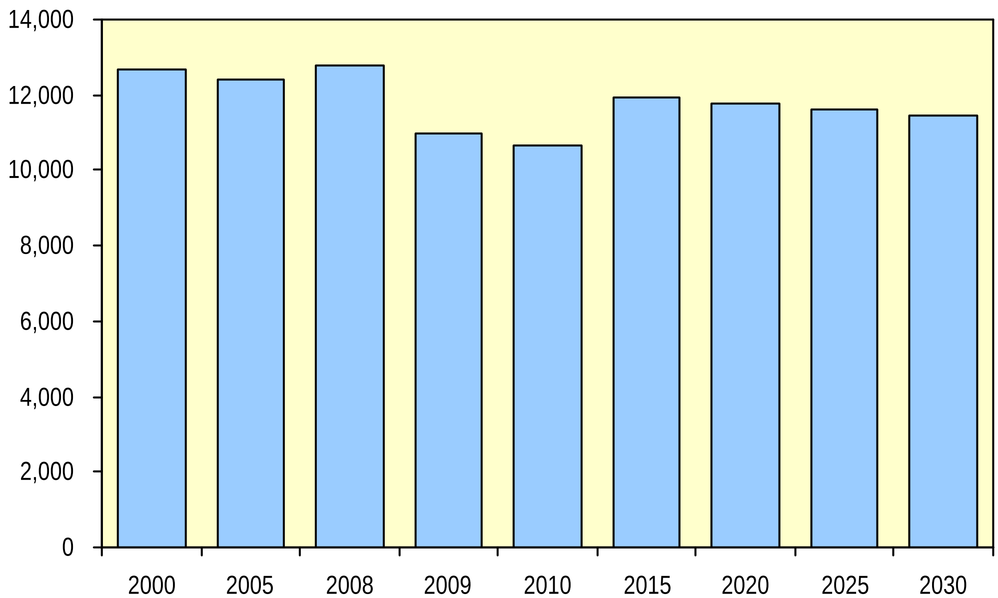
Source: U.S. Geological Survey

Approximately 90 percent of the sulfur in the United States is converted to sulfuric acid. It is the largest volume inorganic chemical and a key component in the manufacture of a wide range of products, especially phosphate fertilizers. Agricultural chemicals, mainly fertilizers, consumed about 60 percent of domestic sulfur demand. The petroleum refining and metal mining industries used approximately 25 and 3 percent, respectively. The remaining 12 percent of United States sulfur demand was used for various industrial products that require sulfur in different stages of their manufacturing process.

Overall growth in sulfur demand is expected to average 0.2 percent per year over the 2009 to 2030 period, a turnaround from the 1.6 percent average annual decline experienced over the last eight years.

Historical and forecast trends for sulfur demand are presented in Figure 3.2.

Figure 3.2 United States Sulfur Demand
Thousand Metric Tons



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Demand for sulfur in the United States totaled 12.8 million metric tons in 2008, an increase of 900 thousand metric tons over 2007. This sharp increase in US sulfur demand was due to a flyup in phosphate fertilizer demand and pricing globally which translated into sharply increased U.S. phosphate fertilizer production for both domestic use and exports and corresponding sulfur demand. However, the situation this year is sharply reversed with sharply declining phosphate fertilizer and corresponding sulfur demand for fertilizer. Overall sulfur demand in the United States has declined significantly since 2000 because of a significant decrease in the production of domestic phosphate fertilizers and therefore no growth in sulfur end use for that industry, along with weather related incidents within the Gulf Coast region, halting production within refineries during 2008.

Overall demand for sulfur is expected to reach about 11.5 million metric tons by 2030, a decrease of approximately 1.4 million metric tons from 2008 but an increase of about 500 thousand tons over estimated 2009 demand. Forecast sulfur demand will be driven by the outlook for phosphate fertilizer production in the U.S. and will be related to forecast U.S. GDP growth in other sectors. The demand for sulfur is seen to continue to decline in 2009 and 2010 due to the economic situation around the world but is expected to grow in the short-term forecast to 2015 as the global economy rebounds and U.S. phosphate fertilizer production and other U.S.

sulfur markets as well. However, since sulfur is in a mature commodity market in the United States, demand is seen to decrease slightly over the long term forecast from 2015 to 2030.

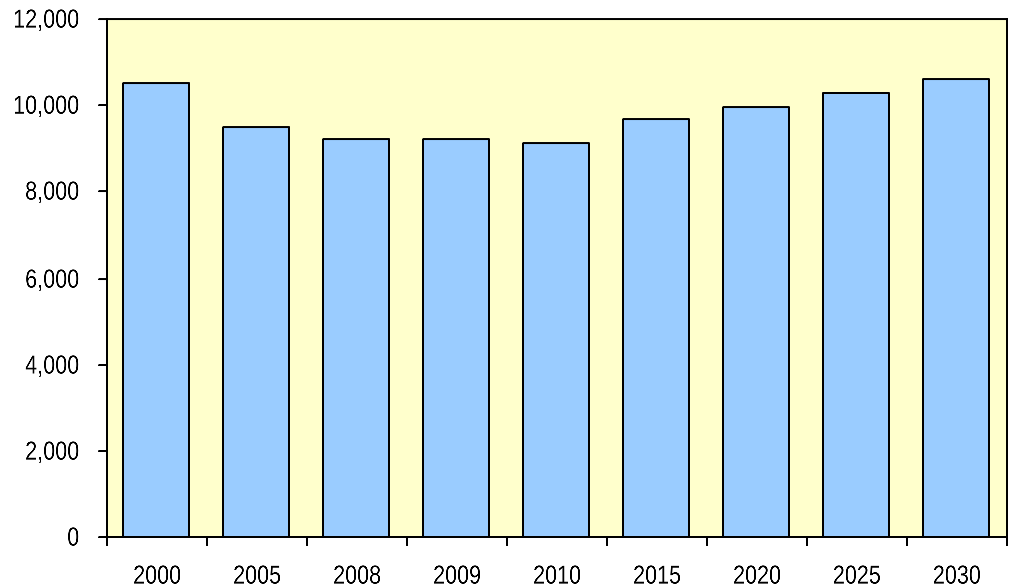
3.2.2 Supply

Sulfur production is expected to increase 0.7 percent per year over the 2009 to 2030 forecast period. This modest growth is a reversal of the 1.4 percent annual decline rate over the past eight years.

The United States is the leading sulfur producer in the world, next being Australia and Canada. During 2008, elemental sulfur was recovered by 40 companies at 107 plants in 26 States and the U.S. Virgin Islands. It was recovered at various petroleum refineries, natural gas processing plants and coking plants. Secondary sources of sulfur come from the sulfur dioxide from industrial mineral wastes, and flue gases. Increased recovery of domestic elemental sulfur production from petroleum refineries is expected to drive growth in future supply, reflecting modest increases in refinery throughput as well as a projected increase in the average sulfur content of crude oil processes in United States refineries.

Sulfur supply in the United States reached 9,200 thousand metric tons in 2008, 8,400 thousand metric tons coming from elemental sulfur from petroleum refineries, and the rest from other forms of sulfur production such as natural gas processing. This represented an increase of 110 thousand metric tons from 2007. However, overall sulfur supply has decreased approximately 1.6 percent over the last eight years due to the halt of United States Frasch mining at the end of 2000. Therefore, future supply will directly reflect the developments in the recovery from industrial processes such as refining and natural gas processing. It is expected that sulfur supply will slightly decrease from 2009 to 2010 due to the recession and the increase use of ethanol in the petroleum industry. However, supply is seen to increase in the long term forecast because of the lower quality crudes coming in from the Canadian oil sands, with higher sulfur contents that need to be extracted. The historical and forecast sulfur supply trends are presented in Figure 3.3.

Figure 3.3 United States Sulfur Supply
Thousand Metric Tons



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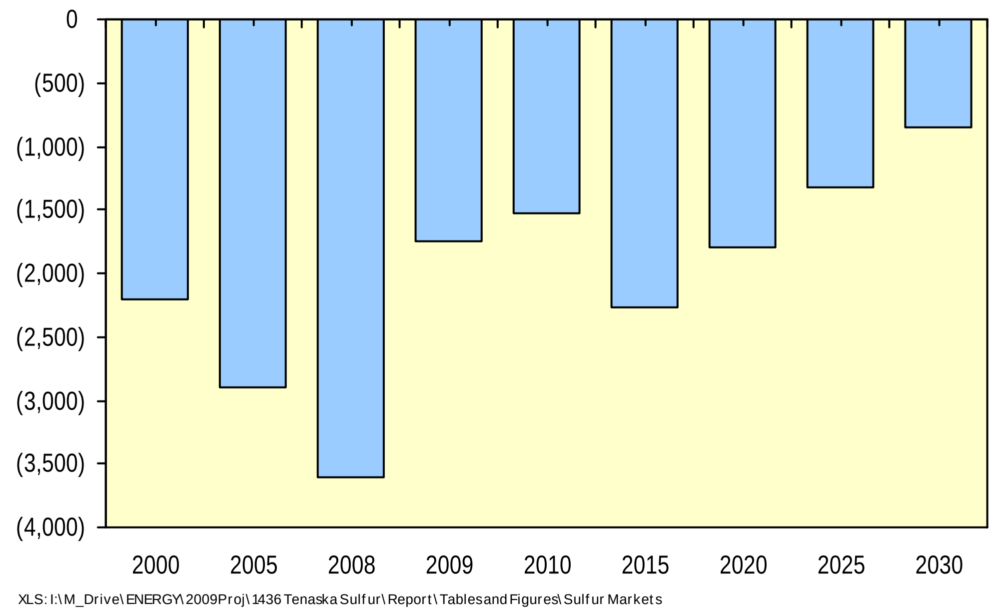
3.2.3 Supply/Demand Balance

The United States is a significant net importer of sulfur, primarily recovered from sour gas in Western Canada and from Mexico and Venezuela, and is expected to remain a net importer in the future. Net imports ranged from 17-28 percent of demand over the 2000-2008 historical period. Overall sulfur demand in the United States has decreased between 2000 and 2009, along with sulfur supply, creating an imbalance between domestic supply and demand. The net deficit of sulfur in the United States was approximately 3,600 thousand metric tons in 2008 (Table 3.1) compared to 2,810 thousand metric tons in 2007. Over the long term forecast period imports will decline to 0.852 million metric tons by 2030. Table 3.1 summarizes historical sulfur supply and demand and Figure 3.4 displays the historical and forecast sulfur supply/demand balance in the United States. Due to the slight decrease in sulfur demand growth over the long-term forecast, the balance between supply and demand is expected to decrease, with the United States being fewer dependants upon sulfur imports by 2030 as in 2008.

Table 3.1 United States Sulfur Supply and Demand Balance
Thousand Metric Tons

	Actual					Est.	Forecast					AAGR, %		
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
Supply	10,500	9,500	9,050	9,090	9,200	9,228	9,135	9,675	9,974	10,282	10,600	-1.4%	0.7%	0.6%
Demand	12,700	12,400	12,000	11,900	12,800	10,971	10,663	11,940	11,775	11,612	11,451	-1.6%	-1.0%	-0.3%
Net Trade	(2,200)	(2,900)	(2,950)	(2,810)	(3,600)	(1,744)	(1,528)	(2,265)	(1,801)	(1,330)	(852)			

Figure 3.4 United States Sulfur Supply and Demand Balance
Net Exports Thousand Metric Tons



3.3 UNITED STATES SULFURIC ACID DEMAND AND SUPPLY

3.3.1 Demand

Sulfuric acid is the single most widely used chemical in the world today. It has uses as a reactant, catalyst, and for pH adjustment. Table 3.2 presents the range of end uses for sulfuric acid.

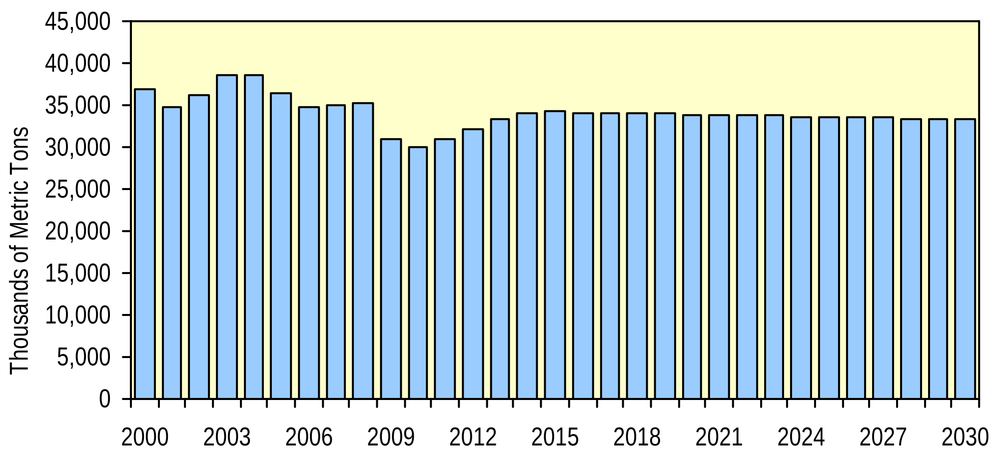
Table 3.2 Sulfuric Acid End Uses

End Use	%
Phosphoric Acid and Fertilizer Production	70
Copper Leaching	5
Petroleum Alkylation	4
Pulp and Paper	3
Ammonium Sulfate	2
Aluminum Sulfate	1
Other	15

Sulfuric acid is a key component in the manufacture of a wide range of products, especially phosphate fertilizers. Agricultural chemicals, mainly fertilizers, consumed about 70 percent of domestic sulfuric acid demand. The petroleum refining and metal mining industries used approximately 10 percent, combined.

Historical and forecast U.S. sulfuric acid demand is outlined in Figure 3.5. As with sulfur, sulfuric acid demand is driven by phosphate fertilizer production. Other sulfuric acid demand is driven by general economic activity. Demand for sulfuric acid in the United States reached 35,280 thousand metric tons in 2008, which was an increase of approximately 200 thousand metric tons from 2007. Overall, sulfuric acid demand in the United States since 2000 has decreased by about 0.2 percent annually. Similar to sulfur, sulfuric acid demand in the United States is relatively stable and since 2000 has decreased by about 0.2 percent annually. Forecast demand is expected to rebound from a floor in 2010 and grow at a rate of 1.7 percent annually between 2009 and 2015. Demand recovery will be driven recovery in phosphate fertilizer production and by the economic recovery. However, longer term demand is forecast to fall by 0.2 percent annually from 2015-2030 as the greater overall trend of slowly diminishing demand continues.

Figure 3.5 United States Sulfuric Acid Demand
Thousand Metric Tons



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3.3.2 Supply

Sulfuric acid supply has been relatively stable over the past eight years, and is expected to remain constant over the forecast period with the exception of the additional capacity brought online by the Taylorville Project, should Tenaska choose to produce sulfuric acid. As this forecast is designed to help Tenaska make the decision whether to produce sulfuric acid, the forecast assumes production by Tenaska in order to evaluate such production. The sources of sulfuric acid supply vary by region and to some extent by time, but typically are as follows:

- From sulfur as the feedstock
  - Sulfur is the source of about 63 percent of global sulfuric acid production
  - Sulfur generally is transported in preference to shipping sulfuric acid. Sulfur is more cost effective to move since acid consists of a large percentage of contained water in the molecule. This allows large consumers of sulfur (especially phosphoric acid producers for fertilizer) to ship in their feedstock to their plant sites

- From smelter gases
  - Smelter gas is the source of about 25 percent of global sulfuric acid production
  - Frequently smelters may not be located near the acid demand, resulting in considerable shipments of acid product

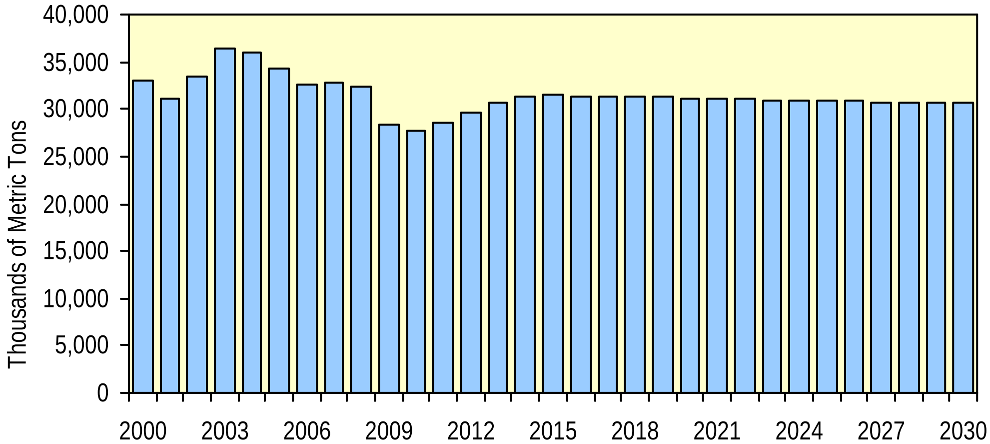
- Pyrites (sulfur-containing ores that contain FeS_2, primarily)
  - Pyrites are the source of about nine percent of global sulfuric acid supply
  - Pyrites are mined on purpose for their sulfur content

- Other sources constitute about three percent of acid supply (primarily the "regeneration" of spent acid and acid sludges)

With the exception of 2001 and 2003-2005, sulfuric acid supply in the United States has generally been in the range of 32.5-33 million metric tons. The years 2003-2005 experienced supply in excess of 35 million metric tons, following supply of 31 million metric tons in 2001, caused by the economic downturn following the September 11th terrorist attacks. Future supply is forecast to decline over the forecast period at the same rate as demand with the exception of the additional capacity brought online by the Taylorville Project during 2014, should Tenaska choose to produce sulfuric acid.

Figure 3.6 United States Sulfuric Acid Supply

Thousand Metric Tons



3.3.3 Supply/Demand Balance

The United States is a significant net importer of sulfuric acid, primarily from Canada, Mexico, and Venezuela, and is expected to remain a net importer in the future. Approximately 10 percent of sulfuric acid used for domestic consumption comes from imports. Historically a net importer, the United States is projected to remain a net importer over the 2015-2030 timeframe (Table 3.3 and Figure 3.7).

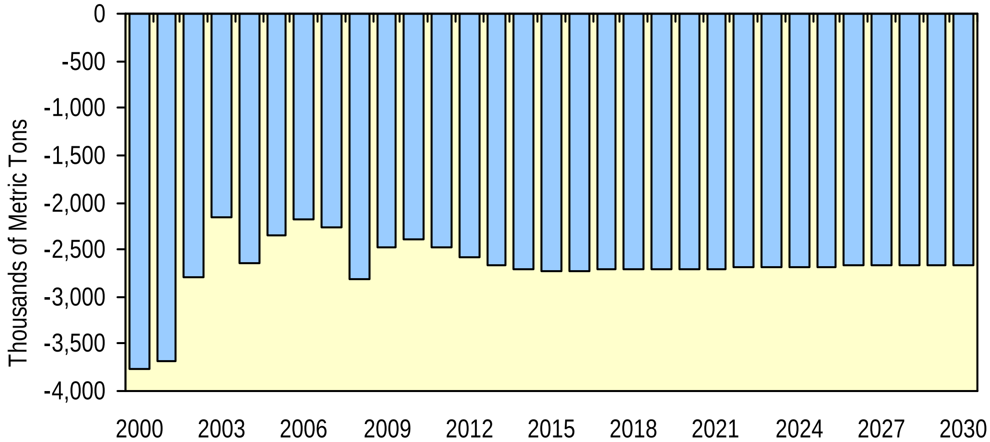
Table 3.3 United States Sulfuric Acid Supply and Demand Balance

Thousand Metric Tons

	Actual			Est	Forecast					AAGR%		
	2000	2005	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
Capacity	36,400	36,400	36,400	36,400	36,400	37,200	37,200	37,200	37,200			
Supply	33,063	34,190	32,463	28,457	27,658	31,440	31,165	30,892	30,622	-0.2%	-0.5%	-0.2%
Demand	36,827	36,532	35,280	30,927	30,059	34,169	33,870	33,573	33,279	-0.5%	-0.5%	-0.2%
Net Trade	(3,764)	(2,342)	(2,818)	(2,470)	(2,401)	(2,729)	(2,705)	(2,681)	(2,658)			

Figure 3.7 United States Sulfuric Acid Net Exports

Thousand Metric Tons



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3.4 CONCLUSIONS

The following conclusions regarding sulfur and sulfuric acid markets for the United States are summarized below.

3.4.1 Sulfur

- Approximately 90 percent of sulfur is converted to sulfuric acid
- Even though demand in the United States has been declining since 2000, it is expected to see moderate growth from 2009 to 2030, around 0.2 percent due primarily to a recovery from current depressed economic conditions and phosphate fertilizer production
- The United States is the leading sulfur producer in the world
- Sulfur supply has declined from 2000-2008 due to the halt in Frasch mining in the United States
- Increased recovery of domestic elemental sulfur production from petroleum refineries is expected to drive growth in future supply, reflecting modest increases in refinery throughput as well as a projected increase in the average sulfur content of crude oil processes in United States refineries.
- The United States is the largest importer of sulfur around the world and is expected to continue to be an importer through the forecast period

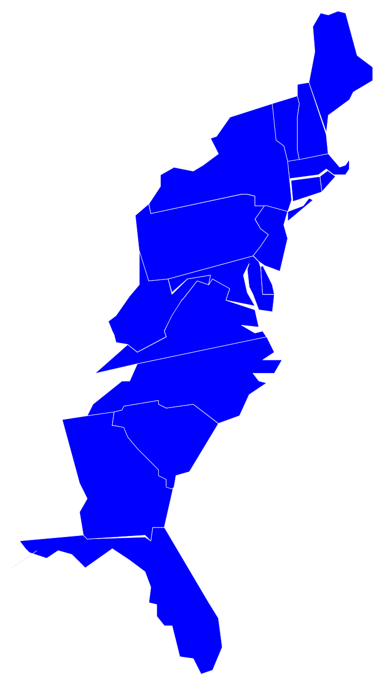
3.4.2 Sulfuric Acid

- Approximately 70 percent of sulfuric acid is consumed by the fertilizer industry
- Sulfuric acid supply and demand in the United States is quite stable, and is forecast to slowly decline from 2015 onward
- The United States is the leading sulfuric acid producer in the world
- The United States has been historically a net importer of sulfuric acid and is expected to maintain this position during the forecast period

4.1 INTRODUCTION

The Petroleum Administration for Defense District (PADD) I, the East Coast, is defined in Figure 4.1. PADD I is a significant consumer of both sulfur and sulfuric acid. The area is dominated by the phosphate fertilizer industry with facilities in North Carolina and Florida. PADD I imports most of its sulfur to produce sulfuric acid, which in turn is used to manufacture fertilizers. Elemental sulfur, mainly from petroleum refining, as well as through natural gas processing, is imported into PADD I primarily from PADD III (the U.S. Gulf Coast) and foreign imports. Sulfuric acid is mainly produced from elemental sulfur in PADD I, through the recovery of off-gasses, along with the recycling of sulfuric acid from refineries.

Figure 4.1 PADD I Map



The sulfur and sulfuric acid markets in PADD I are discussed below.

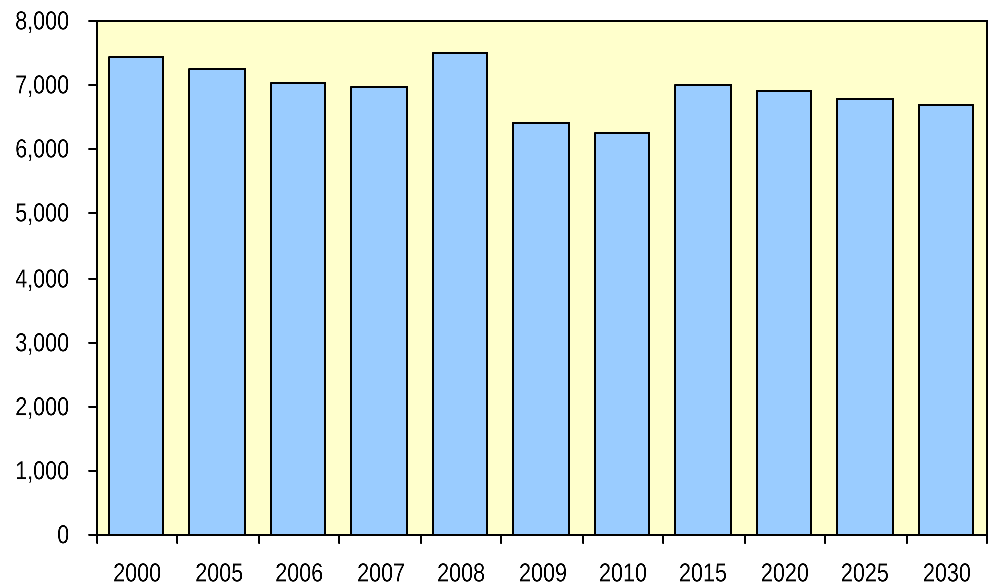
4.2 PADD I SULFUR DEMAND AND SUPPLY

4.2.1 Demand

PADD I accounts for about 60 percent of national sulfur demand, and is expected to maintain this market share throughout the study period. Sulfur consumption in PADD I is dominated by the phosphate fertilizer industry in Florida and North Carolina.

Sulfur demand in PADD I is expected to average 0.2 percent growth per year over the 2009 to 2030 period, compared to the 0.1 percent annual growth over the last eight years as shown in Figure 4.2 displays the historical and forecast trends for sulfur demand in PADD I.

Figure 4.2 PADD I Sulfur Demand
Thousand Metric Tons



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Demand for sulfur in PADD I increased 527 thousand metric tons to 7.497 million metric tons in 2008. The increase was due primarily to sharp increases in global phosphate fertilizer demand and U.S. phosphate fertilizer production. It is estimated to fall to 6.7 million metric tons by 2030. Demand is expected to track economic performance, and therefore demand is expected to suffer a severe contraction in 2009 and 2010, with a rebound taking place from 2011 to 2014. After 2015, it is forecast that demand will slowly decline by approximately 0.3 percent annually, reflecting the maturity of the markets served by sulfur.

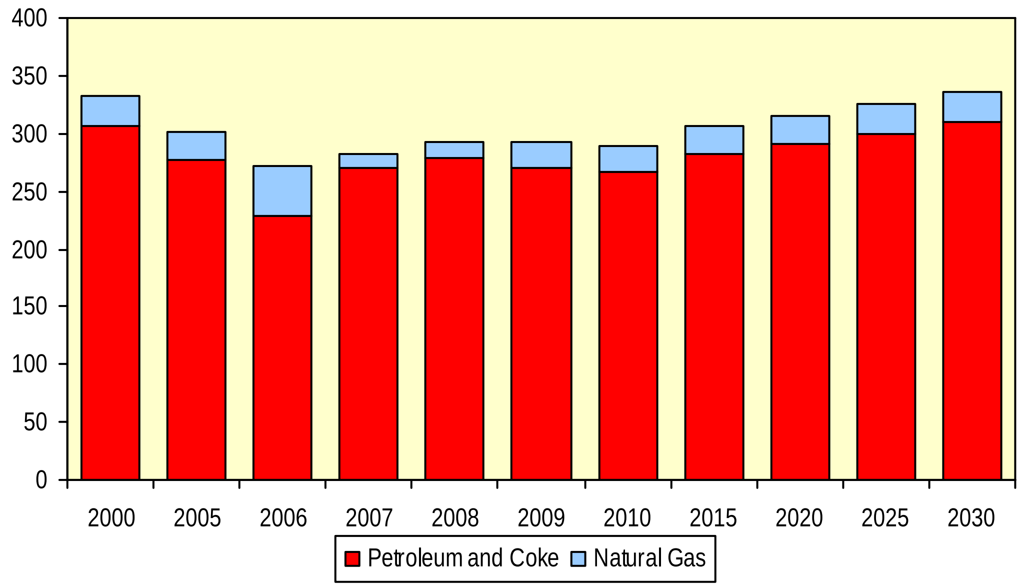
4.2.2 Supply

Sulfur supply in PADD I was 292 thousand metric tons in 2008, which represented an increase of 9 thousand metric tons over 2007. Sulfur production within PADD I represents only about 3 percent of total sulfur supply to the region in 2008. The bulk of PADD I supply comes from petroleum refineries, coking plants and natural gas plants.

Sulfur production in PADD I declined over the past decade, but is forecast to grow 0.7 percent annually over the 2009 to 2030 period. Future supply growth will be driven by an increase in the recovery of sulfur from petroleum refineries, in part due to the projected increase in the average sulfur content of crude oil that will be processed in United States refineries.

Historical and forecast trends of sulfur supply in PADD I are presented in Figure 4.3.

Figure 4.3 PADD I Sulfur Supply
Thousand Metric Tons



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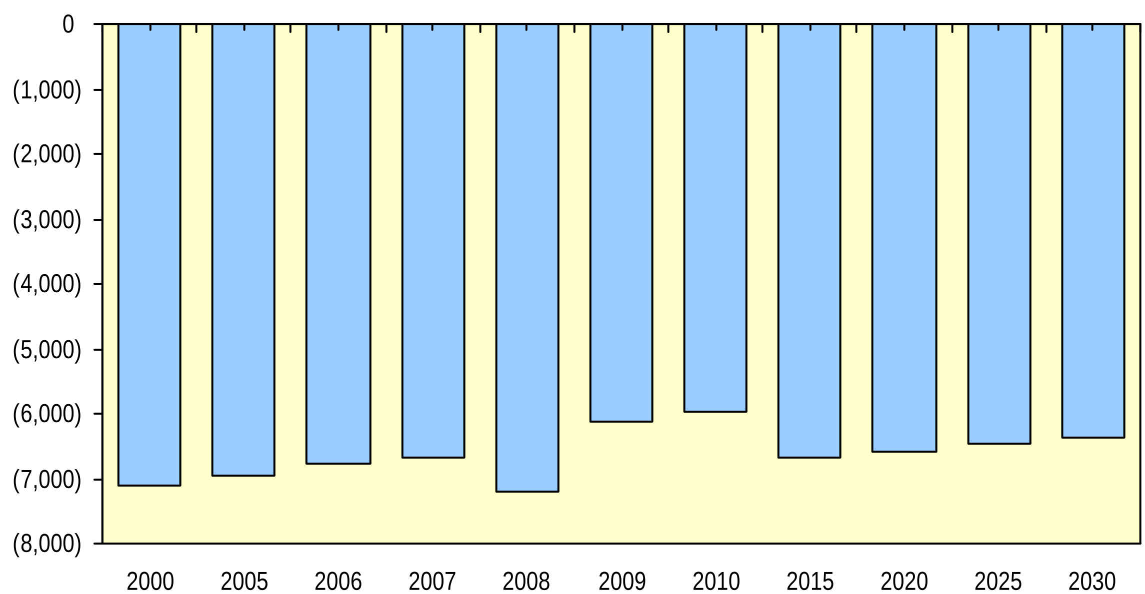
4.2.3 Supply/Demand Balance

Table 4.1 summarizes historical and forecast sulfur supply and demand. PADD I is a major net importer of sulfur, primarily from PADD III (the Gulf Coast) and foreign imports. The net deficit of sulfur in the PADD I was significant over the last eight years, reaching about 7.2 million metric tons in 2008. PADD I is forecast to remain a major net importer of sulfur over the forecast period, as illustrated in Figure 4.4.

Table 4.1 PADD I Sulfur Supply and Demand Balance
Thousand Metric Tons

		Actual					Est.	Forecast					AAGR, %		
		2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
	Petroleum and Coke	307	277	229	270	279	269	267	283	291	300	310			
Supply	Natural Gas	26	24	42	13	13	23	23	24	25	26	26			
	Total	333	301	271	283	292	292	289	307	316	326	336	-1.6%	0.7%	0.6%
Demand		7,438	7,262	7,028	6,970	7,497	6,426	6,245	6,993	6,896	6,801	6,707	0.1%	-1.0%	-0.3%
Net Trade		(7,105)	(6,961)	(6,757)	(6,687)	(7,205)	(6,133)	(5,956)	(6,687)	(6,580)	(6,475)	(6,371)			

Figure 4.4 PADD I Sulfur Supply and Demand Balance
Thousand Metric Tons



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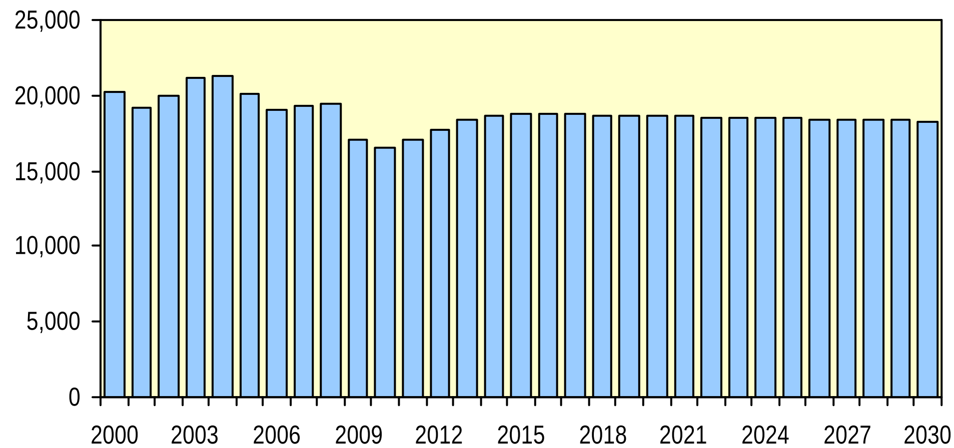
4.3 PADD I SULFURIC ACID SUPPLY AND DEMAND

4.3.1 Demand

Figure 4.5 outlines historical and forecast trends for sulfuric acid demand in PADD I. Demand for sulfuric acid in PADD I grew to 19.4 million metric tons in 2008, an increase of around 140 thousand metric tons from 2007. Demand fell at an annual rate of 0.5 percent during the historical period 2000-2008, and is forecast to continue to modestly decline during the forecast period.

Figure 4.5 PADD I Sulfuric Acid Demand

Thousand Metric Tons



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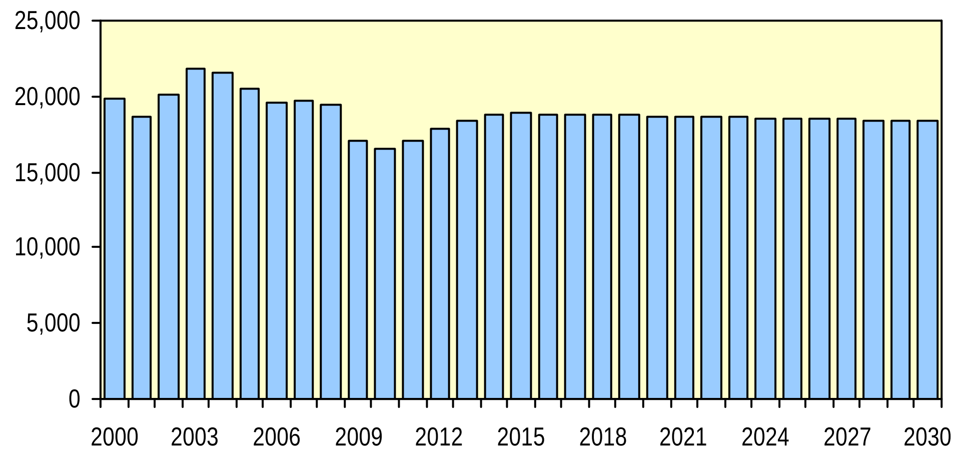
Consumption in PADD I is dominated by the phosphate fertilizer industry in Florida and North Carolina. However, these operations generally produce their own supply. Pulp and paper companies, pickling operations in steel mills, chemical companies, and to a much smaller degree than PADD II, ethanol production make up most of the remainder of the market for sulfuric acid. Petroleum refining is another significant consumer of sulfuric acid. However this sulfuric acid is generally recycled into new supply so net demand is relatively small.

4.3.2 Supply

The bulk of sulfuric acid supply in PADD I is produced from elemental sulfur. The remaining supply is from the recovery of off gasses in smelters, and recycling of sulfuric acid from refineries. The United States Geological Survey (USGS) estimates that 3-5 million tons of sulfuric acid is recycled from the petroleum refining industry in the United States every year. The historical and forecast trend of sulfuric acid supply is presented in Figure 4.6. Sulfuric acid supply in PADD I was 19.5 million metric tons in 2008, a decrease of about 200 thousand metric tons from 2007. The period 2003-2005 was a time of oversupply, following the undersupply of 2001 which was brought about by the economic downturn following the September 11th terrorist attacks. Sulfuric acid supply declined 0.2 percent annually in the historical period from 2000-

2008 and is expected to decline slowly at the same rate as demand through the forecast period, even though supply has been volatile in recent years.

Figure 4.6 PADD I Sulfuric Acid Supply
Thousand Metric Tons



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4.3.3 Supply/Demand Balance

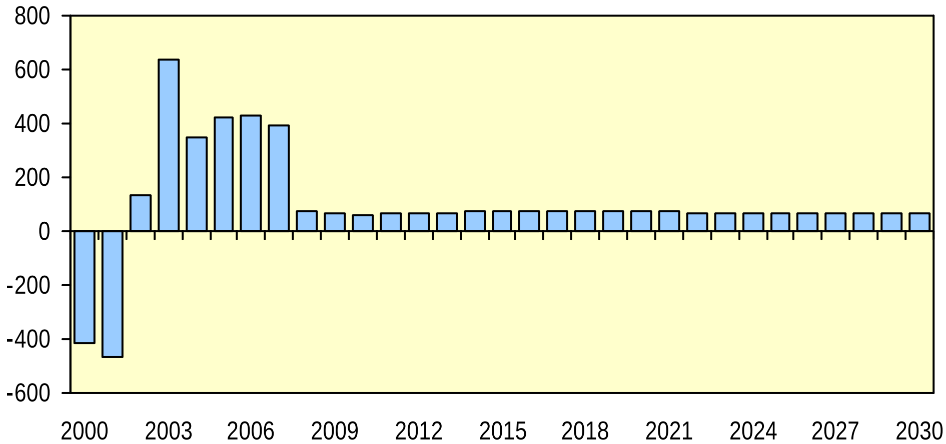
PADD I has been a net exporter of sulfuric acid to outside the region since 2002 and is forecast to remain a modest net exporter during the forecast period. Driven by demand deterioration and the resulting supply decline, net trade (net shipments outside the region) is forecast to remain relatively low, staying less than 100 thousand tons per year, as shown in Table 4.2 and Figure 4.7.

Table 4.2 PADD I Sulfuric Acid Supply and Demand
Thousand Metric Tons

	Actual			Est	Forecast					AAGR%		
	2000	2005	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
Capacity	21,300	21,300	21,300	21,300	21,300	21,300	21,300	21,300	21,300			
Supply	19,838	20,514	19,478	17,074	16,595	18,864	18,699	18,535	18,373	-0.2%	-0.5%	-0.2%
Demand	20,255	20,093	19,404	17,010	16,532	18,793	18,628	18,465	18,304	-0.5%	-0.5%	-0.2%
Net Trade	(417)	421	74	64	63	71	71	70	69			

Figure 4.7 PADD I Sulfuric Acid Supply and Demand Balance

Thousand Metric Tons



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4.4 CONCLUSIONS

Below is a summary of conclusions made for PADD I sulfur and sulfuric acid markets.

4.4.1 Sulfur

- Overall growth in sulfur demand in PADD I is expected to average 0.2 percent per year over the 2009 to 2030 period, in line with the 0.1 percent annual growth from 2000 to 2008
- Consumption in PADD I is dominated by the phosphate fertilizer industry in Florida and North Carolina
- Sulfur production is expected to achieve 0.7 percent annual growth over the 2009 to 2030 period compared to a decline of 1.6 percent annually over the past eight years
- PADD I is a major net importer of sulfur, primarily from PADD III (the Gulf Coast) and foreign sources, and is expected to continue to be a net importer through the forecast period

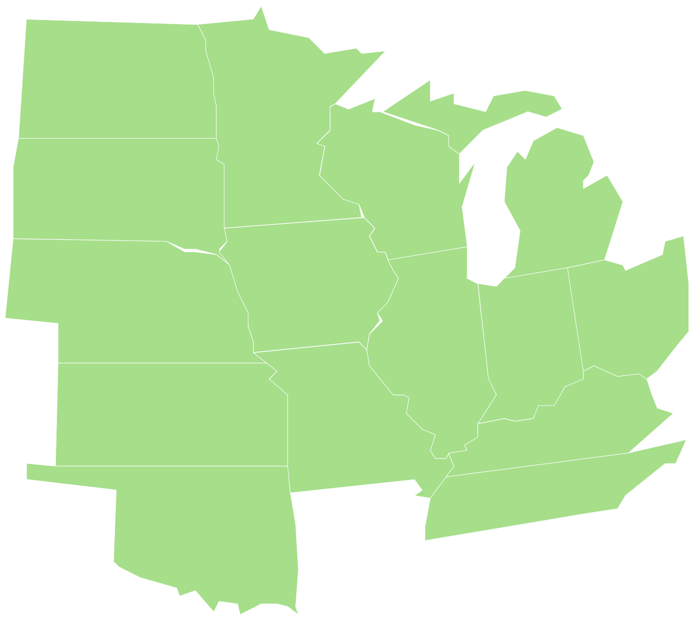
4.4.2 Sulfuric Acid

- Sulfuric acid consumption is mature, and is forecast to very slowly decline over the forecast period
- The consumption of sulfuric acid in PADD I is dominated by the phosphate fertilizer industry in Florida and North Carolina
- PADD I was responsible for 64 percent of supply and 55 percent of sulfuric acid demand in the United States in 2008
- PADD I is relatively balanced in sulfuric acid, and has been a modest net exporter in recent years. It is expected that PADD I will remain an exporter through the forecast period

5.1 INTRODUCTION

The Petroleum Administration for Defense District (PADD) II, the Midwest, is defined in Figure 5.1. PADD II is a significant producer and consumer of both sulfur and sulfuric acid. Elemental sulfur is produced mainly through petroleum refining, along with a small portion being made as a byproduct of natural gas processing. Sulfuric acid is produced from elemental sulfur in PADD II as well as through the recovery of off-gasses, as well as the recycling of sulfuric acid from refineries. The sulfur and sulfuric acid markets in PADD II are discussed below.

Figure 5.1 PADD II Map

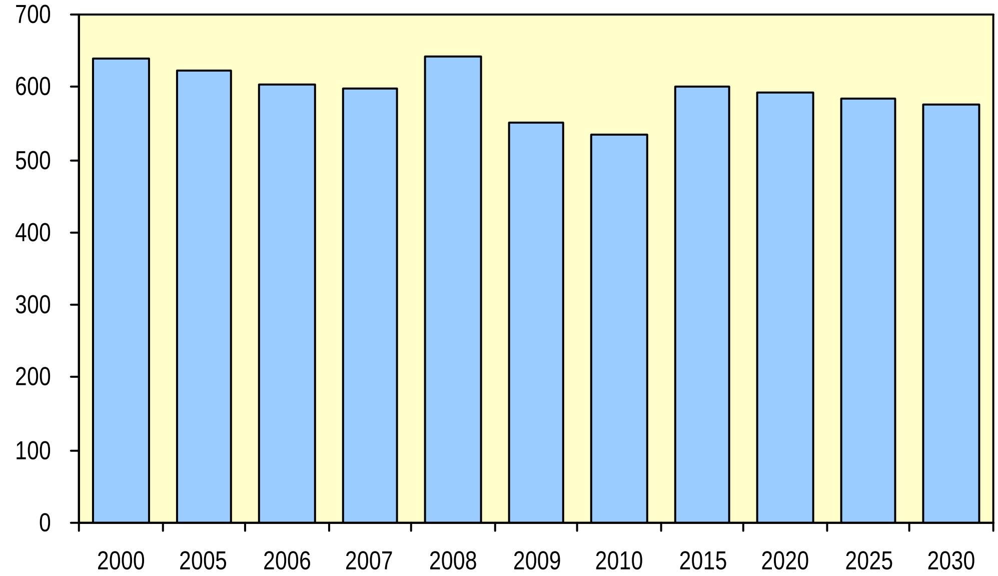


5.2 PADD II SULFUR MARKET

5.2.1 Demand

In 2008, PADD II had the least sulfur consumption of all United States PADDs, representing approximately 5 percent of sulfur demand in the country. Demand in the PADD is expected to average 0.2 percent growth per year from 2009 to 2030, slightly higher than the 0.1 percent growth achieved from 2000 through 2008. Historical and forecast trends for sulfur demand for PADD II are presented in Figure 5.2.

Figure 5.2 PADD II Sulfur Demand
Thousand Metric Tons



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Demand for sulfur in the PADD II was 643 thousand metric tons in 2008, an increase of 20 thousand metric tons from 2007. It is forecast to reach approximately 576 thousand metric tons by 2030. Demand for sulfur has been declining in the region. Future demand is expected to generally follow this trend. Moreover, demand is projected to decline significantly in 2009 and 2010 because to the recent sharp economic downturn but recover during the 2011 to 2014 period. From 2015 to 2030, demand is forecast to gradually decline due to the maturity of the markets served by sulfur.

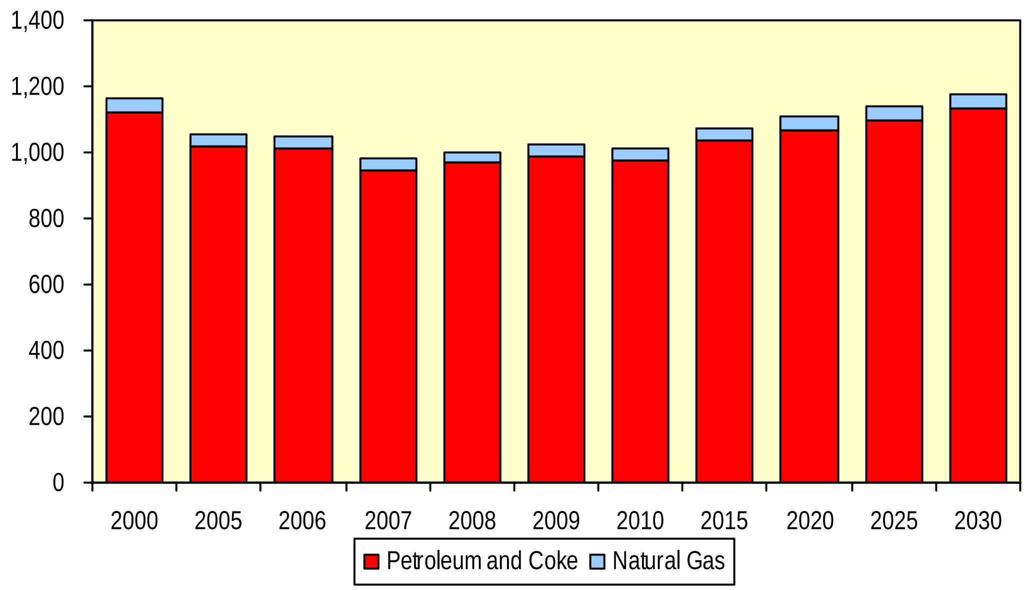
5.2.2 Supply

Sulfur supply increased in PADD II to 999 thousand metric tons in 2008, compared to 984 thousand metric tons in 2007. The region had approximately 11 percent of the 9.2 million metric tons of United States domestic sulfur supply in 2008. The majority of the sulfur supply, as seen also in PADD I, has come from the petroleum refineries and coking plants. The remaining supply has been from the recovery in natural gas plants.

Sulfur production in PADD II declined 1.9 percent annually from 2000 to 2008 but is expected to grow 0.7 percent per year over the 2009 to 2030 forecast period due to the increase in the recovery of domestic elemental sulfur production from petroleum refineries and the increase in the average sulfur content of crude oil that will be processed in United States refineries. Figure 5.3 displays the historical and forecast sulfur supply in PADD II.

Figure 5.3 PADD II Sulfur Supply

Thousand Metric Tons



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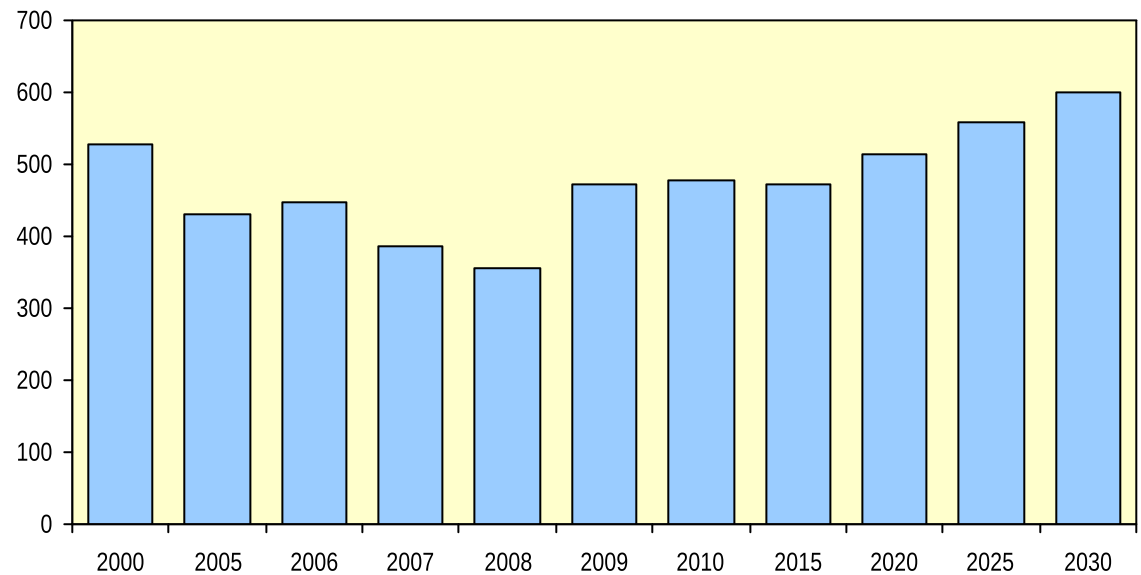
5.2.3 Supply/Demand Balance

Table 5.1 summarized sulfur supply and demand. PADD II has historically been a net exporter of sulfur, reaching a surplus of approximately 356 thousand metric tons in 2008. The region is forecast to remain an exporter of sulfur with over 601 thousand metric tons by 2030. Figure 5.4 displays the historical and forecast sulfur supply and demand balance for PADD II.

Table 5.1 PADD II Sulfur Supply and Demand Balance
Thousand Metric Tons

		Actual					Est.	Forecast					AAGR, %		
		2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
	Petroleum and Coke	1,123	1,016	1,010	944	969	987	977	1,035	1,067	1,099	1,133			
Supply	Natural Gas	42	38	40	40	30	37	37	39	40	41	43			
	Total	1,165	1,054	1,050	984	999	1,024	1,014	1,074	1,107	1,141	1,176	-1.9%	1.0%	0.6%
Demand		638	623	603	598	643	551	536	600	592	584	576	0.1%	-1.0%	-0.3%
Net Trade		527	431	447	386	356	472	478	473	515	557	601			

Figure 5.4 PADD II Sulfur Supply and Demand Balance
Thousand Metric Tons



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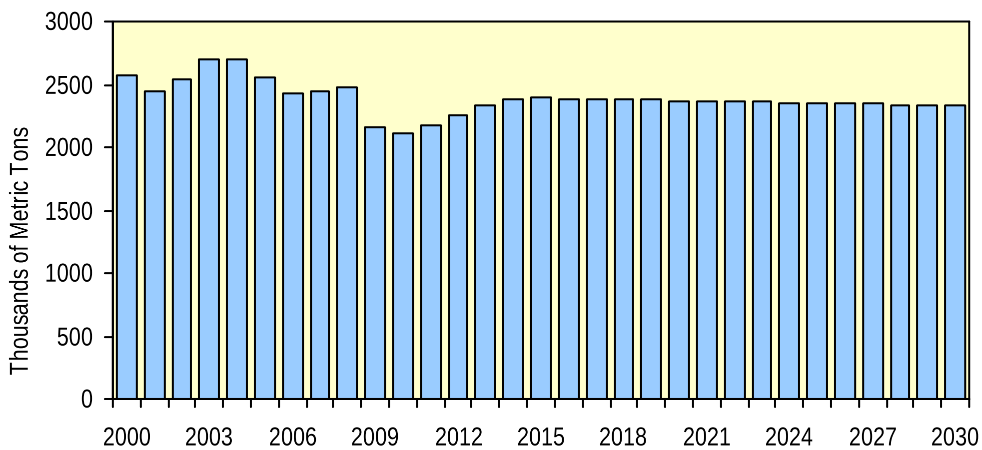
5.3 PADD II SULFURIC ACID SUPPLY AND DEMAND

5.3.1 Demand

Figure 5.5 presents historical and forecast trends for sulfuric acid in PADD II. Demand for sulfuric acid in the PADD II was approximately 2.47 million metric tons in 2008, an increase of 20 thousand metric tons from 2007. Sulfuric acid demand within PADD II has remained relatively constant in the historical period from 2000-2008, declining at 0.5 percent annually in the historic period, similar to the case with PADD I. Demand is forecast to continue to decline modestly during the forecast period.

Figure 5.5 PADD II Sulfuric Acid Demand
Thousand Metric Tons



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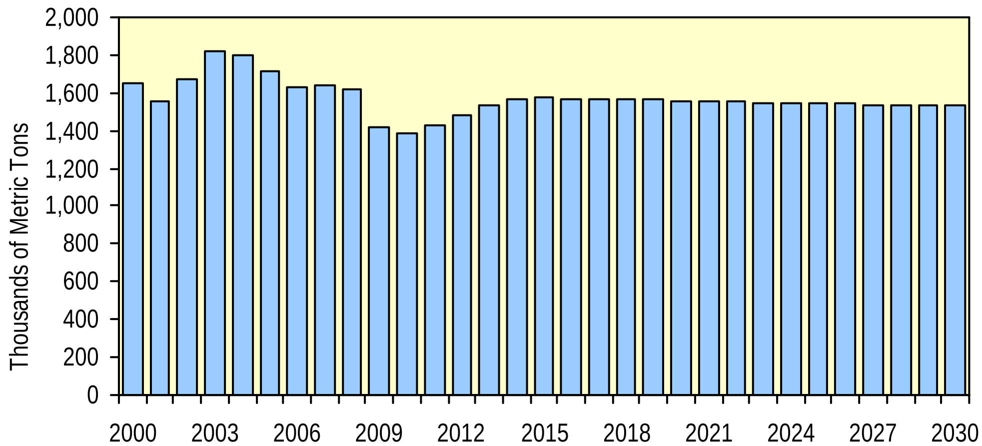
Demand in PADD II is lower and more fragmented than PADD I, due mostly to the absence of the phosphate fertilizer industry's concentration in PADD I.

5.3.2 Supply

The sulfuric acid supply decreased in PADD II to about 1.6 million metric tons in 2008, which was a decrease of 15 thousand metric tons compared to the 1,638 thousand metric tons of supply in 2007. Sulfuric acid supply in PADD II has remained relatively flat over the historical period from 2000-2008, declining at 0.2 percent annually and is expected to decline slowly in the forecast period with the exception of additional production from the Taylorville Project. Figure 5.6 presents the historical and forecast trends for sulfuric acid supply in PADD II.

Figure 5.6 PADD II Sulfuric Acid Supply

Thousand Metric Tons



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5.3.3 Supply/Demand Balance

Table 5.2 summarizes historical and forecast PADD II sulfuric acid supply and demand. PADD II has been a net importer of sulfuric acid. The net sulfuric acid deficit in the region has varied slightly over the years, remaining under 1,000 thousand metric tons, as shown in Figure 5.7. With supply slowly declining at the same rate as demand in the forecast period, PADD II will remain a net importer of sulfuric acid.

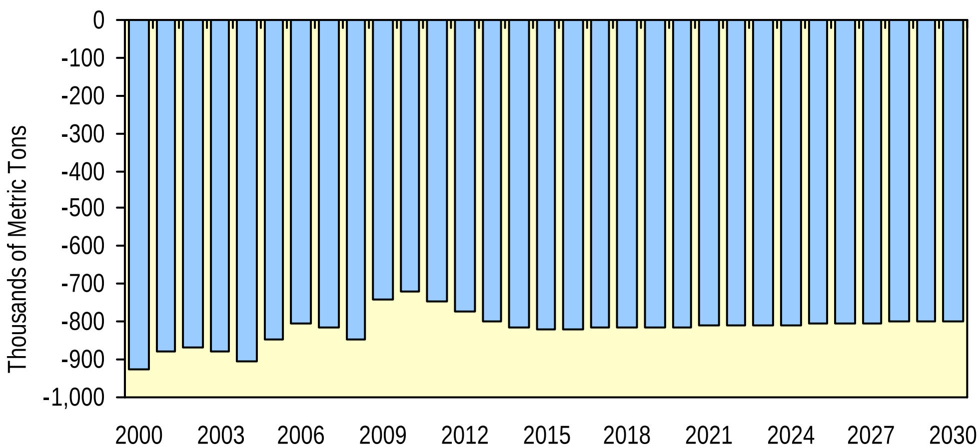
Table 5.2 PADD II Sulfuric Acid Supply and Demand

Thousand Metric Tons

	Actual			Est	Forecast					AAGR%		
	2000	2005	2008	2009	2010	2015	2020	2025	2030	2000-2008	2008-2015	2015-2030
Capacity	1,800	1,800	1,800	1,800	1,800	2,600	2,600	2,600	2,600			
Supply	1,653	1,710	1,623	1,423	1,383	1,572	1,558	1,545	1,531	-0.2%	-0.5%	-0.2%
Demand	2,578	2,557	2,470	2,165	2,104	2,392	2,371	2,350	2,330	-0.5%	-0.5%	-0.2%
Net Trade	(925)	(848)	(846)	(742)	(721)	(820)	(813)	(806)	(798)			

Figure 5.7 PADD II Sulfuric Acid Supply and Demand Balance

Thousand Metric Tons



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5.4 CONCLUSIONS

The following conclusions regarding sulfur and sulfuric acid markets for PADD II are summarized below.

5.4.1 Sulfur

- Sulfur demand growth in PADD II is expected to average 0.2 percent per year from 2009 to 2030 period, slightly higher than the 0.1 percent growth achieved from 2000 to 2008
- Sulfur production is expected to increase 0.7 percent per year over the 2009 to 2030 forecast contrast to the 1.9 percent annual decline rate from 2000 to 2008
- PADD II had approximately 11 percent of the United States domestic sulfur supply in 2008
- PADD II is a net exporter of sulfur, primarily to locations within the region and PADD I
- PADD II will continue to remain an exporter of sulfur through the forecast period, reaching a surplus of approximately 601 thousand metric tons in 2030

5.4.2 Sulfuric Acid

- Sulfuric acid consumption is mature, and is forecast to very slowly decline over the forecast period
- Sulfuric acid production has been relatively constant is expected remain relatively flat through the forecast period, tracking with demand with the exception of the capacity addition of the Taylorville Project
- PADD II had approximately 5 percent of the United States sulfuric acid supply in 2008, and about 8 percent of sulfuric acid demand
- PADD II has been a net importer of sulfuric acid historically, predominantly from PADD III (US Gulf Coast Region)

6.1 INTRODUCTION

Tenaska is considering two coals as feed to its coal-to-SNG (CTS) project located in central Illinois. The range of coal quality being considered are shown in Table 6.1, are to fall between Coal "A", and Coal "Z". As part of its study to consider the market potential of producing concentrated sulfuric acid instead of molten sulfur as a byproduct, Tenaska requested Nexant to determine the amount of sulfur byproduct generated from each of the two coal feeds when used to make the same amount of SNG. This task was evaluated based on producing the same total amount of CO and H2 in syngas exiting the gasifiers as an indication of identical SNG production.

Following is the current CTS plant design basis specified by Tenaska:

- Type of Gasifier — Slurry Feed Total Quench
- Gasifier Sizes — 900 ft^3 each
- Number of Gasifiers — 3 operating + 1 spare
- Gasification Pressure — 1,000 psig
- Total $CO+H_2$ Needed — 360 MMSCFD from 3 gasifiers
- Oxygen Concentration — 99.0 percent by volume
- Oxygen Temperature — 300 °F at gasifier inlet
- Slurry Feed Preheat — None

For Coal "A", the CTS plant is capable of the following process performances:

- Coal Feed — 6,785 STPD (AR basis) total for 3 gasifiers
- Slurry Feed Concentration — 65 wt percent (dry solid basis)
- Oxygen Feed Rate — 5,354 STPD total for 3 gasifiers
- Carbon Conversion — 98 percent
- Gasification Temperature — 2,600 °F

6.2 EVALUATION METHODOLOGY

Gasification heat and material balances (H&MB) was carried out for the two feedstocks to determine the feed rates required to produce syngas containing the specified amount of CO and H_2. The amount of sulfur in the gasifier syngas was used to determine the plant's net sulfur production.

Table 6.1 Coal Characteristics

CHARACTERISTIC	COAL A	COAL Z
PROXIMATE ANALYSIS (AS-RECEIVED)		
Btu/lb	11,337	10,450
% Sulfur	3.14	3.00
# SO_2/ MMB	5.54	5.74
% Ash	7.15	9.50
% Moisture *	14.12	17.00
% Volatile	36.02	34.50
% Fixed Carbon	42.71	39.00
Total %	100.00	100.00
EQUILIBRIUM MOISTURE (%)	10.61	~15.00
ULTIMATE ANALYSIS (DRY)		
% Carbon *	74.27	69.50
%Hydrogen *	4.76	5.04
% Nitrogen *	1.42	1.50
% Sulfur	3.66	3.62
% Ash	8.33	11.45
% Chlorine	0.14	0.16
% Oxygen *	7.43	8.73
Total %	100.00	100.00
ASH FUSION TEMPS (F REDUCING ATM)		
Initial Deformation	2014	1950
H=W	2100	2000
H=1/2W	2213	2070
Fluid	2328	2300

* Revused to make Total = 100.00

CHARACTERISTIC	COAL A	COAL Z
ASH MINERAL ANALYSIS (%)		
SiO_2	49.3	53.25
Al_2O_3	18.28	14.4
TiO_2	0.84	0.79
Fe_2O_3	16.64	18.03
CaO	3.92	0.04
MgO	0.81	0.7
K_2O	2	1.61
Na_2O	2.51	1.27
SO_3	2.92	0.74
P_2O_5	0.32	0.17
BaO		
MnO_2	0.03	
SrO		
Undetermined	2.43	9
Total %	100.00	100.00

For Coal "A", H&MB was carried out at the specified coal and oxygen feed rates, slurry concentration, and carbon conversion to come up with a calculated gasification temperature. Comparison of the independently calculated temperature to the reported temperature served as a check on the consistency of the design information, and also served to establish the accuracy of the H&MB procedure. The same H&MB procedures, after adjustment for coal property differences, were applied to Coal "Z" to determine the coal feed and syngas product rates required for the specified amounts of CO and H_2. Total sulfur containing species in the syngas were used to estimate the sulfur byproduct production for each feedstock.

Some of the H&MB adjustments made between Coal "A" and Coal "Z" are:

- Slurry feed weight percent dry solids for Coal "Z" will be 4.4 percentage point lower than Coal "A" to account for the higher equilibrium moisture for Coal "Z"
- Gasification temperature for Coal "Z" will be 30 °F lower than Coal "A" to account for the lower ash fusion temperature for Coal "Z"
- Ash and Slag carbon content is assumed to be the same between the two coal cases. Carbon conversion for Coal "Z" will be less than Coal "A" due to its higher ash content

Results of the analysis are presented in Table 6.2.

Table 6.2 Gasification H&MB Results

	Coal "A"	Coal "Z"
Total AR Coal Feed, STPD	6,785	7,721
Coal Equilibrium Moisture, wt%	10.6	15.0
Ash Fusion Temperature, deg F	2,328	2,300
Slurry Feed Concentration, wt% Dry Solid	65.0	60.6
99.0% Oxygen Consumption, STPD	5,355	5,788
Carbon Conversion, wt%	98.0	97.1
Gasification Temperature, deg F	2,550	2,520
Gasifier Exit Dry Gas Flow, lb moles/Hr	47,012	49,222
Gasifier Exit H_2+CO Content:		
MMSCFD	360	360
Lb moles/Hr		
Gasifier Exit H_2S+COS Content:		
Lb moles/Hr	554.4	601.2
STPD of Sulfur	213.3	231.3
Gasifier Exit Syngas Composition, Mole% Dry:		
H_2	35.34	37.07
CO	48.72	43.23
CO_2	13.65	17.38
H_2S + COS	1.18	1.22
CH_4	0.19	0.11
N_2 + Argon	0.77	0.83
NH3	0.11	0.11
HCl	0.04	0.05
Total Mole%	100.00	100.00

6.3 MOLTEN SULFUR PRODUCTION

The estimated maximum molten sulfur production rates are presented in Table 6.3.

Table 6.3 Estimated Molten Sulfur Production

	Coal "A"	Coal "Z"
Total AR Coal Feed, STPD	6,785	7,721
Total Sulfur in Syngas Exit Gasifiers, STPD	213.3	231.3
Sulfur in Treated Syngas, STPD	0.2	0.2
Sulfur in TGTU Incinerator Vent, STPD	0.4	0.5
Net Molten Sulfur Production, STPD	212.7	230.6

The estimates of maximum molten sulfur production were based on the following assumptions:

- Sweet syngas from Acid Gas Removal (AGR) system contains 10-ppmv residual sulfur, which will be removed in downstream zinc oxide guard beds;
- Sulfur recovery from AGR acid gas in Claus sulfur recovery and Tail Gas Treatment systems is assumed to be 99.8 percent. The 0.2 percent un-recovered sulfur is vented to atmosphere via tail gas incinerator flue gas.

6.4 SULFURIC ACID PRODUCTION

The estimated maximum sulfuric acid production rates are presented in Table 6.4.

Table 6.4 Estimated Sulfuric Acid Production

	Coal "A"	Coal "Z"
Total AR Coal Feed, STPD	6,785	7,721
Total Sulfur in Syngas Exit Gasifiers, STPD	213.3	231.3
Sulfur in Treated Syngas, STPD	0.2	0.2
Sulfur in Acid Plant Exhaust, STPD	2.1	2.2
Net Sulfur in Sulfuric Acid, STPD Sulfur	211.0	228.9
Total Sulfuric Acid Production, STPD (98 wt%)	658.7	714.6

The estimates of maximum sulfuric acid production were based on the following assumptions:

- Sweet syngas from Acid Gas Removal (AGR) system contains 10-ppmv residual sulfur, which will be removed in downstream zinc oxide guard beds;
- Sulfur recovery from AGR acid gas in Sulfuric Acid Plant is assumed to be 99 percent. The 1 percent un-recovered sulfur is vented with Acid Plant Exhaust.

7.1 INTRODUCTION

This section identifies consumers and producers of both sulfur and sulfuric acid in PADDs I and PADD II, covering the following sectors: sulfur dioxide, elemental sulfur, pulp and paper, steel mills, ethanol and chemicals. Target customers and competitors for the project in Taylorville in PADD II, as well as in PADD I, have been identified and discussed in this section.

7.2 SULFUR INDUSTRY PROFILE

7.2.1 Consumer Profiles

Table 7.1 shows major sulfuric acid producers within PADDs I and II. Raw materials for each of the plants have been identified. Several of these plants process spent sulfuric acid and only purchase part of their throughput as elemental sulfur. The sulfuric acid regeneration business is an important aspect of the sulfuric acid business, and spent acid from oil refineries and other chemical processing plants is returned to sulfuric acid producers who regenerate pure acid from the spent acid. Other sulfuric acid producers are based on smelter by-product sulfur or run completely on spent acid, rather than on elemental sulfur.

Table 7.1 Sulfuric Acid Producers

Capacity – Thousand Metric Tons

Company	Location	State	PADD	Capacity	Raw Material
Valero Energy Corp	Delaware City	Delaware	1	190	70% SO2 in Utility off gases, 30% Sludge
CF Industries	Plant City	Florida	1	2,400	100% Elemental; Captive
The Mosaic Company	Bartow	Florida	1	4,120	100% Elemental; Captive
The Mosaic Company	New Wales	Florida	1	3,930	100% Elemental; Captive
The Mosaic Company	Nichols	Florida	1	735	100% Elemental; mostly captive
The Mosaic Company	Riverview	Florida	1	1,940	100% Elemental; mostly captive
PCS Phosphate Co	White Springs	Florida	1	3,050	100% Elemental, Partly Captive
Tampa Electric Company	Polk County	Florida	1	65	SO2 and H2S in Utility off gases
General Chemical Corp	Augusta	Georgia	1	260	100% Elemental, Partly Captive
Southern States Chemical	Savannah	Georgia	1	135	100% Elemental, 100% Merchant
Tronox Inc.	Savannah	Georgia	1	245	100% Elemental, mostly captive
General Chemical Corp	Newark	New Jersey	1	140	100% Elemental
PVS Chemicals	Buffalo	New York	1	110	20% Elemental, 80% Sludge
PCS Phosphate Co	Aurora	North Carolina	1	3,285	100% Elemental; Captive
Southern States Chemical	Wilmington	North Carolina	1	60	100% Elemental, Merchant
Elementis Pigments	Easton	Pennsylvania	1	15	Ferrous Sulfate; High Purity iron oxides as byproduct; Captive
Langeloth International	Langeloth	Pennsylvania	1	35	100% Molybdenum Smelter gas
DuPont	Richmond	Virginia	1	85	100% Elemental; Partly Captive
Honeywell International	Hopewell	Virginia	1	390	100% Elemental, Captive
Lucite International	Belle	West Virginia	1	110	100% Sludge; Captive
Wheeling Pittsburgh Steel Corp	Follansbee	West Virginia	1	25	100% H2S From coke oven gas, captive
Big River Zinc	Sauget	Illinois	2	135	100% Zinc smelter Gases
PVS Chemical Solutions	Chicago	Illinois	2	80	100% Elemental
Rhodia	Hammond	Indiana	2	270	40% Elemental; 60% Sludge; Partially Captive
Climax Molybdenum Co.	Fort Madison	Iowa	2	90	40% Molybdenum Smelter Gases; 60% Elemental
Phelps Dodge Corp.	Fort Madison	Iowa	2	90	40% Molybdenum Smelter Gases; 60% Elemental
DuPont	Wurtland	Kentucky	2	180	100% Elemental; Partly Captive
The Doe Run Company	Herculaneum	Missouri	2	70	100% Lead Smelter Gases
AK Steel Corp	Middletown	Ohio	2	5	100% H2S From coke oven gas
Chemtrade Logistics	Cairo	Ohio	2	65	100% Elemental
DuPont	North Bend	Ohio	2	160	100% Elemental
Marsulex, Inc.	Oregon	Ohio	2	300	35% Elemental, 65% Sludge, neg H2S
Reliant Energy	Niles	Ohio	2	10	100% SO2 in utility off gases
Chemtrade Refinery Services	Tulsa	Oklahoma	2	60	100% Elemental
Lucite International	Memphis	Tennesse	2	250	100% Sludge; Captive
Zinifex Clarksville	Clarksville	Tennesse	2	135	100% Zinc smelter gases, partly captive

Table 7.2 lists the major sulfur dioxide producers in PADDs I and II. Sulfur dioxide is either produced by burning sulfur or recovered from flue gas, particularly at ore smelting (copper, lead or zinc) operations. It can be used in different industries such as in chemicals, pulp and paper, water and waste treatments, metal and ore refining, oil recovery and refining, and other miscellaneous functions such as for the sulfonation of oils or as a reducing agent. Historically, the primary use of sulfur dioxide has been in the production of sodium hydrosulfite, which is consumed mainly as a bleaching agent by the textile and the pulp and paper industries and for the production of other chemicals. It is also essential in the agricultural and food processing sectors.

Table 7.2 Sulfur Dioxide Producers
Capacity – Thousand Metric Tons

Company	Location	State	PADD	Capacity
PVS Chemical Solutions	Chicago	Illinois	2	40
Chemtrade Logistics	Cairo	Ohio	2	20
Olin Corp	Charleston	Tennesse	2	45

Nexant contacted a range of sulfur consumers in PADD I covering a range of uses including sulfuric acid production and other sulfur chemicals.

Rhodia Group is one of the leading companies which develops and produces specialty chemicals including sulfur dioxide and sulfuric acid. They have one location within PADD II at Hammond, Indiana which produces sulfuric acid. According to one of Rhodia's supply managers, located in Domingues, California, there are long term growth prospects for their products. Nevertheless, overall growth will depend on the state of the economy and therefore the short term outlook is expected to decline. The supply manager would not provide the annual volumes of sulfur that the company uses or disclose the names and price at which they purchase sulfur from their suppliers because that is private company information. He also could not reveal their contract terms, with regard to how long their contracts typically last with their suppliers. However, according to Rhodia, they do use the Vancouver and Tampa sulfur prices as a basis for the price they purchase their sulfur, depending on the location of the plant.

PVS Chemicals, Inc. is a global manufacturer, distributor and marketer of chemicals. It produces many different types of sulfur products including sulfuric acid (multiple grades and strengths), liquid sulfur dioxide, molten sulfur, ammonium thiosulfate, sodium thiosulfate, and many others. The subsidiary, PVS Chemical Solutions, has operations in Chicago, Illinois (PADD II), where it produces sulfuric acid and sulfur dioxide. It also has operations in Buffalo, New York (PADD I) and Coplay, Ohio (PADD II). According to a representative at PVS Chemical Solutions in Chicago, Illinois, there are difficulties in the global sulfuric acid market. It is currently in oversupply around the world, on the order of millions of tons in oversupply. Molten sulfur is currently balanced but could be in oversupply depending on development of the Canadian oil sands which contains about 1.2 to 1.3 billion tons of sulfur. The Gulf Coast is currently the largest consumer of sulfur, more specifically Louisiana and Mississippi, along with Florida in PADD I, as the largest consumer of molten sulfur. PVS Chemical Solutions would not reveal the annual volumes of sulfur that the company uses or provide the names and price at which it purchases sulfur from its suppliers because that is private company information. However, there are three refineries around the Chicago, Illinois area from which it receives its sulfur and the key driver for sulfur supply is the freight costs. PVC Chemical Solutions also acknowledged that it resells any excess sulfur leftover from its chemical operations. It affirmed that the company uses a formula based on the Tampa sulfur price for the price at which it purchases sulfur from the refineries. It also stated that the company's contract terms vary between suppliers but they usually have a one to three year contract with suppliers.

The Doe Run Company is a natural resource company focused on metals mining, smelting, recycling and fabrication. The company's smelting division is located in Herculaneum, Missouri

(PADD II). A representative from the smelting division at the Doe Run Company stated that they do not use sulfur for their sulfuric acid production. Their sulfuric acid production is based on their smelter by-product. The Doe Run Company burns sulfur dioxide which is recovered from their flue gas at the ore smelting operations, and then they produce sulfuric acid.

7.2.2 Producer Profiles

Table 7.3 displays the elemental sulfur producers within PADD I and PADD II. Elemental sulfur is recovered from oil refinery acid gas streams, containing sulfuric acid and sulfur dioxide. It can also be recovered from natural gas production, where sulfuric acid is removed from the raw gas. Elemental sulfur is mainly used to produce sulfuric acid, typically for fertilizer manufacture, sulfur dioxide, phosphorous pentasulfide, rubber vulcanizing and also in pulp and paper uses.

Table 7.3 Elemental Sulfur Producers
(Capacity – Thousand Metric Tons)

Company	Location	State	PADD	Capacity	Raw Material
Valero	Delaware City	Delaware	1	440	Refinery
Exxon Mobil	Jay	Florida	1	107	Natural Gas
Chemical Products Corporation	Cartersville	Georgia	1	7	Sulfur Chemicals byproduct
Amerada Hess Corp	Port Reading	New Jersey	1	5	Refinery
ConocoPhillips	Linden	New Jersey	1	145	Refinery
Sunoco, Inc.	Westville	New Jersey	1	30	Refinery
Valero	Paulsboro	New Jersey	1	90	Refinery
ConocoPhillips	Marcus Hook	Pennsylvania	1	60	Refinery
Sunoco, Inc.	Philadelphia	Pennsylvania	1	95	Refinery
United Refining Company	Warren	Pennsylvania	1	15	Refinery
Giant Industries	Grafton	Virginia	1	66	Refinery
Ergon	Newell	West Virginia	1	na	Refinery
CITGO	Lemont	Illinois	2	320	Refinery
ConocoPhillips	Wood River	Illinois	2	150	Refinery
Exxon Mobil	Joliet	Illinois	2	145	Refinery
Marathon Petroleum	Robinson	Illinois	2	15	Refinery
Natural Gas Pipeline Company of America	St. Elmo	Illinois	2	5	Natural Gas
BP America, Inc.	Whiting	Indiana	2	160	Refinery
Coffeyville Resources Nitrogen Fertlizers	Coffeyville	Kansas	2	5	Refinery
Frontier El Dorado	El Dorado	Kansas	2	75	Refinery
Tessenderlo Kerley	Coffeyville	Kansas	2	na	Refinery
Tessenderlo Kerley	McPherson	Kansas	2	na	Refinery
Marathon Petroleum	Catlettsburg	Kentucky	2	135	Refinery
Marathon Petroleum	Detroit	Michigan	2	25	Refinery
Merit Energy Company	Fredric	Michigan	2	5	Natural Gas
Shell Exploration & Production Company	Manistee	Michigan	2	10	Natural Gas
Flint Hills Resources	Inver Grove Heights	Minnesota	2	265	Refinery
Marathon Petroleum	St. Paul Park	Minnesota	2	55	Refinery
Amerada Hess Corp	Tioga	North Dakota	2	74	Natural Gas
Bear Paw Energy L.L.C	Lignite	North Dakota	2	2	Natural Gas
Petro-Hunt, LLC	Killdeer	North Dakota	2	45	Natural Gas
Tesoro	Mandan	North Dakota	2	5	Refinery
BP America, Inc.	Toledo	Ohio	2	35	Refinery
Ineos	Lima	Ohio	2	13	Refinery
Marathon Petroleum	Canton	Ohio	2	35	Refinery
Sunoco, Inc.	Toledo	Ohio	2	15	Refinery
Valero	Lima	Ohio	2	15	Refinery
Jupiter Sulfur	Ponca City	Oklahoma	2	40	Refinery
Sinclair Oil	Tulsa	Oklahoma	2	15	Refinery
Valero	Ardmore	Oklahoma	2	35	Refinery
Eastman Chemical	Kingsport	Tennesse	2	20	Coal Gasification
Valero	Memphis	Tennesse	2	15	Refinery
Murphy Oil	Superior	Wisconsin	2	5	Refinery

Other domestic sulfur producers will be the main competition for the Taylorville project, should the project choose to produce sulfur. Nexant's contact with one major sulfur producer in the United States is summarized below.

The Montana Sulphur and Chemical Company is one of the major manufacturers of sulfur and sulfur based products for agriculture and industry. They have one location in PADD IV in Billings, Montana which has a capacity of 80 thousand metric tons per year. The company produces sugar-house (flaked) sulfur, high purity hydrogen sulfide, high purity sulfur prill, disintegrating 90 percent sulfur and molten sulfur. According to a representative at Montana Sulphur there is a large surplus of sulfur on the market right now and major users are currently buying at a conservative rate. The person stated that having molten sulfur on hand right now is not a good idea and that sulfuric acid is very plentiful as well. The Montana Sulphur representative also stated that the marketplace is usually in a constant state of flux with conditions always changing.

7.3 SULFURIC ACID INDUSTRY PROFILE

7.3.1 Consumer Profiles

7.3.1.1 Pulp and Paper

Tables 7.4 and 7.5 display Pulp and Paper Mills within PADD I and PADD II, respectively. The pulp and paper industries use sulfuric acid as a neutralizer as well as a non-chlorinated chemical for the bleaching of kraft pulp, among a number of other uses.

Table 7.4 PADD I Pulp and Paper Mills
Paper Production Capacity – Thousand Metric Tons

Owner	Location	State	Capacity
Ahlstrom Filtration, Inc.	Mount Holly Springs	PA	6
American Eagle Paper Mills (Team Ten, LLC)	Tyrone	PA	99
Caraustar Industries, Inc.	Taylors	SC	76
Cascades Tissue Group Inc.	Ransom	PA	61
Kimberly-Clark Corp.	Beech Island	SC	184
LinPac Inc.	Cowpens	SC	247
MH Dielectrics Inc.	Mount Holly Springs	PA	6
Moulded Fibre Technology	Scarborough	ME	1
National Gypsum Co.	New Columbia	PA	125
Newark Group, Inc.	York	PA	50
Newman & Co	Philadelphia	PA	79
PaperWorks Industries Inc. (Sun Capital Partners, Inc.)	Philadelphia	PA	137
Pratt Industries Inc. (Visy Pulp & Paper)	Staten Island	NY	382
Procter&Gamble Paper Products	Mehoopany	PA	303
Quin-T Corp.	Erie	PA	40
Rock-Tenn Co.	Delaware Water Gap	PA	56
Roses Southeastern Papers	Sanford	FL	28
Sealed Air Corp.	Modena	PA	28
Sealed Air Corp.	Reading	PA	25
United CorrStack Inc L.L.C.	Reading	PA	161
United States Gypsum Co.	Jacksonville	FL	85
Woodstream Corp.(EKCO Group Co.)	Lititz	PA	0
AbitibiBowater	Catawba	SC	976
American Tissue Corp.	Augusta	ME	17
APC Paper Co. of New York	Claremont	NH	32
APC Paper Co. of New York	Norfolk	NY	77
Appleton	Roaring Springs	PA	139
Atlas Paper Mills Ltd	Hialeah	FL	24
Augusta Newsprint Co.	Augusta	GA	529
Austell Boxboard(Caraustar)	Austell	GA	166
Banner Fiberboard Co.	Wellsburg	WV	29
Bennington Paperboard Co.(The Newark Group Inc.)	North Hoosick	NY	48
Bio-Tech Mills, Inc.	Greenwich	NY	21
Bontex	Buena Vista	VA	18
Brownville Specialty Paper, Inc.	Brownville	NY	29
Buckeye Technologies Inc.	Perry	FL	559
Buckeye Technologies Inc.	Lumberton	NC	61
Burrows Paper Corp.	Little Falls	NY	48
Burrows Paper Corp.	Lyons Falls	NY	20
Caraustar Industries, Inc.	Baltimore	MD	77
Caraustar Industries, Inc.	Lockport	NY	83
Caraustar Industries, Inc.	Roanoke Rapids	NC	36
Cascades Inc.	Auburn	ME	88
Cascades Inc.	Mechanicville	NY	66
Cascades Tissue Group Inc.	Rockingham	NC	28
Cascades, Inc.	Versailles	CT	205
Cedartown Paperboard(Caraustar)	Cedartown	GA	33
Cellu Tissue Holdings, Inc.	East Hartford	CT	31
Cellu Tissue Holdings, Inc.	Gouverneur	NY	28
Celotex Corp.	Sunbury	PA	100
Climax Mfg. Co.	Carthage	NY	51
Congoleum Corp.	Finksburg	MD	104
Cottrell Paper Co., Inc.	Rock City Falls	NY	2
Crane & Co., Inc.	Dalton	MA	74

Table 7.4 PADD I Pulp and Paper Mills (Cont'd.)

Paper Production Capacity – Thousand Metric Tons

Owner	Location	State	Capacity
Creative Packaging Inc.	Worcester	MA	58
Crocker Technical Papers	Fitchburg	MA	15
Curtis Fine Papers	Adams	MA	17
Dexter Corp.	Windsor Locks	CT	24
Domtar	Plymouth	NC	1223
Domtar Industries Inc.	Woodland	ME	413
EHV-Weidmann Industries Inc.	St. Johnsbury	VT	20
Erving Paper Mills Inc.	Erving	MA	76
Esleeck Mfg. Co. Inc.	Turners Falls	MA	10
Evergreen Packaging Group	Canton	NC	549
Evergreen Paper East Ryegate Mill	East Ryegate	VT	30
Felix Schoeller Technical Papers	Pulaski	NY	58
FiberMark Inc.	West Springfield	MA	12
FiberMark North America Inc.	Brattleboro	VT	46
FiberMark North America, Inc.	Brownville	NY	14
Finch Paper	Glens Falls	NY	276
First Quality Tissue L.P.	Lock Haven	PA	209
Flower City Tissue Mills Co	Rochester	NY	9
Fort Orange Paper Co., Inc.	Castleton	NY	44
Fraser Paper Inc.	Madawaska	ME	457
Fraser Papers Inc.	Gorham	NH	143
GAF Manufacturing Corp.	Dudley	NC	172
Georgia-Pacific Corp.	Palatka	FL	571
Georgia-Pacific Corp.	Cedar Springs	GA	1180
Georgia-Pacific Corp.	Rincon	GA	485
Georgia-Pacific Corp.	Plattsburgh	NY	164
Georgia-Pacific Corp.	Plattsburgh	NY	169
Georgia-Pacific Corp.	Catawba	SC	90
Georgia-Pacific Corp.	Big Island	VA	358
Georgia-Pacific Corp.(owned by Koch Industries)	Brunswick	GA	1031
Graphic Packaging Holding Corporation	Macon	GA	585
Greif Bros. Corp.	Amherst/Riverville	VA	468
Halltown Paperboard Co.	Halltown	WV	77
Haverhill(Newark Group Inc.)	Haverhill	MA	154
Hollingsworth & Vose Co.	Hawkinsville	GA	13
Hollingsworth & Vose Co.	East Walpole	MA	18
Hollingsworth & Vose Co.	West Groton	MA	20
Hollingsworth & Vose Co.	Greenwich	NY	19
Hollingsworth & Vose Co.	Greenwich	NY	6
Homasote Co.	West Trenton	NJ	120
Interface Solutions, Inc.	Beaver Falls	NY	18
Interface Solutions, Inc.	Hoosick Falls	NY	9
International Paper Co.	Augusta	GA	716
International Paper Co.	Savannah	GA	981
International Paper Co.	Riegelwood	NC	936
International Paper Co.	Eastover	SC	827
International Paper Co.	Georgetown	SC	709
International Paper Co.	Franklin	VA	785
Interstate Paper L.L.C.	Riceboro	GA	305
Irving Tissue Inc.(Irving Forest Ltd.)	Fort Edward	NY	23
Jackson Paper Mfg Co.(Recycling Systems Corp.)	Sylva	NC	100
KapStone Paper and Packaging Corp.	Charleston	SC	998
KapStone Paper and Packg (Stone Arcade Acqu. Corp.)	Roanoke Rapids	NC	516
Katahdin Paper (owned by Brookfield Asset)	East Millinocket	ME	278

Table 7.4 PADD I Pulp and Paper Mills (Cont'd.)

Paper Production Capacity – Thousand Metric Tons

Owner	Location	State	Capacity
Kimberly-Clark Corp.	New Milford	CT	80
Knowlton Specialty Papers Inc.	Watertown	NY	8
Lafayette Paper L.P.	New Windsor	NY	158
Laurel Hill Paper Co.	Cordova	NC	20
Lincoln Paper and Tissue Co.(First Paper Holding LLC)	Lincoln	ME	125
Madison Paper Industries	Madison	ME	248
Marcal Paper Mills Inc.	Elmwood Park	NJ	180
Martisco Paper Co., Inc.	Marcellus	NY	6
Maryland Paper Co. L.P.	Williamsport	MD	161
Masonite Corp.	Towanda	PA	281
McGoldrick Paper Co., Inc.	Hinsdale	NH	4
McIntyre Paper Co., Inc.	Fayetteville	NY	11
MeadWestvaco Corp.	South Lee	MA	15
MeadWestvaco Corp.	Covington	VA	1174
Mohawk Fine Papers, Inc.	Cohoes	NY	54
Mohawk Fine Papers, Inc.	Waterford	NY	41
Monadnock Paper Mills, Inc.	Bennington	NH	28
Munksjo Paper Decor Inc.	Fitchburg	MA	25
National Gypsum, Corp.	Delair	NJ	66
Newark America(Newark Group)	Fitchburg	MA	95
Newark Group, Inc.	Gardiner	ME	39
Newark Group, Inc.	Natick	MA	55
Newark Group, Inc.	Chatham	NY	41
NewPage Corp.	Rumford	ME	731
NewPage Corp.	Luke	MD	640
Newstech(Belkorp Industries Inc.)	Deferiet	NY	244
Newstech(Belkorp Industries Inc.)	Hagerstown	MD	152
Newton Falls Fine Paper Co.	Newton Falls	NY	77
Norampac (Cascades Inc.)	Niagara Falls	NY	294
NVF Co.	Yorklyn	DE	8
NVF Co.	Yorklyn	DE	7
P.H. Glatfelter Co.	Spring Grove	PA	320
Packaging Corp. of America	Valdosta	GA	485
Pactiv Corp.	Macon	GA	40
Paper Service Ltd.	Hinsdale	NH	10
Paper-Pak Products Inc.	Washington	GA	10
Paramount Paper Ltd.	Maxton	NC	4
Parsons Paper Co.(NVF Co.)	Holyoke	MA	13
Penacook Fibre Co	Penacook	NH	2
Pepperell Paper(Merrimac Paper)	Pepperell	MA	29
Perkit Folding Box Corp.	Mattapan	MA	33
Potsdam Specialty Paper, Inc. (PSPI)	Potsdam	NY	30
Procter&Gamble Paper Products	Albany	GA	336
Putney Paper Co. Inc.	Putney	VT	28
Rayonier	Fernandina Beach	FL	165
Rayonier	Jesup	GA	661
Red Hook Paper Inc.	Red Hook	NY	6
RFS Ecusta Inc.(Purico Ltd.)	Pisgah Forest	NC	110
Rock-Tenn Co.	Sheldon Springs	VT	93
Rock-Tenn Co.	Lynchburg	VA	154
Rock-Tenn Company (previously Southern Container)	Syracuse	NY	793
Sappi Fine Paper North America	Westbrook	ME	176
Sappi Fine Paper North America	Hinckley	ME	749
SCA Tissue North America, L.L.C.	South Glens Falls/Greenwich	NY	97

Table 7.4 PADD I Pulp and Paper Mills (Cont'd.)

Paper Production Capacity – Thousand Metric Tons

Owner	Location	State	Capacity
Schweitzer-Mauduit Intl. Inc.	Spotswood	NJ	66
Schweitzer-Mauduit Intl. Inc.	Ancram	NY	4
Sealed Air Corp.	Lenoir	NC	8
Seaman Paper Co.	Otter River	MA	48
SFK Pulp	Fairmont	WV	231
Simkins Industries Inc.	Catonsville	MD	77
Smurfit-Stone Container Corp.	Uncasville	CT	195
Smurfit-Stone Container Corp.	Fernandina Beach	FL	900
Smurfit-Stone Container Corp.	Panama City	FL	985
Smurfit-Stone Container Corp.	Florence	SC	753
Smurfit-Stone Container Corp.	Hopewell	VA	489
Smurfit-Stone Container Corp.	West Point	VA	918
Smurfit-Stone Container Corp. (Seminole Mill)	Jacksonville	FL	549
Sonoco Products Co.	Atlanta	GA	52
Sonoco Products Co.	Holyoke	MA	73
Sonoco Products Co.	Hartsville	SC	204
Sonoco Products Co.	Richmond	VA	86
Southworth Co.	West Springfield	MA	10
Sweetwater Paperboard(Caraustar)	Austell	GA	154
Temple-Inland Corp.	Rome	GA	907
Texon International	Russell	MA	43
United States Gypsum Co.	Clark	NJ	164
United States Gypsum Co.	Oakfield	NY	58
Verso Paper Holdings LLC	Bucksport	ME	562
Verso Paper Holdings LLC	Jay	ME	851
Visy Paper NY Inc.(Visy Industries)	New York	NY	329
Wausau-Mosinee Paper Corp.	Jay	ME	22
Weyerhaeuser Co.	Oglethorpe	GA	386
Weyerhaeuser Co.	Savannah, Port Wentworth	GA	355
Weyerhaeuser Co.	New Bern	NC	369
Weyerhaeuser Co., Port Wentworth Mill	Savannah	GA	355
White Birch Paper Co.	Ashland	VA	304
White Birch Paper Co. (SP Newsprint Co.)	Dublin	GA	624
Windsor-Stevens Inc	Poquonock	CT	4
Total			**46,107**

Table 7.5 PADD II Pulp and Paper Mills
Paper Production Capacity – Thousand Metric Tons

Owner	Location	State	Capacity
AbitibiBowater	Calhoun	TN	961
Ahlstrom Filtration, Inc.	Madisonville	KY	23
Ahlstrom Filtration, Inc.	Chattanooga	TN	11
Ahlstrom Paper Group	Taylorville	IL	27
Alcoa Flexible Packaging Corp.	Joliet	IL	56
Alcoa Flexible Packaging Corp.	Peoria	IL	14
Alcoa Flexible Packaging Corp.	Detroit	MI	61.25
American Tissue Mills of WI (American Tissue Corp.)	Tomahawk	WI	8
Appleton	West Carrollton	OH	175
Appleton Coated LLC (Arjowiggins SAS 100%)	Combined Locks	WI	396
Atlas Roofing Corp.	Franklin	OH	47
Atlas Roofing Corp.	Ardmore	OK	18
BBP America, Inc.(BBP Celotex)	Quincy	IL	88
Beloit Box Board Co., Inc.	Beloit	WI	21
Blandin Paper(UPM-Kymmene)	Grand Rapids	MN	475
Blue Water Fibre L.P.	Port Huron	MI	70
Boise Inc.	International Falls	MN	530
BPB America Inc.	LAnse	MI	98
Buckeye Technologies Inc.	Memphis	TN	210
Caraustar Industries, Inc.	Chicago	IL	86
Caraustar Industries, Inc.	Tama	IA	50
Caraustar Industries, Inc.	Cincinnati	OH	74
Caraustar Industries, Inc.	Rittman	OH	175
Cascades Inc.	Eau Claire	WI	55
CertainTeed Corp.	Shakopee	MN	87
CertainTeed Corp.	Milan	OH	32
Cheney Pulp & Paper Co.	Franklin	OH	11
CityForest Corp.	Ladysmith	WI	49
Columbus Specialty Paper L.L.C.	Columbus	OH	18
Crown Vantage Inc.	Parchment	MI	110
Crystal Tissue Co	Middletown	OH	28
Domtar	Hawesville	KY	75
Domtar	Hawesville	KY	639
Domtar	Kingsport	TN	166
Domtar	Rothschild	WI	150
Domtar Industries Inc.	Port Huron	MI	94
Domtar Industries Inc.	Nekoosa	WI	218
Dunn Paper	Port Huron	MI	80
Eco Fibre, Inc.	De Pere	WI	35
Fibercorr Inc.	Massillon	OH	79
FiberMark, Inc.	Owensboro	KY	10
Field Container Co. L.P.	Pekin	IL	28
Field Container Co. L.P.	Battle Creek	MI	119
Filter Materials	Waupaca	WI	5
Flambeau River Papers, LLC	Park Falls	WI	137
Fletcher Paper Co.	Alpena	MI	30

Table 7.5 PADD II Pulp and Paper Mills (Cont'd.)

Paper Production Capacity – Thousand Metric Tons

Owner	Location	State	Capacity
Forest Ressources L.L.C.	Hartford City	IN	224
Fox River Fiber Co.	De Pere	WI	77
Fox River Paper Co.	Vicksburg	MI	21
Fraser Paper Inc.	Dayton	OH	55
French Paper Co.	Niles	MI	19
Geo. A. Whiting Paper Co.	Menasha	WI	10
Georgia-Pacific Corp.	Duluth	MN	91
Georgia-Pacific Corp.	Green Bay	WI	425
Georgia-Pacific Corp.	Superior	WI	51
Georgia-Pacific Corp.	Green Bay	WI	175
Georgia-Pacific Corp.	Pryor	OK	69
Georgia-Pacific LLC	Muskogee	OK	374
Glatfelter	Chillicothe	OH	465
Globe Building Materials Inc.	Cornell	WI	73
Graphic Packaging Holding Company	Middletown	OH	153
Graphic Packaging Holding Corporation	Kalamazoo	MI	351
Great Lakes Tissue Co.	Cheboygan	MI	36
Green Bay Packaging Inc.	Green Bay	WI	225
Greif Bros. Corp.	Massillon	OH	120
Huebert Brothers Products L.L.C.	Boonville	MO	27
International Paper Co. (former Weyerhaeuser Co.)	Cedar Rapids	IA	979
International Paper Co. (former Weyerhaeuser Co.)	Henderson	KY	249
International Paper Co. (former Weyerhaeuser Co.)	Valliant	OK	1360
Johns-Manville Corp.	Rockdale	IL	73
Kimberly-Clark Corp.	Owensboro	KY	136
Kimberly-Clark Corp.	Munising	MI	48
Kimberly-Clark Corp.	Loudon	TN	60
Kimberly-Clark Corp.	Marinette	WI	75
Kimberly-Clark Corp.	Neenah	WI	100
Kimberly-Clark Corp.	Jenks	OK	72
Kruger Tissue Group	Memphis	TN	121
Liberty Paper Inc.(Liberty Industries)	Becker	MN	155
Little Rapids Corp.	Shawano	WI	56
Ludlow Corp.	Constantine	MI	53
Madison Paper Co.	Alsip	IL	228
Manistique Papers Inc.(Kruger Inc.)	Manistique	MI	110
Menominee Paper Co.	Menominee	MI	15
Middletown Paperboard(Newark Group, Inc.)	Middletown	OH	55
Mohawk Fine Papers, Inc.	Hamilton	OH	65
National Gypsum Co.	Pryor	OK	79
Neenah Paper(Kimberly-Clark Corp.)	Neenah	WI	80
Neenah Paper(Kimberly-Clark Corp.)	Stevens Point	WI	80
Neenah Paper, Inc.	Appleton	WI	35
Newark Group Inc.(Franklin Boxboard Corp.)	Franklin	OH	66
NewPage Corp.	Escanaba	MI	761
NewPage Corp.	Stevens Point	WI	239

Table 7.5 PADD II Pulp and Paper Mills (Cont'd.)

Paper Production Capacity – Thousand Metric Tons

NewPage Corp.	Wisconsin Rapids	WI	320
NewPage Corp.	Wisconsin Rapids	WI	108
NewPage Corp.	Stevens Point	WI	152
NewPage Corp.	Wisconsin Rapids	WI	579
NewPage Corp.(Cerberus Capital Mgt.)	Wickliffe	KY	426
NewPage Corp.(Cerberus Capital Mgt.)	Duluth	MN	240
NewPage Corp.(Cerberus Capital Mgt.)	Duluth	MN	132
Ohio Paperboard (Newark Group Inc.)	Baltimore	OH	125
Ohio Pulp Mills, Inc.	Cincinnati	OH	18
Orchids Paper Products Co.	Pryor	OK	35
Packaging Corp. of America	Filer City	MI	310
Packaging Corp. of America	Counce	TN	927
Packaging Corp. of America	Tomahawk	WI	520
Pactiv Corp.	Griffith	IN	32
PaperWorks Industries Inc. (Sun Capital Partners, Inc.)	Wabash	IN	142
Plainfield Asset Management	Hamilton	OH	146
Plainwell Tissue Inc.	Memphis	TN	44
Ponderosa Fibres of America Inc.	Memphis	TN	70
Ponderosa Fibres of America Inc.	Oshkosh	WI	77
Procter&Gamble Paper Products	Green Bay	WI	229
Rock-Tenn Co.	Aurora	IL	35
Rock-Tenn Co.	Eaton	IN	60
Rock-Tenn Co.	Battle Creek	MI	130
Rock-Tenn Co.	St. Paul	MN	180
Rock-Tenn Co.	Cincinnati	OH	53
Rock-Tenn Co.	Chattanooga	TN	120
Sappi Fine Paper North America	Muskegon	MI	285
Sappi Fine Paper North America	Cloquet	MN	230
SCA Tissue North America L.L.C. (Svenska Cellulose Ab)	Alsip	IL	60
SCA Tissue North America, L.L.C. (Svenska Cellulose Ab)	Menasha	WI	220
SFK Pulp	Menominee	MI	165
Simkins Industries Inc.	Indianapolis	IN	26
Simplicity Pattern Co., Inc.	Niles	MI	12
Smurfit-Stone Container Corp.	Ontonagon	MI	271
Smurfit-Stone Container Corp.	Coshocton	OH	328
Sonoco Products Co.	Hutchinson	KS	109
Sonoco Products Co.	Lancaster	OH	45
Sonoco Products Co.	Munroe Falls	OH	25
Sonoco Products Co.	Newport	TN	119
Sonoco Products Co.	Menasha	WI	63
Sorenson Paperboard Corp.	Palmyra	MI	28
Southern Cellulose Products Inc.	Chattanooga	TN	50
ST Paper, LLC	Oconto Falls	WI	68
Tamko Roofing Products, Inc.	Phillipsburg	KS	36
Tamko Roofing Products, Inc.	Joplin	MO	51
Tamko Roofing Products, Inc.	Knoxville	TN	80

Table 7.5 PADD II Pulp and Paper Mills (Cont'd.)

Paper Production Capacity – Thousand Metric Tons

Owner	Location	State	Capacity
Temple-Inland Corp.	Maysville	KY	486
Temple-Inland Corp.	New Johnsonville	TN	330
Temple-Inland Corp., Premier Boxboard Ltd.	Cayuga	IN	323
Thilmany, LLC	Kaukauna	WI	200
Thilmany, LLC	De Pere	WI	65
U.S. Paper Mills Corp.	De Pere	WI	35
United States Gypsum Co.	North Kansas City	MO	35
United States Gypsum Corp.	Otsego	MI	228
Valley Converting Co.	Toronto	OH	39
Verso Paper Holdings LLC	Norway, Quinnesec Mill	MI	605
Verso Paper Holdings LLC	Sartell	MN	310
Wausau Paper Corp.	Brokaw	WI	176
Wausau Paper Corp.	Mosinee	WI	116
Wausau-Mosinee Paper Corp	Brainerd	MN	155
Wausau-Mosinee Paper Corp.	Rhinelander	WI	199
White Pigeon Paper Co.	White Pigeon	MI	70
Wisconsin Paperboard(Newark Group)	Milwaukee	WI	152
Total			**25,325**

As the Kraft Process for pulp making requires sulfuric acid amongst other paper making processes, and due to the large amount of paper production in the United States, particularly in PADD I and II, the pulp and paper industry are large end users of sulfuric acid. Summarized below are contacts with major players in the pulp and paper industry in the United States.

International Paper Company is a global paper and packaging company that is complemented by an extensive North American merchant distribution system, with primary markets and manufacturing operations in North America, Europe, Latin America, Russia, Asia and North Africa. International Paper had sales in 2007 of $22 billion and for 2007 was ranked No. 93 among Fortune 500 companies. They operate 16 pulp, paper and packaging mills, 85 converting and packaging plants and 4 wood products facilities in the United States. International Paper stated that they expect demand growth in sulfuric acid for the pulp and paper industry to be flat. They currently source their sulfuric acid from various suppliers. Pricing for purchased sulfuric acid is done through bidding, with the lowest delivered price generally winning the contract, and is done on a case by case basis for each mill location. Long and short term supply contracts are possible, though many suppliers are wary to lock in a price for a long term contract as there has been considerable volatility in the sulfuric acid price in recent years. International Paper stated that they would welcome a new source of supply, as long as the price was favorable.

Georgia-Pacific is one of the world's leading manufacturers of tissue, pulp, paper, packaging, building products and related chemicals. They have approximately 300 manufacturing facilities across North America, South America and Europe, ranging from large pulp, paper and tissue operations to gypsum plants, box plants and building products complexes. Headquartered in Atlanta, Georgia-Pacific employs more than 45,000 people at approximately 300 locations worldwide. In 2005 it was acquired as a wholly owned subsidiary of Koch Industries, Inc., a privately owned company based in Wichita, Kansas. Similar to International Paper's view of demand growth for sulfuric acid in the pulp and paper industry, Georgia-Pacific expects demand growth to be flat. Unlike the situation with International Paper, Georgia-Pacific's sulfuric acid purchasing for the entire company is handled through their corporate office. Georgia-Pacific corporate stated that they generally do not accept unsolicited offers from vendors.

Smurfit-Stone is another one of the largest pulp and paper manufacturers in the United States. They operate approximately 150 facilities with nearly 22,000 employees in the United States, Canada, Mexico, and Asia. Smurfit-Stone stated that they too see demand growth for sulfuric acid in the pulp and paper industry as flat. They currently are supplied with sulfuric acid by Chemtrade Logistics, and Norfalco. Smurfit-Stone's stated that their choice of supplier is based upon the bidding for the lowest possible price. Long and short term contracts are available, and interest in a new supplier is largely dependant on pricing.

7.3.1.2 Integrated Steel Mills

Table 7.6 lists integrated steel mills in PADDs I and II. Steel mills use an acid bath to do what is called "pickling" of steel, a purification step removing scale and other undesirables from the final product. In excess of half of all steel products are pickled. Sulfuric acid and hydrochloric acid are used for pickling of carbon steel, which accounts for in excess of 90 percent of steel manufactured in the United States. Beginning in the mid 1960's the trend has been to use hydrochloric acid instead of sulfuric acid because it is less expensive, cleaner, requires a smaller amount of acid, has a higher utilization of acid, lower steam consumption, less waste pickle liquor, and creates a more uniformed product. Typically hydrochloric acid is used for continuous and so called push pull pickling, whereas sulfuric acid is still used for batch-wise pickling. Nexant's relevant contacts with the steel industry are summarized below.

ArcelorMittal is the world's largest steel company, present in more than 60 countries. It led the consolidation of the world steel industry, and as a result is the leader in all major global markets, including automotive, construction, household appliances and packaging. The Group leads in R&D and technology, holds sizeable captive supplies of raw materials and operates extensive distribution networks. Its industrial presence in Europe, Asia, Africa and America gives the Group exposure to all the key steel markets, from emerging to mature. ArcelorMittal key financials for 2008 show revenues of $124.9 billion and crude steel production of 103.3 million tons, representing approximately 10% of world steel output. ArcelorMittal stated that they no longer use sulfuric acid in the pickling process, opting to use hydrochloric acid instead. They stated that they expect sulfuric acid demand growth in the steel industry to be negative, as the trend is towards using hydrochloric acid in place of sulfuric acid; additionally this is a tough time for the steel industry as the economic crisis has drastically reduced both the price and demand for steel in the United States. However, substitution of other acids for sulfuric acid is will not necessarily create a depression of demand, as sulfuric acid is used to produce some other acids commonly used as replacements such as hydrochloric and hydrofluoric acids.

Table 7.6 Integrated Steel Mills in PADDs I and II

Steel Production Capacity – Thousand Metric Tons

Company	City	State	PADD	Capacity
ArcelorMittal	Bethlehem	PA	1	274
ArcelorMittal	Sparrows Point	MD	1	52
Georgetown	Georgetown	SC	1	307
U.S. Steel	Edgar Thomson	PA	1	1115
ArcelorMittal	Weirton	WVa	1	2200
AK Steel	Ashland	OH	2	2657
AK Steel	Middletown	OH	2	2657
ArcelorMittal	Burns Harbor	IN	2	3400
ArcelorMittal	Indiana Harbor	IN	2	3200
Interlake	S. Chicago	IL	2	307
LTV/Cleveland	Cleveland	OH	2	2900
LTV/Ind. Harbor	Ind. Harbor	IN	2	3086
McLouth	Detroit	MI	2	760
National	Granite City	IL	2	888
National	Great Lakes	MI	2	1090
Severstal	Rouge	MI	2	710
U.S. Steel	Gary	IN	2	3496
USS/Kobe joint venture	Lorain	OH	2	1115
WCI Steel	Warren	OH	2	1000
Wheeling-Pittsburg	Steubenville	OH	2	450
PADD 1				**3,947**
PADD 2				**27,716**

7.3.1.3 Ethanol

Ethanol is another consumer of sulfuric acid in the United States. Though only consuming a small amount of sulfuric acid per unit of ethanol produced, due to the amount of ethanol produced in this country, a significant amount of sulfuric acid is in fact used by the ethanol industry. Table 7.7 presents the ethanol production capacities in PADDs I and II.

Table 7.7 Ethanol Production Capacity in PADDs I and II

Capacity – Millions of Gallons per Year

Company	Location	PADD	Feedstock	Operating Production (MMGPY)	Estimated Acid Demand (Thousand Metric Tons)
Bional Clearfield	Clearfield, PA	1	Corn		
Clean Burn Fuels, LLC	Raeford, NC	1	Corn		
Northeast Biofuels	Volney, NY	1	Corn		
Range Fuels	Soperton, GA	1	Wood waste		
Southwest Georgia Ethanol, LLC	Camilla, GA	1	Corn	100	2.13
Western New York Energy LLC	Shelby, NY	1		50	1.06
Wind Gap Farms	Baconton, GA	1	Brewery waste	0.4	0.01
Abengoa Bioenergy Corp. (Total)		2		168	3.57
Abengoa Bioenergy Corp.	Madison, IL	2	corn		
Abengoa Bioenergy Corp.	Mt. Vernon, IN	2	corn		
Abengoa Bioenergy Corp.	Colwich, KS	2	corn/milo		
Abengoa Bioenergy Corp.	Ravenna, NE	2	Corn		
Abengoa Bioenergy Corp.	York, NE	2	Corn		
Absolute Energy, LLC*	St. Ansgar, IA	2	Corn	100	2.13
ACE Ethanol, LLC	Stanley, WI	2	Corn	41	0.87
Adkins Energy, LLC*	Lena, IL	2	Corn	40	0.85
Advanced Bioenergy, LLC	Fairmont, NE	2	Corn	100	2.13
Advanced Bioenergy, LLC	Aberdeen, SD	2	Corn	50	1.06
Advanced Bioenergy, LLC	Huron, SD	2	Corn	32	0.68
Ag Energy Resources, Inc.	Benton, IL	2	corn		
AGP*	Hastings, NE	2	Corn	52	1.11
Agri-Energy, LLC*	Luverne, MN	2	Corn	21	0.45
Al-Corn Clean Fuel*	Claremont, MN	2	Corn	42	0.89
Alchem Ltd. LLP	Grafton, ND	2	Corn		
AltraBiofuels Coshocton Ethanol, LLC	Coshocton, OH	2	corn		
AltraBiofuels Indiana, LLC	Cloverdale, IN	2	corn		
Amaizing Energy, LLC*	Atlantic, IA	2	Corn		
Amaizing Energy, LLC*	Denison, IA	2	Corn	48	1.02
18 - Archer Daniels Midland (Total)		2		1,070.00	22.76
Archer Daniels Midland	Cedar Rapids, IA	2	Corn		
Archer Daniels Midland	Clinton, IA	2	Corn		
Archer Daniels Midland	Decatur, IL	2	Corn		
Archer Daniels Midland	Peoria, IL	2	Corn		
Archer Daniels Midland	Marshall, MN	2	Corn		
Archer Daniels Midland	Wallhalla, ND	2	Corn/barley		
Archer Daniels Midland	Columbus, NE	2	Corn		
Arkalon Energy, LLC	Liberal, KS	2	Corn	110	2.34
26 - Aventine Renewable Energy, LLC (Total)		2		207	4.40
Aventine Renewable Energy, LLC	Pekin, IL	2	Corn		
Aventine Renewable Energy, LLC	Aurora, NE	2	Corn		
Badger State Ethanol, LLC*	Monroe, WI	2	Corn	48	1.02
Big River Resources Galva, LLC	Galva, IL	2	corn		
Big River Resources, LLC*	West Burlington, IA	2	Corn	92	1.96
BioFuel Energy - Buffalo Lake Energy, LLC	Fairmont, MN	2	Corn	115	2.45
BioFuel Energy - Pioneer Trail Energy, LLC	Wood River, NE	2	Corn	115	2.45
Blue Flint Ethanol	Underwood, ND	2	Corn	50	1.06
Bonanza Energy, LLC	Garden City, KS	2	Corn/milo	55	1.17
Bridgeport Ethanol	Bridgeport, NE	2	corn	54	1.15
Bushmills Ethanol, Inc.*	Atwater, MN	2	Corn	50	1.06
Cardinal Ethanol	Union City, IN	2	Corn	100	2.13
Cargill, Inc.	Eddyville, IA	2	Corn	35	0.74
Cargill, Inc.	Blair, NE	2	Corn	85	1.81
Castle Rock Renewable Fuels, LLC	Necedah, WI	2	Corn	50	1.06
Center Ethanol Company	Sauget, IL	2	Corn	54	1.15
Central Indiana Ethanol, LLC	Marion, IN	2	Corn	40	0.85
Central MN Ethanol Coop*	Little Falls, MN	2	Corn	21.5	0.46
Chief Ethanol	Hastings, NE	2	Corn	62	1.32
Chippewa Valley Ethanol Co.*	Benson, MN	2	Corn	45	0.96
Commonwealth Agri-Energy, LLC*	Hopkinsville, KY	2	Corn	33	0.70
Corn Plus, LLP*	Winnebago, MN	2	Corn	44	0.94
Corn, LP*	Goldfield, IA	2	Corn	55	1.17
Cornhusker Energy Lexington, LLC	Lexington, NE	2	Corn	40	0.85
Dakota Ethanol, LLC*	Wentworth, SD	2	Corn	50	1.06
DENCO, LLC	Morris, MN	2	Corn		
Didion Ethanol	Cambria, WI	2	Corn	40	0.85
E Caruso (Goodland Energy Center)	Goodland, KS	2	Corn		

Table 7.7 Ethanol Production Capacity in PADDs I and II (Cont'd.)

Capacity – Millions of Gallons per Year

Company	Location	PADD	Feedstock	Operating Production (MMGPY)	Estimated Acid Demand (Thousand Metric Tons)
E Energy Adams, LLC	Adams, NE	2	Corn	50	1.06
E3 Biofuels	Mead, NE	2	corn		
East Kansas Agri-Energy, LLC*	Garnett, KS	2	Corn	35	0.74
ESE Alcohol Inc.	Leoti, KS	2	Seed corn	1.5	0.03
Ethanol Grain Processors, LLC	Obion, TN	2	Corn	100	2.13
Gateway Ethanol	Pratt, KS	2	Corn		
Glacial Lakes Energy, LLC - Mina	Mina, SD	2	corn	107	2.28
Glacial Lakes Energy, LLC*	Watertown, SD	2	Corn	100	2.13
Global Ethanol/Midwest Grain Processors	Lakota, IA	2	Corn	97	2.06
Global Ethanol/Midwest Grain Processors	Riga, MI	2	Corn	57	1.21
Golden Grain Energy, LLC*	Mason City, IA	2	Corn	115	2.45
Golden Triangle Energy, LLC*	Craig, MO	2	Corn	20	0.43
Grain Processing Corp.	Muscatine, IA	2	Corn	20	0.43
Granite Falls Energy, LLC*	Granite Falls, MN	2	Corn	52	1.11
Greater Ohio Ethanol, LLC	Lima, OH	2	Corn		
Green Plains Renewable Energy	Shenandoah, IA	2	Corn	55	1.17
Green Plains Renewable Energy	Superior, IA	2	Corn	55	1.17
Hawkeye Renewables, LLC	Fairbank, IA	2	Corn	120	2.55
Hawkeye Renewables, LLC	Iowa Falls, IA	2	Corn	105	2.23
Hawkeye Renewables, LLC	Menlo, IA	2	Corn	110	2.34
Hawkeye Renewables, LLC	Shell Rock, IA	2	Corn	110	2.34
Heartland Corn Products*	Winthrop, MN	2	Corn	100	2.13
Heron Lake BioEnergy, LLC	Heron Lake, MN	2	Corn	50	1.06
Highwater Ethanol LLC	Lamberton, MN	2	Corn		
Homeland Energy	New Hampton, IA	2	Corn		
Husker Ag, LLC*	Plainview, NE	2	Corn	75	1.60
Illinois River Energy, LLC	Rochelle, IL	2	Corn	100	2.13
Indiana Bio-Energy	Bluffton, IN	2	Corn	101	2.15
Iroquois Bio-Energy Company, LLC	Rensselaer, IN	2	corn	40	0.85
KAAPA Ethanol, LLC*	Minden, NE	2	Corn	40	0.85
Kansas Ethanol, LLC	Lyons, KS	2	Corn	55	1.17
Land O' Lakes*	Melrose, MN	2	Cheese whey	2.6	0.06
LDCommodities	Grand Junction, IA	2	corn		
LDCommodities	Norfolk, NE	2	Corn	45	0.96
Lifeline Foods, LLC	St. Joseph, MO	2	Corn	40	0.85
Lincolnland Agri-Energy, LLC*	Palestine, IL	2	Corn	48	1.02
Lincolnway Energy, LLC*	Nevada, IA	2	Corn	50	1.06
Little Sioux Corn Processors, LP*	Marcus, IA	2	Corn	92	1.96
Marquis Energy, LLC	Hennepin, IL	2	Corn	100	2.13
Marysville Ethanol, LLC	Marysville, MI	2	Corn	50	1.06
Mid America Agri Products/Horizon	Cambridge, NE	2	Corn		
Mid America Agri Products/Wheatland	Madrid, NE	2	Corn	44	0.94
Mid-Missouri Energy, Inc.*	Malta Bend, MO	2	Corn	50	1.06
Midwest Renewable Energy, LLC	Sutherland, NE	2	Corn	25	0.53
Minnesota Energy*	Buffalo Lake, MN	2	Corn	18	0.38
NEDAK Ethanol	Atkinson, NE	2	corn		
Nesika Energy, LLC	Scandia, KS	2	corn	10	0.21
New Energy Corp.	South Bend, IN	2	Corn	102	2.17
North Country Ethanol, LLC*	Rosholt, SD	2	Corn	20	0.43
One Earth Energy	Gibson City, IL	2	corn		
Otter Tail Ag Enterprises	Fergus Falls, MN	2	Corn	57.5	1.22
Parallel Products	Louisville, KY	2	Beverage waste	5.4	0.11
Patriot Renewable Fuels, LLC	Annawan, IL	2	Corn	100	2.13
Penford Products	Cedar Rapids, IA	2	Corn	45	0.96
Pine Lake Corn Processors, LLC	Steamboat Rock, IA	2	corn	30	0.64
Platinum Ethanol, LLC*	Arthur, IA	2	Corn	110	2.34
Plymouth Ethanol, LLC*	Merrill, IA	2	Corn	50	1.06
POET Biorefining - Alexandria	Alexandria, IN	2	Corn	68	1.45
POET Biorefining - Ashton	Ashton, IA	2	Corn	56	1.19
POET Biorefining - Big Stone	Big Stone City, SD	2	Corn	79	1.68
POET Biorefining - Bingham Lake	Bingham Lake, MN	2	Corn	35	0.74
POET Biorefining - Caro	Caro, MI	2	Corn	53	1.13
POET Biorefining - Chancellor	Chancellor, SD	2	Corn	110	2.34
POET Biorefining - Coon Rapids	Coon Rapids, IA	2	Corn	54	1.15
POET Biorefining - Corning	Corning, IA	2	Corn	65	1.38
POET Biorefining - Emmetsburg	Emmetsburg, IA	2	Corn	55	1.17

Table 7.7 Ethanol Production Capacity in PADDs I and II (Cont'd.)

Capacity – Millions of Gallons per Year

Company	Location	PADD	Feedstock	Operating Production (MMGPY)	Estimated Acid Demand (Thousand Metric Tons)
POET Biorefining - Fostoria	Fostoria, OH	2	Corn	68	1.45
POET Biorefining - Glenville	Albert Lea, MN	2	Corn	42	0.89
POET Biorefining - Gowrie	Gowrie, IA	2	Corn	69	1.47
POET Biorefining - Hanlontown	Hanlontown, IA	2	Corn	56	1.19
POET Biorefining - Hudson	Hudson, SD	2	Corn	56	1.19
POET Biorefining - Jewell	Jewell, IA	2	Corn	69	1.47
POET Biorefining - Laddonia	Laddonia, MO	2	Corn	50	1.06
POET Biorefining - Lake Crystal	Lake Crystal, MN	2	Corn	56	1.19
POET Biorefining - Leipsic	Leipsic, OH	2	Corn	68	1.45
POET Biorefining - Macon	Macon, MO	2	Corn	46	0.98
POET Biorefining - Marion	Marion, OH	2	Corn		
POET Biorefining - Mitchell	Mitchell, SD	2	Corn	68	1.45
POET Biorefining - North Manchester	North Manchester, IN	2	Corn	68	1.45
POET Biorefining - Portland	Portland, IN	2	Corn	68	1.45
POET Biorefining - Preston	Preston, MN	2	Corn	46	0.98
POET Biorefining - Scotland	Scotland, SD	2	Corn	11	0.23
POET Biorefining- Groton	Groton, SD	2	Corn	53	1.13
Prairie Horizon Agri-Energy, LLC	Phillipsburg, KS	2	Corn	40	0.85
Quad-County Corn Processors*	Galva, IA	2	Corn	30	0.64
Red Trail Energy, LLC	Richardton, ND	2	Corn	50	1.06
Redfield Energy, LLC *	Redfield, SD	2	Corn	50	1.06
Reeve Agri-Energy	Garden City, KS	2	Corn/milo	12	0.26
Renew Energy	Jefferson Junction, WI	2	Corn	130	2.77
Riverland Biofuels	Canton, IL	2	corn	37	0.79
Show Me Ethanol	Carrollton, MO	2	Corn	55	1.17
Siouxland Energy & Livestock Coop*	Sioux Center, IA	2	Corn	60	1.28
Siouxland Ethanol, LLC	Jackson, NE	2	Corn	50	1.06
Southwest Iowa Renewable Energy, LLC *	Council Bluffs, IA	2	Corn	110	2.34
Tate & Lyle	Ft. Dodge, IA	2	Corn		
Tate & Lyle	Loudon, TN	2	Corn	67	1.43
Tharaldson Ethanol	Casselton, ND	2	Corn	110	2.34
The Andersons Albion Ethanol LLC	Albion, MI	2	Corn	55	1.17
The Andersons Clymers Ethanol, LLC	Clymers, IN	2	Corn	110	2.34
The Andersons Marathon Ethanol, LLC	Greenville, OH	2	Corn	110	2.34
Trenton Agri Products, LLC	Trenton, NE	2	Corn	40	0.85
United Ethanol	Milton, WI	2	Corn	52	1.11
United WI Grain Producers, LLC*	Friesland, WI	2	Corn	49	1.04
Utica Energy, LLC	Oshkosh, WI	2	Corn	48	1.02
VeraSun Energy Corp.	Dyersville, IA	2	corn		
VeraSun Energy Corp.	Linden, IN	2	Corn		
VeraSun Energy Corp.	Lake Odessa, MI	2	Corn		
VeraSun Energy Corp.	Janesville, MN	2	corn		
VeraSun Energy Corp.	Welcome, MN	2	corn		
VeraSun Energy Corp.	Hankinson, ND	2	corn		
VeraSun Energy Corp.	Albion, NE	2	corn		
VeraSun Energy Corp.	Central City, NE	2	corn		
VeraSun Energy Corp.	Ord, NE	2	Corn		
VeraSun Energy Corp.	Bloomingburg, OH	2	corn		
VeraSun Energy Corp.	Marion, SD	2	corn		
178 - VeraSun Energy Corporation (Total)		2		450	9.57
VeraSun Energy Corporation	Albert City, IA	2	Corn		
VeraSun Energy Corporation	Charles City, IA	2	Corn		
VeraSun Energy Corporation	Ft. Dodge, IA	2	Corn		
VeraSun Energy Corporation	Hartley, IA	2	Corn		
VeraSun Energy Corporation	Welcome, MN	2	Corn		
VeraSun Energy Corporation	Aurora, SD	2	Corn		
Western Plains Energy, LLC*	Campus, KS	2	Corn	45	0.96
Western Wisconsin Renewable Energy, LLC*	Boyceville, WI	2	Corn	40	0.85
White Energy	Russell, KS	2	Milo/wheat starch	48	1.02
Xethanol BioFuels, LLC	Blairstown, IA	2	Corn	5	0.11
Ethanol Production			PADD 1	150	3.20
Ethanol Production			PADD 2	3,415	72.64
Total				**3,565**	75.84

Ethanol, though only using a small amount of acid per gallon produced, is a very large end user of sulfuric acid domestically due to the volume of ethanol produced in the United States. Nexant's relevant contacts with the ethanol industry are summarized below.

Poet, formerly known as Broin, is the largest Ethanol producer in the United States. With a network of 26 plants in seven states producing over one billion gallons of ethanol annually, their facilities are the most successful and profitable in the industry. Poet consumes roughly 13 million pounds (about 6,000 metric tons) of sulfuric acid annually as part of the ethanol production process. Poet expects demand growth for sulfuric acid in the ethanol industry as flat to negative, as the industry is trying to become more efficient, and is trying to diminish sulfuric acid use, though they stated that the technology is not there yet. Though Poet is currently supplied by Hawkins, Inc., a sulfuric acid supplier in the Midwest, a supply agreement that was just entered into, Poet invites new suppliers to bid for supply in 2-3 years when the current supply contract expires. Suppliers will be chosen based upon two criteria, the first of which is price. Similar to other consumers of sulfuric acid, supply contracts are bid on, with the low bidder generally winning the supply. The second criterion is security of supply. Poet stated that they would not be able to accept a supply interruption as this would force a pause in production.

Advanced Bioenergy, LLC is another large ethanol producer in the Midwest. With plants in South Dakota, and Nebraska, they too are significant consumers of sulfuric acid. Advanced bioenergy consumes 200 million gallons of sulfuric acid annually. While they do not expect demand to increase for sulfuric acid, they also stated that they do not see that the demand by the ethanol industry will be decreased as the Renewable Fuel Standard (RFS) is increasing the demand for ethanol. The increased demand for ethanol is expected to increase domestic production, which in turn will increase the amount of consumers, buffering against demand loss due to increased efficiencies and lower consumption per gallon of ethanol produced.

7.3.1.4 Chemical Companies

Virtually all chemical companies have some requirement for sulfuric acid. This can be as a reagent, catalyst for a reaction, or as a pH adjustment or neutralizer amongst other uses. Tables 7.9 and 7.10 present chemical companies in PADDs I and II respectively. This listing includes chemical retailers such as Sigma Aldrich and Malinckrodt, who are distributors, typically to laboratories, and typically in smaller quantities. Also included in this listing are the larger chemical companies such as DOW and Carolina Eastman, who are chemical manufacturers.

Table 7.8 PADD I Chemical Companies

Company	City	State
Coastal Products Co.	Westbrook	ME
Aronol	Westbrook	ME
Chemfast	Westbrook	ME
Chute Chemical Co., Inc.	Bangor	ME
Medical Isotopes, Inc.	Pelham	NH
Roymal, Inc.	Newport	NH
Digital Specialty Chemicals Limited	Dublin	NH
American Sand-Banum Co., Inc.	Sunapee	NH
Coating Systems, Inc.	Nashua	NH
Chem-Pak, Inc.	Martinsburg	WV
New Chem Inc.	New Cumberland	WV
Kincaid Enterprises, Inc.	Nitro	WV
Raybo Chemical Corp.	Huntington	WV
GE Co., GE Specialty Chemicals	Parkersburg	WV
Creative Materials, Inc.	Tyngsboro	MA
Solutek Corp.	Boston	MA
Iris Engineering, Inc.	Ashland	MA
Multi-Sport	Norwood	MA
Webco Chemical Corp.	Dudley	MA
Prime Polymers, Inc.	Lynn	MA
Nano-C, Inc.	Westwood	MA
Heesung Metals	Rehoboth	MA
Glsynthesis Inc	Worcester	MA
Borden & Remington Corp.	Fall River	MA
Boremco Specialty Chemicals	Fall River	MA
Mascon	Woburn	MA
Barclay Water Management, Inc.	Watertown	MA
Hapco	Hanover	MA
Sensiv, Inc.	Waltham	MA
Wireway/Husky Corp.	Sterling	MA
Carlisle Chemical Co.	Lexington	MA
Borregaard Synthesis Inc.	Newburyport	MA
Cristy Corp.	Fitchburg	MA
NEN Life Science Products	Boston	MA
Bay State Adhesive Corp.	Salem	MA
Diptech Inc.	Manchester	MA
Water Chemicals, Inc.	Chelsea	MA
New England Biolabs Inc.	Beverly	MA
Ramsey Co.	Marlborough	MA
Polaroid Corp., Chemicals Div.	Waltham	MA
Sphinx Adsorbents, Inc.	Springfield	MA
HOLLAND COMPANY INC.	ADAMS	MA
Process Solutions Inc.	Longmeadow	MA
Lab Chem Plus	Indian Orchard	MA
Loctite Industrial, Henkel Corp.	Rocky Hill	CT
Jensen Fabricating Engineers, Inc./JENFAB	Berlin	CT
Rose Mill Co.	West Hartford	CT
Simoniz USA, Inc	Bolton	CT
Hampford Research	Stratford	CT
Pfaltz & Bauer	Waterbury	CT
Alcan International Network USA, Inc. Alcan Chemical	Stamford	CT
Charkit Chemical Corp.	Norwalk	CT
MacDermid, Inc.	Waterbury	CT
Momentive Performance Materials Inc.	Wilton	CT
Rago Industries, Inc	Shelton	CT
Rem Chemicals, Inc.	Southington	CT
Mica Corporation	Shelton	CT
RSA Corp.	Danbury	CT
Purification Technologies, Inc	Chester	CT
Dow Chemical Co.	Gales Ferry	CT
Diagnostic Chemicals Ltd. (USA)	Oxford	CT
Sanitized, Inc.	New Preston	CT
Chessco Industries, Inc.	Westport	CT
U.S. Chemical, Inc.	New Canaan	CT
Technical Industries, Inc.	Peace Dale	RI
Terecon Corporation	Saunderstown	RI
Bercen, Inc.	Cranston	RI
Nerl Diagnostics Corporation	East Providence	RI

Table 7.8 PADD I Chemical Companies (Cont'd.)

Company	City	State
Epoxies Etc.	Cranston	RI
Ultra Scientific, Inc.	Kingstown	RI
Cal Chemical Corp.	Coventry	RI
Spectral Chemical Co., Inc.	Warwick	RI
International Dioxcide, Inc.	North Kingstown	RI
Hess, John R. Co.	Cranston	RI
CNC International Corp.	Woonsocket	RI
Original Bradford Soap Works, Inc.	West Warwick	RI
Hercules, Inc.	Wilmington	DE
Archimica, Inc.	Wilmington	DE
Grace, W. R. & Co.	Columbia	MD
Chemgen	Gaithersburg	MD
Arcal Chemicals, Inc.	Capitol Heights	MD
Erachem Comilog	Baltimore	MD
Colonial Metals, Inc.	Elkton	MD
PharmaKinetics Laboratories, Inc.	Baltimore	MD
Dentocide Chemical Co.	Brooklyn	MD
Paulen Industries, Inc.	Beltsville	MD
Dynasurf Chemical Corp.	Baltimore	MD
Philadelphia Quartz Co.	Baltimore	MD
Chem-Met Co.	Clinton	MD
Niacet Corp.	Niagara Falls	NY
Indium Corp. of America	Utica	NY
Ferro Corp.	Penn Yan	NY
Cridel	Syracuse	NY
Remet, Inc.	Utica	NY
Aldon Corporation	Avon	NY
Comac Builders Supply Corp.	Rochester	NY
Surpass Chemical	Albany	NY
Bison Laboratories, Inc.	Buffalo	NY
Tarksol Inc.	Rochester	NY
Rochester Midland Corp. (RMC)	Rochester	NY
Uc Coatings	Buffalo	NY
Flame Control Coatings, Inc.	Niagara Falls	NY
Morgan Materials, Inc.	Buffalo	NY
American Biorganics, Inc.	Niagara Falls	NY
Mil-Spec Industries Corp.	Roslyn Heights	NY
Alfa Chemical Corp.	Kings Point	NY
Chemi-Coatings, Inc.	Walden	NY
Tridon Chemical	Deer Park	NY
Chemcor	Chester	NY
Positive Products Laboratories Inc.	Poughkeepsie	NY
Pall Corporation	Port Washington	NY
Sovereign Products Inc	Brooklyn	NY
Idp Labs Inc	Chappaqua	NY
Global Decisions, Inc.	Islip	NY
Chemclean Corp.	Jamaica	NY
Sundial Fragrances & Flavors, Inc.	Bohemia	NY
M. Michel & Company, Inc.	New York	NY
Alconox, Inc.	White Plains	NY
Balchem Corp.	Slate Hill	NY
Hogan Flavors & Fragrances, Inc.	New York	NY
Axel Plastics Research Laboratories, Inc.	Woodside	NY
Fiber-Shield Industries, Inc.	Yaphank	NY
Citrus & Allied Essences Ltd	New Hyde Park	NY
Arc Specialty Products - Balchem Corp.	Slate Hill	NY
Atomergic Chemetals Corp.	Farmingdale	NY
Mitsui Chemicals America, Inc.	Rye Brook	NY
Leico Industries	New York	NY
Crowley Tar Products Co., Inc.	New York	NY
Melax Mfg., Inc.	Woodside	NY
Vitriturf	Hauppauge	NY
Sanofi Pharmaceuticals	New York	NY
Nuvite Chemical Compounds Corporation	Brooklyn	NY
Safeguard Chemical Corporation	Bronx	NY
Pax Surface Chemicals, Inc.	Syosset	NY
Ciba Speciality Chemicals	Tarrytown	NY
Power Chemical Co., Inc.	Bronx	NY

Table 7.8 PADD I Chemical Companies (Cont'd.)

Company	City	State
Metro Group, Inc., Cosmopolitan Chemical Co. Div.	Long Island City	NY
Telstar Industries, Inc.	Commack	NY
Centflor Manufacturing Co., Inc.	New York	NY
Century Multech, Inc.	Flushing	NY
Silfen, Leo, Inc.	Bedford	NY
Ayers International Corp.	Irvington	NY
Parke-Hill Chemical Corp.	Mount Vernon	NY
RONA/EM Industries, Inc.	Hawthorne	NY
Twintex Chemical Corp.	Brooklyn	NY
CA Aromatics Co.	Floral Park	NY
Enequist Chemical Co., Inc.	Brooklyn	NY
Meta-Therm Corp.	Harrison	NY
Ajax Chemical Corp.	Floral Park	NY
Jax Chemical Co.	Floral Park	NY
Essential Fine Ingredients, Inc.	Port Washington	NY
Non Tox Chemical Corp.	Woodside	NY
Vitricon	Commack	NY
Andrews Paper & Chemical Co., Inc.	Port Washington	NY
Nepera, Inc., A Cambrex Co.	Harriman	NY
Bio-Scientific Specialty Products, Inc.	Freeport	NY
ACL	Mill Neck	NY
Aquaphoenix Scientific	Hanover	PA
Sartomer Co., Inc.	Exton	PA
Houghton International	Valley Forge	PA
FMC Corp.	Philadelphia	PA
Esstech, Inc.	Essington	PA
Quaker Chemical	Conshohocken	PA
Polysciences, Inc.	Warrington	PA
Clarkson Chromatography Products Inc.	South Williamsport	PA
Pharmachem Corp.	Bethlehem	PA
Curtiss Labs Inc.	Bensalem	PA
Carbochem, Inc.	Ardmore	PA
Arkema, Inc.	Philadelphia	PA
Osram Sylvania Inc., Chemicals & Metallurgical Products	Towanda	PA
Sunoco Chemicals	Philadelphia	PA
Heico Chemicals, Inc.	Delaware Water Gap	PA
Hydrol Chemical Company	Yeadon	PA
Chemtech	Media	PA
Epichem Ltd	Allentown	PA
Coopers Creek Chemical Corporation	West Conshohocken	PA
DCL Solutions	Philadelphia	PA
PQ Corp.	Valley Forge	PA
Rohm & Haas Co.	Philadelphia	PA
Vexcon Chemicals	Philadelphia	PA
Purolite International Limited	Bala Cynwyd	PA
Applied Separations, Inc.	Allentown	PA
Martin, R. & E. Chemicals	Philadelphia	PA
Peacock Laboratories, Inc.	Philadelphia	PA
Schafco Packaging Company	Lancaster	PA
Cantol, Inc.	Philadelphia	PA
Corco Chemical Corp.	Fairless Hills	PA
Miller, Harry, Corp.	Philadelphia	PA
Twin Specialties Corp.	Conshohocken	PA
Jonas, N., & Co., Inc.	Bensalem	PA
Leatex Chemical Co.	Philadelphia	PA
A + A Chemical Products	Kingston	PA
Ceramic Color & Chemical Manufacturing Co.	New Brighton	PA
LANXESS Corp. - Material Protection Products	Pittsburgh	PA
PPG Industries, Inc.	Pittsburgh	PA
Penn Carbose	Somerset	PA
Callery Chemical Company	Evans City	PA
Pressure Chemical Company	Pittsburgh	PA
Bayer MaterialScience LLC - Inorganic Basic Chemicals	Pittsburgh	PA
Almatis, Inc.	Leetsdale	PA
Ferro Corp.	Washington	PA
ABCO Manufacturing	Blawnox	PA
Applied Creativity, Inc.	Export	PA
Craft Products Co., Inc.	Pittsburgh	PA

Table 7.8 PADD I Chemical Companies (Cont'd.)

Company	City	State
Penn Champ, Inc.	East Butler	PA
Beaver Alkali Products	Rochester	PA
Penn Texstyle	Somerset	PA
Spec Sciences Inc.	Sharon	PA
Quality Chemicals Inc.	Tyrone	PA
Eaton Electrical	Pittsburgh	PA
P.W. Perkins Co., Inc.	Woodstown	NJ
W.D. Service Co., Inc.	Bellmawr	NJ
Northeast Industrial and Marine Equipment	Cape May	NJ
Buckton Scott USA	Princeton	NJ
Ganes Chemicals, Inc.	Pennsville	NJ
Shieldalloy Metallurgical Corp.	Swedesboro	NJ
Johnson Matthey Pharmaceuticals	West Deptford	NJ
Elementis Specialties Inc.	Hightstown	NJ
Chemetall America	New Providence	NJ
Banner Chemical Corp.	Orange	NJ
Atlantic Equipment Engineers, Div. of Micron Metals, Inc.	Bergenfield	NJ
Dunbar Sales & Manufacturing Co., Inc.	Bayonne	NJ
L & R Manufacturing Co.	Kearny	NJ
International Crystal Laboratories	Garfield	NJ
Elan Chemical Co.	Newark	NJ
Philipp Brothers Chemicals, Inc.	Fort Lee	NJ
Plenum Scientific Research	Hackensack	NJ
Evonik Indusatries	Ridgefield Park	NJ
IBF Corp.	Garfield	NJ
Hydro Med Sciences	Cranbury	NJ
ISP	Wayne	NJ
Akcros Chemicals	New Brunswick	NJ
Merck & Co., Inc.	Whitehouse Station	NJ
Hummel Croton Inc.	Plainfield	NJ
Penetone Corp.	Tenafly	NJ
Mallinc.Krodt Baker, Inc.	Phillipsburg	NJ
Ferro Corp.	Edison	NJ
Marisol, Inc.	Bound Brook	NJ
BASF Chemical Co.	Florhamparic	NJ
Drom International, Inc.	Towaco	NJ
Jame Fine Chemicals, Inc.	Bound Brook	NJ
Thermo Cote Inc.	Franklin	NJ
Surepure Chemetals, Inc.	Florham Park	NJ
Baumar Industries, Inc.	Nutley	NJ
CSL Water Treatment, Inc.	Warren	NJ
Venture Chemical Co., Inc.	Tinton Falls	NJ
Rotuba Extruders Inc.	Linden	NJ
Lipo Chemicals, Inc.	Paterson	NJ
MRI International	Newton	NJ
Octagon Process, Inc	Edison	NJ
Commonwealth Metal Corp.	Fort Lee	NJ
Cambrex Corp.	East Rutherford	NJ
Cooper Chemical Company, Inc.	Long Valley	NJ
Berje Inc.	Bloomfield	NJ
Commercial Products Co. Inc.	Hawthorne	NJ
Jersey Chemicals, Inc	Paterson	NJ
Qualco, Inc	Passaic	NJ
Honeywell, Inc.	Morristown	NJ
Finetex, Inc.	Edison	NJ
Advanced Polymer, Inc.	Carlstadt	NJ
Armour Products	Hawthorne	NJ
ADM Tronics Unlimited, Inc.	Northvale	NJ
Pharmacia Corp.	Peapack	NJ
Pariser Industries Chemicals	Paterson	NJ
Napp Technologies	Saddle Brook	NJ
Diamond Chemical	East Rutherford	NJ
Int'l Consolidated Chemex Corporation	New Brunswick	NJ
General Chemical Corp.	Parsippany	NJ
Dow Chemical Co.	Bound Brook	NJ
Reheis Inc.	Berkeley Heights	NJ
Cloroben Chemical Corp.	Passaic	NJ
Horizon Products, LLC	Ridgefield Park	NJ

Table 7.8 PADD I Chemical Companies (Cont'd.)

Company	City	State
Zrchem	Flemington	NJ
Stanson	Kearney	NJ
Penta Manufacturing	Livingston	NJ
Emulsitone	Whippany	NJ
Cosan Chemical Corp., A Cambrex Co.	Carlstadt	NJ
Engelhard Corp., Specialty Chemicals Div.	Iselin	NJ
CP/PhibroChem	Fort Lee	NJ
Engineering Chemical Services, Inc.	Whippany	NJ
Uniqema	Paterson	NJ
Honig Chemical & Processing Corp.	Newark	NJ
Federal Mining & Mfg. Co.	Roselle	NJ
Rempak Industries, Inc.	Fort Lee	NJ
Hy-Test 303 Corp.	Rutherford	NJ
Aetna Chemical Corp.	Elmwood Park	NJ
Fabric Chemical Corp.	Jersey City	NJ
Sentry/Custom Services Corp., Specialty Products Div.	Allamuchy	NJ
Chemisphere Corp.	Boonton	NJ
Noramco Inc.	New Brunswick	NJ
Foster & Co., Inc.	Cedar Knolls	NJ
Degen Co.	Jersey City	NJ
Laplace, L.J. & M.	Elmwood Park	NJ
Pilar River Plate Co.	Newark	NJ
Ultra Chemical Co.	Red Bank	NJ
H & S Chemical Co., Inc.	Wallington	NJ
Pfister Chemical, Inc.	Ridgefield	NJ
Bio Clinical Lab, Inc.	Phillipsburg	NJ
Grant Chemical Co.	Elmwood Park	NJ
Dover Laboratories, Inc.	Paterson	NJ
Scher Chemicals, Inc.	Clifton	NJ
Fales, W. H., Co.	Newton	NJ
Expanded Products, Inc.	Pompton Plains	NJ
Polarome Mfg. Co., Inc.	Jersey City	NJ
Drew Chemical Corp.	Boonton	NJ
Galaxie Chemical Corp.	Paterson	NJ
Chris Industries, Inc.	Freehold	NJ
Capital Janitorial Supply & Service, LLC	Richmond	VA
Goldschmidt Chemical Corp.	Hopewell	VA
Danchem Technologies, Inc.	Danville	VA
Exloc Instruments, Inc.	Warrenton	VA
Boehringer Ingelheim Chemicals, Inc	Petersburg	VA
Ethyl Corp.	Richmond	VA
Dominion Chemical Co.	Petersburg	VA
Wen-Don Corp.	Roanoke	VA
Tidewater Chemical Corp.	Chesapeake	VA
Hampton Roads Chemical Corp.	Newport News	VA
Dow Chemical Co.	Richmond	VA
Reagents	Charlotte	NC
Giles Chemical	Waynesville	NC
Pisgah Labs, Inc.	Pisgah Forest	NC
Prochem Chemicals	High Point	NC
Arrochem, Inc.	Holly	NC
Handi-Clean Products	Greensboro	NC
South Atlantic Services, Inc.	Wilmington	NC
Wright Corporation	Wilmington	NC
Chemical Specialties Inc.	Charlotte	NC
Apollo Chemical Company, LLC, Inc.	Burlington	NC
Smith Brothers Chemical Co.	Plymouth	NC
Lord Corp.	Cary	NC
Morflex	Greensboro	NC
Best Lab Deals	Garner	NC
Cvchem	Cary	NC
Boron Molecular Inc.	Research Triangle Park	NC
Surry Chemicals, Inc.	Mount Airy	NC
Chtusa	Charlotte	NC
Piedmont Chemical Industries	High Point	NC
Forshaw Chemicals Inc.	Charlotte	NC
Unitex Chemical Corporation	Greensboro	NC
Stockhausen, LLC	Greensboro	NC

Table 7.8 PADD I Chemical Companies (Cont'd.)

Company	City	State
Ncfi	Mount Airy	NC
Cosmechem	Hampstead	NC
Milanco Chemical Inc.	Charlotte	NC
Huron Tech Corp.	Delco	NC
Catawba-Charlab, Inc.	Charlotte	NC
Agri-Tech Systems LLC	Dunn	NC
Athol Manufacturing Co.	Butner	NC
Chemol, Inc.	Greensboro	NC
Carochem, Inc.	Durham	NC
Aerochem Corp.	High Point	NC
Super Absorbent Co., Inc.	Lumberton	NC
Tillett Chemical, Inc.	Pineville	NC
Southeastern Chemical Corp.	Graham	NC
MWT & O Inc.	Boone	NC
Davidson Labs, Inc.	Davidson	NC
All-Chemie, Ltd.	Mount Pleasant	SC
DPI Chemical	Lancaster	SC
Lindau Chemicals, Inc.	Columbia	SC
Caraustar Industrial & Consumer Products Group	Rock Hill	SC
Ethox	Greenville	SC
Milliken & Co.	Spartanburg	SC
APEX Chemical Corp. of South Carolina	Spartanburg	SC
BASF Catalysts LLC	Seneca	SC
Innovative Chemical Solutions, Inc	Duncan	SC
King's Laboratory, Inc.	Blythewood	SC
Chemco International, Inc.	Greenville	SC
Lubrizol, Inc.	Spartanburg	SC
Axon Products	Greenville	SC
Blackman Uhler Chemical	Spartanburg	SC
Metal Chem, Inc	Greenville	SC
Ortec, Inc.	Easley	SC
Synalloy Corp.	Spartanburg	SC
Fire Equipment Services	Sumter	SC
Automotive Technology Corp.	Easley	SC
Fibre Chemicals	Anderson	SC
Patrick, C.H., & Co., Inc.	Greenville	SC
Astro American Chemical Co.	Fountain Inn	SC
Sequa Chemicals Inc.	Chester	SC
Lever Industrial Co.	Ladson	SC
Plexon Corp.	Pelzer	SC
Specialty Industrial Products	Spartanburg	SC
Aiken Chemical Co., Inc.	Greenville	SC
Carolina Eastman Co.	Columbia	SC
Atlantic Products	Westminster	SC
Chapman Corporation	Nokomis	FL
Florida Chemical Co., Inc.	Winter Haven	FL
R2J Chemical Services, Inc	Largo	FL
Troy Industries	Miami	FL
International Chemical Corporation	West Melbourne	FL
Brewer International	Vero Beach	FL
Northland Manufacturing	Tallahassee	FL
Walter Industries, Inc.	Tampa	FL
Huey Chemical	Tampa	FL
Alchem Laboratories Co.	Alachua	FL
T2 Laboratories Inc	Jacksonville	FL
Bastech Chemicals, Inc.	Jacksonville	FL
W.R. Grace & Co.	Boca Raton	FL
Beckman Coulter, Inc.	Miami	FL
Stratford Corp.	Clearwater	FL
Chemline, Inc.	Kissimmee	FL
Jones Chemicals, Inc.	Sarasota	FL
Dyco Paints Inc.	Clearwater	FL
Precision Chemicals, Inc.	Tallahassee	FL
Chemical Standards Laboratory, Inc.	Clearwater	FL
Chemical Systems Of Florida, Inc.	Zellwood	FL
Webb Wright Corp.	Bokeelia	FL
Astor Products, Inc.	Jacksonville	FL
Cleanlook Chemical Corp.	Opa Locka	FL

Table 7.8 PADD I Chemical Companies (Cont'd.)

Company	City	State
Appearance Products, Inc.	Venice	FL
U.S. Chemical & Funeral	Miami	FL
Associated Engineering Chemistry, Inc.	Fort Lauderdale	FL
Sun Sanitary Supplies, Inc.	Crossroads	FL
Magnolia Plastics, Inc.	Chamblee	GA
QualiChem Technologies	Roswell	GA
Eagle Solutions	Adairsville	GA
AMRep / AMRep MRO Products	Marietta	GA
Huber Engineered Materials	Atlanta	GA
Mayzo, Inc.	Norcross	GA
Ajay North America LLC	Powder Springs	GA
Technochem, Inc.	Augusta	GA
Waco Chemical & Supply Co., Inc.	Dalton	GA
Kor-Chem, Inc.	Atlanta	GA
Imerys	Alpharetta	GA
Abaco, Inc	Eastanollee	GA
Chemical Products Technology - CPT LLC	Cartersville	GA
Ecolink, Inc.	Tucker	GA
Dow Chemical Co.	Dalton	GA
Telechem	Atlanta	GA
KrudKutter	Cumming	GA
Ferro Corp.	Toccoa	GA
LPS Laboratories, Inc., An Illinois Tool Works Co.	Tucker	GA
Amrep, Inc.	Marietta	GA
Amrep - MRO Products Group	Marietta	GA
J&S Chemical	Canton	GA
Momar, Inc.	Atlanta	GA
Atco	Marietta	GA
Head's Chemicals, Inc.	Atlanta	GA
Resource Innovations, Inc	Cartersville	GA
Apollo Industries, Inc.	Smyrna	GA
Chemlink Labs	Kennesaw	GA
CJB Industries	Valdosta	GA
Selecto, Inc.	Swanee	GA
Lynex Chemical Co.	Smyrna	GA
Southeastern Latex	Dalton	GA
Vinings Industries, Inc.	Kennesaw	GA
ARI	Griffin	GA
Chemtall, Inc.	Hinesville	GA
XL Corp.	Calhoun	GA
Liquid Glaze Inc.	Toccoa	GA
LLC Industries, Inc.	East Point	GA
Blackman-Uhler Chemical Co.	Augusta	GA

Table 7.9 PADD II Chemical Companies

Company	City	State
Allied Pressure Washers	Vermillion	SD
Rieke Metals	Lincoln	NE
Abs Corporation	Omaha	NE
Odor Z Way	Phillipsburg	KS
Vulcan Materials Co.	Wichita	KS
Flint Hills Resources	Wichita	KS
Spurrier Chemical Companies	Wichita	KS
ITW Dymon	Olathe	KS
Ccpi	Topeka	KS
Kaw Valley, Inc.	Leavenworth	KS
Mission Clay Products Div., MCP Industries, Inc.	Pittsburg	KS
Natur's Way, Inc.	Horton	KS
Mid Continent Packaging	Enid	OK
Magnesium Products, Inc.	Tulsa	OK
Phillips Petroleum Co.	Bartlesville	OK
Montello, Inc.	Tulsa	OK
Phillips Chemical Co., Specialty Chemicals	Bartlesville	OK
Tomco Harwel Industries, Inc	Tulsa	OK
SMC Technologies, Inc.	Midwest City	OK
Bio Cide International, Inc.	Norman	OK
Fluorine & Acetates	Catoosa	OK
Kerr McGee Corp.	Oklahoma City	OK
Kerr McGee Chemical Corp.	Oklahoma City	OK
Technisond Inc.	Roff	OK
Kinark Corp.	Tulsa	OK
ASAS/Tysol	Woodbury	MN
Fastenal	Winona	MN
Chaska Chemical	Savage	MN
Seacole Specialty Chemical	Saint Paul	MN
Hobo Inc	Lakeville	MN
US Carton & Supply, Inc.	Chaska	MN
Fremont Industries, Inc.	Shakopee	MN
Ecolab Inc.	St. Paul	MN
Uncommon Conglomerates, Inc.	St. Paul	MN
MultiClean	Shoreview	MN
Agsco, Inc.	Crookston	MN
Stanke Technical Sales	Saint Paul	MN
Aquacide Co.	White Bear Lake	MN
VersaPak	Shakopee	MN
Sentinel Chemical Co., Inc.	Minneapolis	MN
Fiemont Industries, Inc.	Shakopee	MN
Terra Environmental Technologies, A Terra Industries Co. -	Sioux City	IA
Tucker Manufacturing Co., Inc. -	Cedar Rapids	IA
MI-T-M -	Peosta	IA
Jacobson Warehouse Co.	Des Moines	IA
Green Valley Chemical Corporation	Union County	IA
Salsbury Chemicals, Inc.	Charles City	IA
Higley Chemical Co.	Dubuque	IA
Permeate Refining Inc	Cedar Rapids	IA
Walter Wurdack, Inc.	Saint Louis	MO
Champion Brands, LLC	Clinton	MO
Foam Supplies, Inc.	Earth City	MO
Sigma Aldrich Corp.	St. Louis	MO
Lubar Chemical Co.	Kansas City	MO
American Chemical Enterprises, Inc.	St. Louis	MO
Brewer Science, Inc.	Rolla	MO
Hohn Manufacturing, Inc.	Fenton	MO
Jenkin-Guerin, Inc.	St Louis	MO
Whitmire Micro-Gen Research Laboratories, Inc.	St. Louis	MO
KO Mfg.	Springfield	MO
Mallinckrodt, Inc.	Hazelwood	MO
Navy Brand Manufacturing Co.	St. Louis	MO
WSI Industries LLC/N-Terpinal	Springfield	MO
Terrace Packaging	Kansas City	MO
Varley, James & Sons, Inc.	St. Louis	MO
North American Chemical Corp.	Kansas City	MO
Wagner Brake Subsidiary, Moog Automotive, Div. of Cooper Industries	St. Louis	MO
El Dorado Chemical, Inc.	Bonne Terre	MO

Table 7.9 PADD II Chemical Companies (Cont'd)

Company	City	State
QV Chemicals, LLC	Chesterfield	MO
Douglas Products Pkg.	Liberty	MO
Products Supply, Inc.	Bonne Terre	MO
Custom Compunders, Inc.	Arnold	MO
Hydrite Chemical Co.	Brookfield	WI
CERAC, Inc., Subsidiary of Williams Advanced Materials, Inc.	Milwaukee	WI
Electro Polish Systems, Inc.	Milwaukee	WI
Wedor Corp.	West Allis	WI
Metalline Chemicals Corp.	Mequon	WI
Athea Laboratories, Inc.	Milwaukee	WI
Motomco	Madison	WI
Chemelex Div., RBP Chemical Corp.	Milwaukee	WI
Agi-Water Treatment/Chemical Formulations	Germantown	WI
Applied Biochemists	Germantown	WI
Sigma Aldrich Chemical, Co.	Milwaukee	WI
Nova Molecular Technologies Inc.	Janesville	WI
RBP Chemical Technology, Inc.	Milwaukee	WI
Prochemicals LLC	Green Bay	WI
Wayne Consultants & Mfg., Inc.	Waukesha	WI
Tetrionics, Inc.	Madison	WI
AT Products Corp.	Waukesha	WI
Online Packaging, Inc.	Plover	WI
Chem-Tech International Inc.	Random Lake	WI
Winn-Sol Products, Inc.	Oshkosh	WI
Fluka Chemical Corp.	Milwaukee	WI
Kyros Corp.	Middleton	WI
Marschall Products	Madison	WI
Steiner Electric Co. - Multiple Locations	Multiple Locations	IL
TRI SECT CORPORATION	Schaumburg	IL
A-Z FACTORY SUPPLY	Schiller Park	IL
EDC Industries, Inc.	Elk Grove Village	IL
Rydlyme: Apex Engineering Products Corp.	Aurora	IL
Elm Grove Industries, Inc.	Mundelein	IL
Slide Products, Inc.	Wheeling	IL
Chem-Impex	Wood Dale	IL
Castrol Industrial North America Inc.	Naperville	IL
Nuance Solutions	Chicago	IL
Velsicol Chemical Corp.	Rosemont	IL
Dow Chemical Co.	Joliet	IL
Wei T'o Index	Matteson	IL
Advanced Asymmetrics	Millstadt	IL
PICO Chemical Corp.	Chicago Heights	IL
Atm America Corp	Morton Grove	IL
Stepan Co.	Northfield	IL
Rycoline Products, Inc.	Chicago	IL
Tru-Test Mfg. Co.	Cary	IL
Rock Valley Oil & Chemical Co.	Rockford	IL
R.I.T.A. Corp.	Woodstock	IL
Spartan Flame Retardants Inc.	Crystal Lake	IL
Graham Chemical, Inc	Barrington	IL
Dow Chemical Co.	Chnnahon	IL
Dober Chemical Corp.	Midlothian	IL
Ivanhoe Industries Inc.	Mundelein	IL
MPG Industries	Joliet	IL
Odor Management, Inc.	Barrington	IL
JLM Chemicals Inc.	Blue Island	IL
Coral Corp.	Waukegan	IL
GC Electronics, Inc.	Rockford	IL
Expomix	Wauconda	IL
Eureka Chemical Lab, Inc.	Chicago	IL
Paket Corp.	Chicago	IL
Akzo Chemicals Inc.	Chicago	IL
Sunnyside Corporation	Wheeling	IL
Techdrive Inc.	Chicago	IL
Bankmark	Mount Prospect	IL
Rho Chemical Co., Inc.	Joliet	IL
Starlite Technical Service Inc.	Chicago	IL
Searle Chemicals, Inc.	Chicago	IL

Table 7.9 PADD II Chemical Companies (Cont'd)

Company	City	State
Polyenviro Labs, Inc.	Mokena	IL
CP Inorganics	Joliet	IL
K.C.I. Chemical Co.	Matteson	IL
Angus Chemical Co.	Buffalo Grove	IL
Calgene Chemical Inc.	Skokie	IL
Basic Products Co.	Chicago	IL
River Valley Coatings, Inc.	Aurora	IL
Chemrock Chemical Co.	Northbrook	IL
Watts, J. B. Co., Inc.	Chicago	IL
Pierce Chemical Co.	Rockford	IL
K & N Laboratories	Deerfield	IL
Masterbond, Inc.	Lake In The Hills	IL
Atrachem L.P.	Bedford Park	IL
Sesco Enterprises, Inc.	Chicago Heights	IL
General Chemical Corp.	East St Louis	IL
L. Carlton Mertz Co.	Chicago	IL
Nyatex Adhesive and Chemical Company	Howell	MI
Cross Chemical	Detroit	MI
Dow Chemical Co., The	Midland	MI
Arrow Chemical Products, Inc.	Detroit	MI
Detrex Solvents & Environmental Services Div.	Southfield	MI
DaimlerChrysler	Auburn Hills	MI
Freiborne Industries, Inc.	Pontiac	MI
Dow Chemical Co.	Midland	MI
Photo-Systems Inc.	Dexter	MI
Energy Additives, Inc.	Battle Creek	MI
DSC Products Inc.	Muskegon	MI
Dow Chemical Co.	Ludington	MI
Excelda Manufacturing Co., Inc.	Brighton	MI
Dow Chemical Co.	Midland	MI
Wacker Chemical Corp.	Adrian	MI
Peninsula Copper Industries, Inc.	Hubbell	MI
Premiere Packaging	Flint	MI
Detroit Chemical Supply Co.	Detroit	MI
Dow Chemical Co., The	Midland	MI
AG Group Worldwide Inc.	Clinton Twp	MI
Sun Chemical Corp.	Muskegon	MI
Wyckoff Chemical Co., Inc.	South Haven	MI
Mbi	Lansing	MI
Standhardt Chemical Corp.	Grand Rapids	MI
Algoma Products	Grand Rapids	MI
Pacific Steamex	Muskegon	MI
Dow Chemical Co.	Midland	MI
Gage Products Co.	Ferndale	MI
Rutherford Chemicals, Inc	Zeeland	MI
Dow Chemical Co.	Midland	MI
Producto Chemicals, Inc.	Livonia	MI
Vertellus Specialties, Inc.	Zeeland	MI
Haviland Enterprises Inc.	Grand Rapids	MI
Chem-Trend	Howell	MI
Amsa Inc	Midland	MI
Difco Laboratories	Detroit	MI
ESCO Co., Ltd. Partnership	Muskegon	MI
Superior Manufacturing Corp.	Detroit	MI
Environmental Marketing Services	Lansing	MI
Dow Chemical Co.	Bay City	MI
Guardsman Products, Inc., Specialty Products Div.	Fremont	MI
Quaker Chemical Corporation	Bingham Farms	MI
L.I.S. Manufacturing	Livonia	MI
Americhem, Inc.	Mason	MI
e-Chemicals Inc.	Ann Arbor	MI
North American Group	Flat Rock	MI
Nelsonite Chemical Products, Inc.	Grand Rapids	MI
Cory Labs, Inc.	Menominee	MI
Chemical Systems Corp.	Livonia	MI
Dow Chemical Co., Materials Engineering Center	Midland	MI
High-Po-Chlor Inc.	Romulus	MI
Electro Cote Chemicals Co. Inc.	Detroit	MI

Table 7.9 PADD II Chemical Companies (Cont'd)

Company	City	State
Fepco Tool & Supply	Noblesville	IN
Prosco, Inc.	Indianapolis	IN
Century Chemical Corp.	Elkhart	IN
Indian Naval Stores	Indianapolis	IN
Midwest Custom Chemicals Inc.	Newburgh	IN
Red Bird, Inc.	Osgood	IN
Pfau, George Sons Co., Inc.	Jeffersonville	IN
Chemtura Corp.	West Lafayette	IN
Reilly Industries, Inc	Indianapolis	IN
Ferro Corp.	Hammond	IN
Ferro Corp.	Plymouth	IN
Caypin Industries, Inc.	Fort Wayne	IN
Wayne Chemical Inc.	Fort Wayne	IN
QO Chemicals Inc.	West Lafayette	IN
Mason Metals Co.	Schererville	IN
Rexford Rand Corp.	Michigan City	IN
Great Lakes Products, Inc.	Indianapolis	IN
Chemicals-Solvents & Lubricants, Inc	Fort Wayne	IN
GSD Technology Inc.	Elkhart	IN
American Chemical Service, Inc.	Griffith	IN
Chem-A-Co, Inc.	Monticello	IN
Blue Grass Chemical Specialties	New Albany	IN
Challenge Inc.	Indianapolis	IN
Palmer Bolt & Supply Co.	Piqua	OH
American Lubricants & Chemicals, LLC	Marietta	OH
Bernard Laboratories, Inc.	Cincinnati	OH
Michelman, Inc.	Cincinnati	OH
Cognis Corp., Chemicals Group, Oleochemicals	Cincinnati	OH
PMC Specialties Group, Inc.	Cincinnati	OH
Cognis Corp.	Cincinnati	OH
JBS Industries	Lebanon	OH
Dow Chemical Co.	Ironton	OH
Orchem Corp.	Fairfield	OH
Ashland Chemical Co.	Columbus	OH
DuBois Chemicals	Sharonville	OH
Aluchem	Reading	OH
Borden Graphics, Inc.	Cincinnati	OH
Shepherd Chemical Co., The	Cincinnati	OH
Microtek Laboratories	Dayton	OH
Ashland Specialty Chemical Co.	Dublin	OH
DuBois	Sharonville	OH
Chemical Ventures	Cincinnati	OH
Ohio Valley Chemical Corp.	Cincinnati	OH
Quaker Chemical Corporation	Middletown	OH
Corrugated Chemicals	Cincinnati	OH
Syrgis	Covington	KY
H&S Chemical Co. Inc.	Covington	KY
Kenway Distributors Inc.	Louisville	KY
Ashland, Inc.	Covington	KY
ChemPharma	Richmond	KY
Angstrom Technologies	Erlanger	KY
Alltech Inc.	Nicholasville	KY
Dynatex	Elizabethtown	KY
Calvert City Chemical Co.	Calvert City	KY
The Walter A. Wood Supply Co., Inc.	Chattanooga	TN
Culligan of Chattanooga	Chattanooga	TN
Aquaphase, Inc.	Gallatin	TN
Eastman Chemical Co.	Kingsport	TN
Industrial Process Services, Inc.	Knoxville	TN
Drexel Chemical Co.	Memphis	TN
Water Services, Inc	Knoxville	TN
Precious Metals Corp.	Sevierville	TN
Colonial Chemical	South Pittsburg	TN
Alco Chemical	Chattanooga	TN
W.M. Barr & Co. Inc.	Memphis	TN
Buckman Laboratories	Memphis	TN
Cedar Chemical Corp.	Memphis	TN
ETRAC Laboratories, Inc.	Oak Ridge	TN

Table 7.9 PADD II Chemical Companies (Cont'd)

Company	City	State
GFS Chemicals, Inc.	Powell	OH
Palmer Bolt & Supply Co.	Piqua	OH
Krylon Products Group	Cleveland	OH
JRM Chemical	Cleveland	OH
CerCo, LLC	Shreve	OH
Vitex Corp.	Cleveland	OH
Dow Chemical Co.	Findlay	OH
Rohm & Haas Co.	North Olmsted	OH
Ferro Corp.	Orrville	OH
Applied Specialties, Inc.	Avon Lake	OH
Lubrizol Corp., The	Wickliffe	OH
Zaclon LLC	Cleveland	OH
Chemix Corporation	Berea	OH
Specrete Ip, Inc	Cleveland	OH
Ferro Corp., Pigment Group	Cleveland	OH
Ferro Corp., Specialty Ceramics Div.	Cleveland	OH
Ferro Corp., Plastic Colorants Div.	Stryker	OH
Struktol	Stow	OH
Dover Chemical Limited	Dover	OH
Ferro Corp., Porcelain Plant	East Liverpool	OH
GE Co., GE Lighting Components & Sales	Cleveland	OH
Quantam Technologies Inc.	Akron	OH
O'Brien Products/Zinkan Enter., Inc.	Twinsburg	OH
Ferro Corp.	Stryker	OH
USB Corp.	Cleveland	OH
Ferro Corp., Electronic Materials Group, Cleveland Plant	Cleveland	OH
Ecmorris	Wadsworth	OH
Royal Sheen	North Canton	OH
Taskem	Brooklyn Heights	OH
Jet Inc.	Cleveland	OH
Flexsys America L.P.	Akron	OH
Ferro Corp., Porcelain Enamel Div.	Cleveland	OH
Ferro Corp.	Cleveland	OH
GAC Chemical Corp.	Holland	OH
JMP Industries, Inc.	Cleveland	OH
Tremco, Inc.	Beachwood	OH
Akron Dispersions, Inc.	Akron	OH
Betco	Toledo	OH
Seaforth Mineral & Ore Co., Inc.	Cleveland	OH
Ferro Corp., Industrial Coatings Div.	Cleveland	OH
SHH Company, Ltd	Lewis Center	OH
Exochem, Inc.	Lorain	OH
AMRESCO, Inc.	Solon	OH
State Chemical Ltd	Cleveland	OH
Basic Coatings, Inc.	Toledo	OH
Canberra Corp.	Toledo	OH
Maxum, Inc.	Akron	OH
Wiley Organics, Inc.	Coshocton	OH
Degussa Initiators, LLC	Elyria	OH
TRA Coatings Corp.	Cortland	OH
Electroplating & Fabricating Co.	Cleveland	OH
National Borax Corp.	Cleveland	OH
Newton Laboratories, Inc.	Toledo	OH
Inceptor, Inc.	Toledo	OH
Cleveland Chemical Corp.	Cleveland	OH
Ryzel Corp.	Bristolville	OH
Lakewood Chemical & Supply Co.	East Palestine	OH
Sovereign Chemical Co.	Cuyahoga Falls	OH
Bond Chemicals, Inc.	Medina	OH
Alcan Chemicals	Beachwood	OH

7.3.2 Sulfuric Acid Producer Profiles

Sulfuric acid producers within PADDs I and II are presented in Table 7.10.

Table 7.10 Sulfuric Acid Producers

Capacity – Thousand Metric Tons

Company	Location	State	PADD	Capacity	Raw Material
Valero Energy Corp	Delaware City	Delaware	1	190	70% SO2 in Utility off gases, 30% Sludge
CF Industries	Plant City	Florida	1	2,400	100% Elemental; Captive
The Mosaic Company	Bartow	Florida	1	4,120	100% Elemental; Captive
The Mosaic Company	New Wales	Florida	1	3,930	100% Elemental; Captive
The Mosaic Company	Nichols	Florida	1	735	100% Elemental; mostly captive
The Mosaic Company	Riverview	Florida	1	1,940	100% Elemental; mostly captive
PCS Phosphate Co	White Springs	Florida	1	3,050	100% Elemental, Partly Captive
Tampa Electric Company	Polk County	Florida	1	65	SO2 and H2S in Utility off gases
General Chemical Corp	Augusta	Georgia	1	260	100% Elemental, Partly Captive
Southern States Chemical	Savannah	Georgia	1	135	100% Elemental, 100% Merchant
Tronox Inc.	Savannah	Georgia	1	245	100% Elemental, mostly captive
General Chemical Corp	Newark	New Jersey	1	140	100% Elemental
PVS Chemicals	Buffalo	New York	1	110	20% Elemental, 80% Sludge
PCS Phosphate Co	Aurora	North Carolina	1	3,285	100% Elemental; Captive
Southern States Chemical	Wilmington	North Carolina	1	60	100% Elemental, Merchant
Elementis Pigments	Easton	Pennsylvania	1	15	Ferrous Sulfate; High Purity iron oxides as byproduct; Captive
Langeloth International	Langeloth	Pennsylvania	1	35	100% Molybdenum Smelter gas
DuPont	Richmond	Virginia	1	85	100% Elemental; Partly Captive
Honeywell International	Hopewell	Virginia	1	390	100% Elemental, Captive
Lucite International	Belle	West Virginia	1	110	100% Sludge; Captive
Wheeling Pittsburgh Steel Corp	Follansbee	West Virginia	1	25	100% H2S From coke oven gas, captive
Big River Zinc	Sauget	Illinois	2	135	100% Zinc smelter Gases
PVS Chemical Solutions	Chicago	Illinois	2	80	100% Elemental
Rhodia	Hammond	Indiana	2	270	40% Elemental; 60% Sludge; Partially Captive
Climax Molybdenum Co.	Fort Madison	Iowa	2	90	40% Molybdenum Smelter Gases; 60% Elemental
Phelps Dodge Corp.	Fort Madison	Iowa	2	90	40% Molybdenum Smelter Gases; 60% Elemental
DuPont	Wurtland	Kentucky	2	180	100% Elemental; Partly Captive
The Doe Run Company	Herculaneum	Missouri	2	70	100% Lead Smelter Gases
AK Steel Corp	Middletown	Ohio	2	5	100% H2S From coke oven gas
Chemtrade Logistics	Cairo	Ohio	2	65	100% Elemental
DuPont	North Bend	Ohio	2	160	100% Elemental
Marsulex, Inc.	Oregon	Ohio	2	300	35% Elemental, 65% Sludge, neg H2S
Reliant Energy	Niles	Ohio	2	10	100% SO2 in utility off gases
Chemtrade Refinery Services	Tulsa	Oklahoma	2	60	100% Elemental
Lucite International	Memphis	Tennese	2	250	100% Sludge; Captive
Zinifex Clarksville	Clarksville	Tennesse	2	135	100% Zinc smelter gases, partly captive

7.4 RELAVENCE TO TENASKA

7.4.1 Sulfur

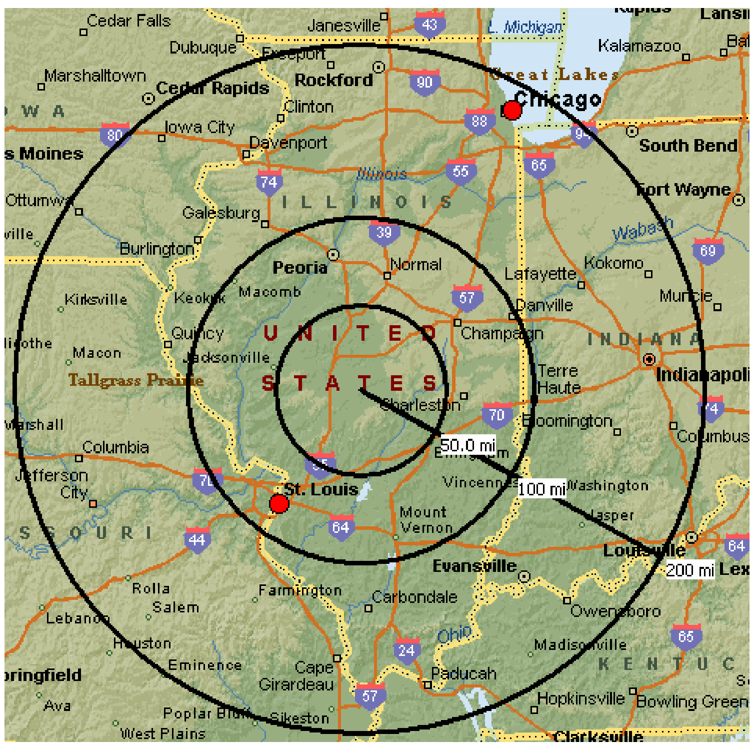
7.4.1.1 Potential Customers

A listing of potential sulfur consumers in Illinois is presented in Table 7.11, and as a map in Figure 7.1. Nexant has identified only 2 possible customers for sulfur produced at Taylorville. One is almost 200 miles away in Chicago, while the other is about 70 miles away in Sauget, just outside of St. Louis.

Table 7.11 Sulfur Consumers in Illinois

Company	Location
Big River Zinc	Sauget
PVS Chemical Solutions	Chicago

Figure 7.1 Sulfur Consumers in Illinois



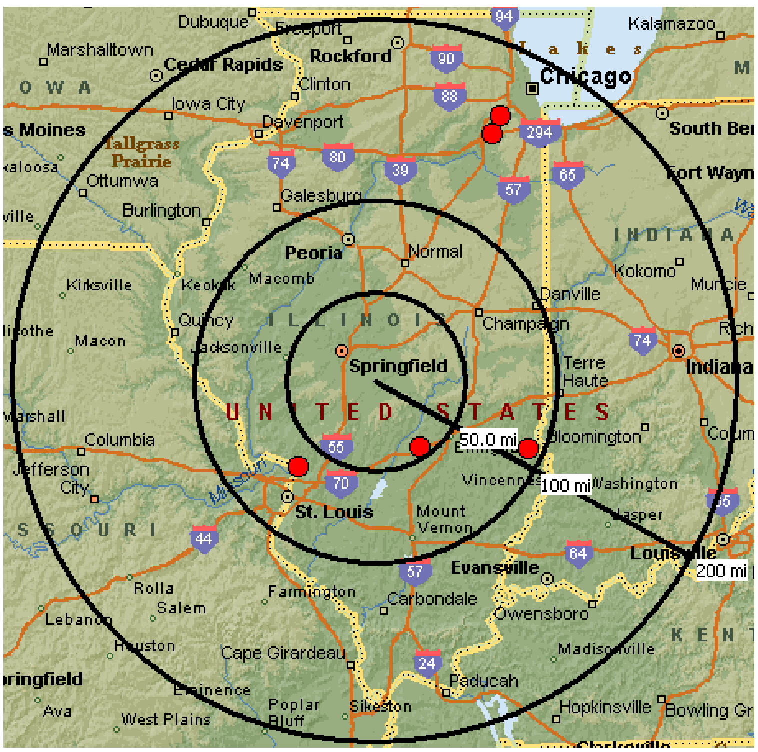
7.4.1.2 Potential Competition

A listing of potential competitors in Illinois is presented in Table 7.12, and as a map in Figure 7.2. All of the possible competitors are closer to the possible customers than the Taylorville plant, allowing for a potential logistical advantage over Tenaska.

Table 7.12 Potential Key Competitors

Company	Location
CITGO	Lemont
ConocoPhillips	Wood River
Exxon Mobil	Joliet
Marathon Petroleum	Robinson
Natural Gas Pipeline Company of America	St. Elmo

Figure 7.2 Potential Key Competitors



7.4.2 Sulfuric Acid

7.4.2.1 Potential Customers

A listing of potential sulfuric acid consumers in Illinois is presented in Tables 7.13 through 7.16, and is displayed on a map in Figure 7.3 below. Chemical companies are clustered near Chicago, almost 200 miles from Taylorville, while other consumers are spread throughout the state.

Table 7.13 Chemical Companies in Illinois

Company	City
Steiner Electric Co. - Multiple Locations	Multiple Locations
TRI SECT CORPORATION	Schaumburg
A-Z FACTORY SUPPLY	Schiller Park
EDC Industries, Inc.	Elk Grove Village
Rydlyme: Apex Engineering Products Corp.	Aurora
Elm Grove Industries, Inc.	Mundelein
Slide Products, Inc.	Wheeling
Chem-Impex	Wood Dale
Castrol Industrial North America Inc.	Naperville
Nuance Solutions	Chicago
Velsicol Chemical Corp.	Rosemont
Dow Chemical Co.	Joliet
Wei T'o Index	Matteson
Advanced Asymmetrics	Millstadt
PICO Chemical Corp.	Chicago Heights
Atm America Corp	Morton Grove
Stepan Co.	Northfield
Rycoline Products, Inc.	Chicago
Tru-Test Mfg. Co.	Cary
Rock Valley Oil & Chemical Co.	Rockford
R.I.T.A. Corp.	Woodstock
Spartan Flame Retardants Inc.	Crystal Lake
Graham Chemical, Inc	Barrington
Dow Chemical Co.	Chnnahon
Dober Chemical Corp.	Midlothian
Ivanhoe Industries Inc.	Mundelein
MPG Industries	Joliet
Odor Management, Inc.	Barrington
JLM Chemicals Inc.	Blue Island
Coral Corp.	Waukegan
GC Electronics, Inc.	Rockford
Expomix	Wauconda
Eureka Chemical Lab, Inc.	Chicago
Paket Corp.	Chicago
Akzo Chemicals Inc.	Chicago
Sunnyside Corporation	Wheeling
Techdrive Inc.	Chicago
Bankmark	Mount Prospect
Rho Chemical Co., Inc.	Joliet
Starlite Technical Service Inc.	Chicago
Searle Chemicals, Inc.	Chicago

Table 7.14 Pulp and Paper Mills in Illinois

Company	City
Ahlstrom Paper Group	Taylorville
Alcoa Flexible Packaging Corp.	Joliet
Alcoa Flexible Packaging Corp.	Peoria
BBP America, Inc.(BBP Celotex)	Quincy
Caraustar Industries, Inc.	Chicago
Field Container Co. L.P.	Pekin
Johns-Manville Corp.	Rockdale
Madison Paper Co.	Alsip
SCA Tissue North America L.L.C. (Svenska Cellulose Ab)	Alsip
Rock-Tenn Co.	Aurora

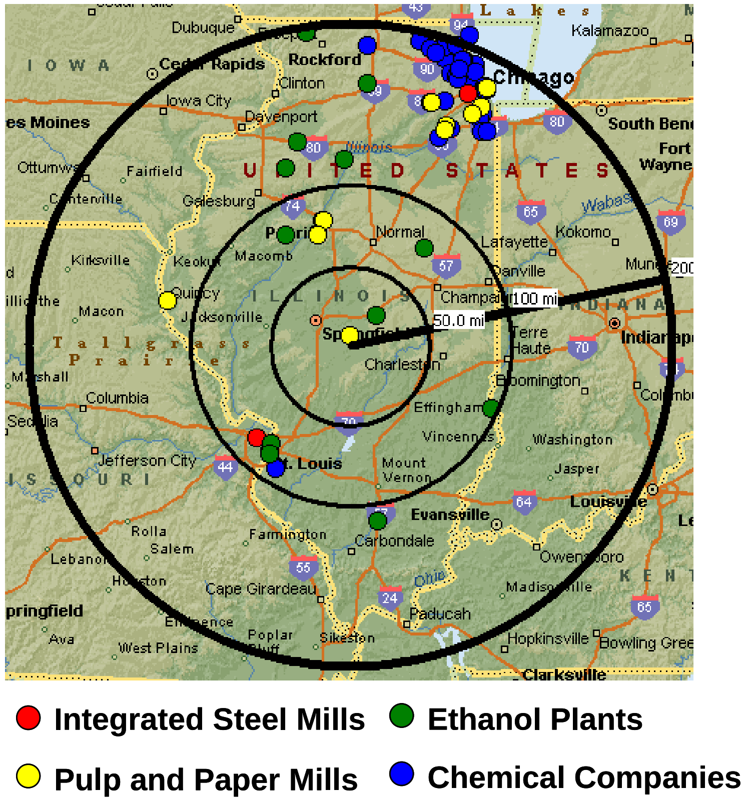
Table 7.15 Integrated Steel Mills in Illinois

Company	City
Interlake	S. Chicago
National	Granite City

Table 7.16 Ethanol Plants in Illinois

Company	City
Abengoa Bioenergy Corp.	Madison
Adkins Energy, LLC*	Lena
Ag Energy Resources, Inc.	Benton
Archer Daniels Midland	Decatur
Archer Daniels Midland	Peoria
Aventine Renewable Energy, LLC	Pekin
Big River Resources Galva, LLC	Galva
Center Ethanol Company	Sauget
Illinois River Energy, LLC	Rochelle
Lincolnland Agri-Energy, LLC*	Palestine
Marquis Energy, LLC	Hennepin
One Earth Energy	Gibson City
Patriot Renewable Fuels, LLC	Annawan
Riverland Biofuels	Canton

Figure 7.3 Sulfuric Acid Consumers in Illinois



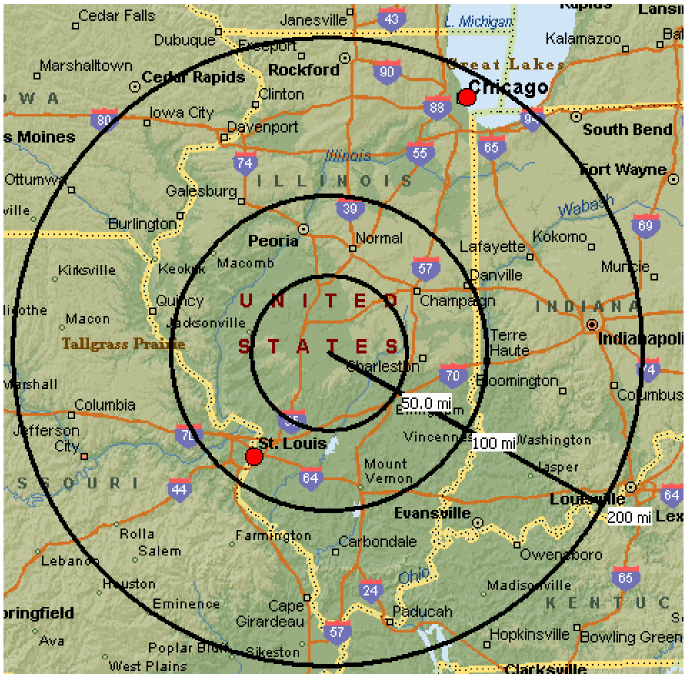
7.4.2.2 Potential Competition

A listing of potential sulfuric acid producers in Illinois is presented in Table 7.17 below, and is displayed on a map in Figure 7.4 below. Illinois has only two possible competitors with regard to sulfuric acid.

Table 7.17 Sulfuric Acid Producers in Illinois

Company	Location
Big River Zinc	Sauget
PVS Chemical Solutions	Chicago

Figure 7.4 Sulfuric Acid Producers in Illinois



8.1 INTRODUCTION

The major price setting hub for sulfur and sulfuric acid in the United States is Tampa, Florida. Prices are set here for sulfur by negotiations between sulfur producers and the fertilizer industry. Sulfuric acid prices are set by supply and demand conditions, but sulfur price is a major component in sulfuric acid cost. Historically, both sulfur and sulfuric acid prices have been volatile, similar to most commodity industries that periodically suffer from boom and bust cycles.

8.2 MOLTEN SULFUR

There are many different price assessments in the global market for sulfur which include:

- FOB Vancouver spot or contract (USD/MT)
- CFR Tampa (USD/LT)
- CFR China (USD/MT)
- FOB Black Sea (USD/MT)
- Liquid Sulfur (USD/MT)
- DEL Benelux (USD/MT)
- FOB Saudi/Kuwait/UAE (low-end N African contracts) (USD/MT)
- CFR Mediterranean spot (USD/MT)
- CFR North Africa contract (USD/MT)
- CFR India (USD/MT)
- FOB Iran (formed) (USD/MT)
- FOB Mideast (USD/MT)

Globally, prices are usually quoted for sulfur traded in formed, crushed bulk or flaked form and in liquid (molten) form for the United States. Spot prices for China are for recovered sulfur. The major reference prices in the global sulfur market are the FOB Vancouver contract (formed sulfur), FOB Saudi/Kuwait/UAE (contract and spot), FOB Iran (spot) and FOB Black Sea (contract and spot) quotes. In the United States, market pricing is determined by the quarterly price negotiations between the sulfur producers and the phosphate fertilizer industry which are represented by the Tampa quotation.

The majority of sulfur shipped in the United States is shipped in its molten state. For large quantities of molten sulfur, rail tank cars or barges are typically used for shipment. Trucks are usually used to move small quantities of molten sulfur for consumers closer to the supplier. A key issue for suppliers is the freight cost to ship molten sulfur to a particular customer.

The sections below discuss the historical and forecast pricing of molten sulfur at the benchmark Tampa location, along with relative freight rates to ship the product around the country and the resulting netbacks for the facility in Taylorville.

8.2.1 FOB Pricing

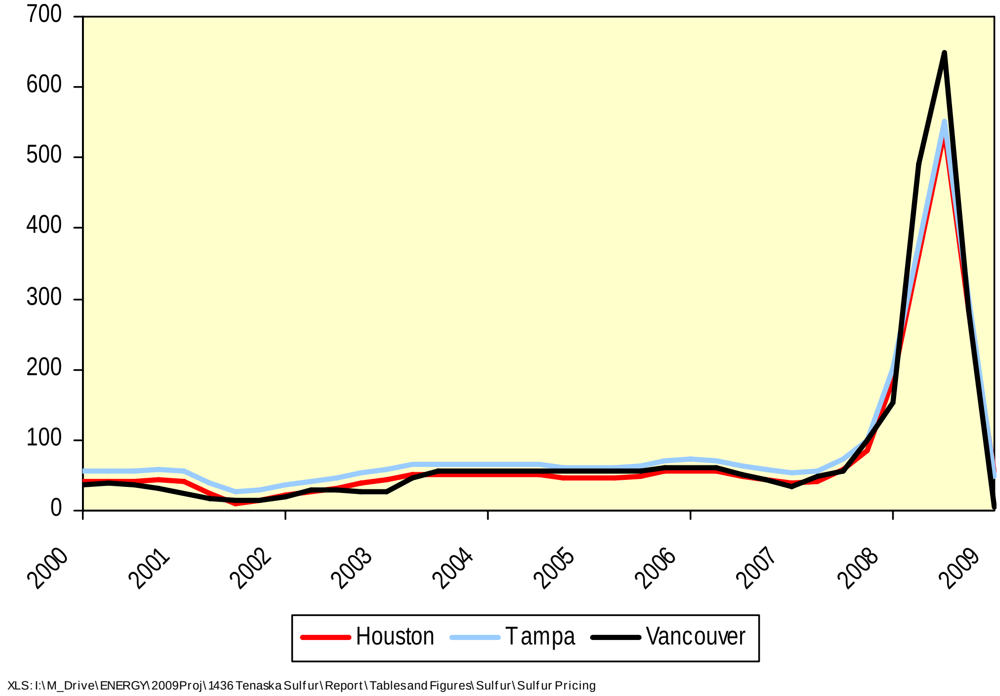
Global sulfur prices are typically set by low cost production in remote locations that then must be shipped to market. Thus, in addition to Tampa, Florida, FOB Vancouver sulfur pricing is a key indication of global sulfur pricing, reflecting the major quantities of sulfur produced and exported from Western Canada and the remote location of some of the region's major production locations.

The United States Gulf Coast price for liquid sulfur compared to Vancouver's FOB price for solid sulfur indicates that the two markets function independently much of the time. The North American market is somewhat unique in that it consumes almost entirely liquid sulfur, while the rest of the world works almost entirely with solid sulfur. United States sulfur consumers are not presently equipped to re-melt solid sulfur, so they are serviced by liquid sulfur suppliers: the United States, Western Canada, Mexico, Venezuela, and Germany. This prevents the United States from having access to most of the sulfur on the world spot market and increases the potential for volatility in the North American market.

As shown in Figure 8.1, sulfur pricing has generally been stable between 2000 and 2007, with prices in the $30-$60 per metric ton. Price volatility within this range can be primarily attributed to Canadian sulfur producers and the delicate balance they strike between oversupplying the market, achieving positive returns, and a growing sulfur inventory stockpile. In early 2008 sulfur prices increased sharply, peaking at over US$639 per ton during the third quarter of 2008. This flyup can be attributed to the general flyup in commodity prices that occurred during that period, including similar flyups in the price of crude oil, steel, commodity chemicals, etc. During the first quarter of 2009, the price of sulfur has collapsed due to the decline in crude oil prices and the global and United States economic slowdown, reaching about US$5 per ton in Vancouver. Figure 8.1 also demonstrates that prices in each of the three key markets in the United States track each other very closely.

Figure 8.1 North American Sulfur Price Trend

Nominal Dollars per Metric Ton



Historically, volatility in sulfur prices has been somewhat controlled by the ability of the industry to react to surpluses or deficits by adjusting the percentage coming from dedicated production from sulfur mining. The expectation is that future pricing of the sulfur market in the Western Hemisphere will become somewhat more volatile than in the past. Now that deliberate (optional) production, which once provided a stabilizing force, or buffer, for the market, has essentially disappeared in the Hemisphere, the market faces the prospect of growing excesses of sulfur supply produced as a byproduct from refineries and gas processing plants, and thus has lost an important balancing factor to moderate prices. Other factors that result in volatility include sulfur's highly fragmented consumption pattern, except for sulfuric acid, which is more consolidated. However, sulfuric acid demand itself is mostly dependent on the phosphate fertilizer market, which is, in turn, also volatile. Therefore, sulfur and sulfuric acid both have interrelated markets that are dependent on the relatively volatile and seasonal agricultural market.

Historical and forecast sulfur prices in Tampa are summarized in Table 8.1 and Figure 8.2, along with an estimated price for sulfur in Illinois. As previously explained, benchmark prices in the United States are set at Tampa, and prices for sulfur in Illinois have been set relative to Tampa based on the cost of shipping sulfur from Illinois (which is surplus in sulfur) to Tampa (which is deficit in sulfur). Specifically, prices in Illinois are estimated based on the quoted price differential between Tampa and New Orleans (which is also a commonly available quotation), less the cost to ship sulfur from Illinois to New Orleans by barge. The New Orleans quoted price is marginally lower than the Tampa price, reflecting the fact that PADD 3 is surplus in sulfur. Sulfur prices are forecast to increase about 3 percent annually during the forecast period.

Table 8.1 United States Sulfur Prices

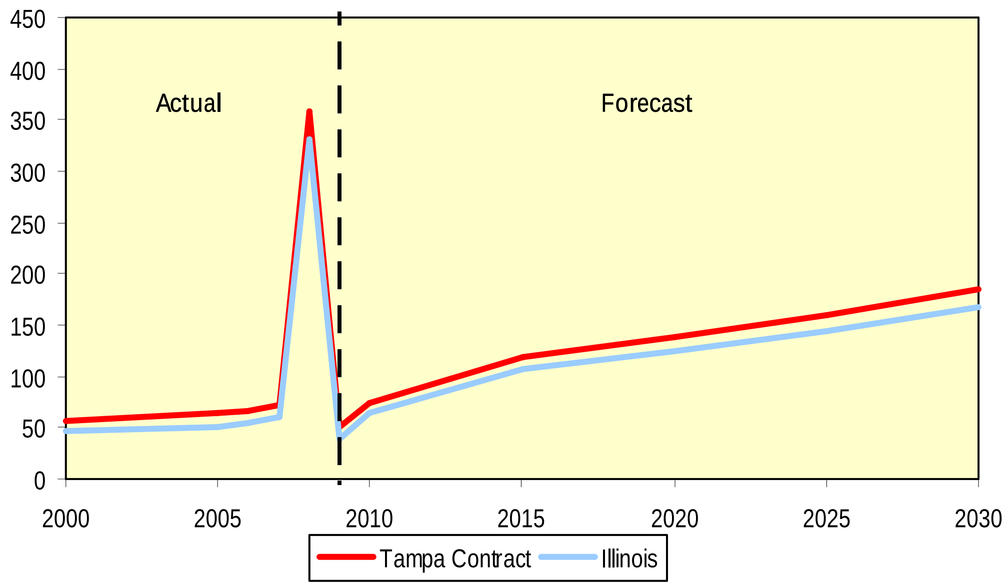
Nominal Dollars per Metric Ton

	Actual					Est.	Forecast				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
Tampa Contract	56	64	66	71	358	50	75	119	138	160	186
Illinois	46	51	55	60	330	40	65	107	125	144	167

Source: Green Markets, Pike and Fisher & Nexant Estimates

Figure 8.2 United States Sulfur Prices

Nominal Dollars per Metric Ton



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8.2.2 Freight Costs

Inventorying and the permanent storage of sulfur are used to balance supply and demand now that nearly all sulfur is produced as a byproduct. Sulfur is now stored on site in block, granular or pelletized form. It can also be stored in molten form, but very expensively, in rail tank cars because there is insufficient storage capacity to handle sulfur generation at refineries and gas processing plants. The United States Gulf Coast is one of the few places in the world where sulfur is produced, stored, and shipped in molten form. The molten sulfur is available from numerous United States refineries and is transported to Louisiana and central Florida for the production of fertilizers.

Most sulfur elsewhere in the world is formed into solid blocks for storage. The world's current block sulfur inventories and government policies on the inventories contribute to volatility.

Major block inventories in Western Canada and Kazakhstan, and smaller ones in Russia and Iran could potentially precipitously increase the sulfur supply.

Sulfur can be shipped as a solid in bulk or in molten form as a liquid. At room temperature, sulfur is a soft, yellow solid while molten sulfur turns a blood red color. Molten sulfur is a normally carried commodity that uses purpose built cars for transport. The main issue in transporting sulfur in its molten form is keeping its temperature at about 135°C to 145°C. Short distance shipments can be done in well insulated containers to maintain sulfur in its molten form. Sulfur has low thermal conductivity which minimizes heat loss and helps it to preserve heat so it does not solidify. A heating system is needed to keep sulfur in the liquid state over long distances.

Large quantities of the product are transported by rail. Molten sulfur needs to be heated until it becomes a liquid for it to be loaded and unloaded from a tank car. A six inch thick layer of insulation keeps the contents in the tank car from losing a large amount of heat while being shipped. Steam is passed through a series of heating coils welded to the tank envelop hidden under the tank car's insulation and a thin metal jacket in order to heat the molten sulfur in the car during unloading.

Table 8.2 displays molten sulfur rail transportation costs from East St. Louis, Illinois to Tampa, Florida provided by CSX Transportation (St. Louis to Tampa), and Norfolk Southern (Taylorville to St. Louis) with Nexant estimates of forecast costs. The majority of molten sulfur is shipped to PADD I, more specifically to North Carolina, Florida and Georgia, the leaders in the phosphate fertilizer industry. The cost to ship the product increases as the distance between the supplier and customer grows. Therefore, the distance between suppliers and their customers is one of the most important issues when it comes for a customer to choose where their supply is coming from.

Table 8.2 Molten Sulfur Rail Rates

Nominal Dollars per Metric Ton

	Actual					**Est.**	**Forecast**				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
Taylorville to St. Louis (Rail)	24	27	28	29	30	30	31	34	38	43	48
St. Louis to Tampa	38	43	45	46	48	48	49	55	61	68	77
Taylorville to Tampa	61	71	73	75	78	78	80	89	100	111	125
Taylorville to St. Louis (Truck)	16	33	38	41	56	25	32	43	47	52	57
St. Louis to Tampa	38	43	45	46	48	48	49	55	61	68	77
Taylorville to Tampa	54	76	83	88	104	73	81	97	108	120	134

Source: CSX Transportation, Norfolk Southern and Nexant Estimates

To ship sulfur by ocean on barges, it can be shipped either as a solid or liquid over long distances. Solid sulfur can be transported in almost any bulk carrier if it has been thoroughly cleaned in and out. Molten sulfur is shipped in specially designed ships that are equipped with heating systems to maintain the sulfur in its liquid form. It is more feasible to ship solid sulfur over molten sulfur because molten sulfur requires special equipment in order to keep the product in its liquid form. Therefore, there are not many marine transportation companies that are willing to ship molten sulfur.

The size of sulfur cargoes varies from 10,000-50,000 tons depending on the producing region. Middle East sulfur is typically shipped in 10,000-30,000 ton lots while the Former Soviet Union (FSU) usually transports in smaller 5,000-10,000 ton lots to nearby countries and in 20,000-30,000 ton lots to North Africa. In Canada, sulfur is sold in lots of 30,000-50,000 tons. Liquid sulfur is generally shipped in 10,000-25,000 ton lots.

Table 8.3 shows molten sulfur barge transportation costs from St. Louis to Tampa provided by the United States Department of Agriculture (USDA), along with Nexant estimates. The route for shipment is from East St. Louis, then down the Mississippi River to New Orleans and then to Tampa by ocean. Barge rates are slightly less than rail transportation.

Table 8.3 Molten Sulfur Barge Rates

Nominal Dollars per Metric Ton

	Actual					Est.	Forecast				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
Taylorville to St. Louis (Rail)	24	27	28	29	30	30	31	34	38	43	48
St. Louis to Tampa	12	26	29	26	34	34	34	36	39	42	45
Taylorville to Tampa	35	53	57	55	64	64	65	71	77	85	93
Taylorville to St. Louis (Truck)	16	33	38	41	56	25	32	43	47	52	57
St. Louis to Tampa	12	26	29	26	34	34	34	36	39	42	45
Taylorville to Tampa	28	58	67	68	90	59	66	79	86	94	102

Source: USDA and Nexant Estimates

Sulfur is typically transported in trucks constructed of stainless steel with a capacity of approximately 25.9 metric tons (3,800 U.S. Gallons). The truck is usually insulated. Tank trailers used for transporting molten sulfur are generally used to only ship molten sulfur because it is difficult to clean in order for the tank to transport another commodity on the return trip or to another destination. Therefore, the tank is full on the delivery to a customer but empty on the trip back. In order to reduce the "loaded miles" scenario, a specially designed tank trailer, which combines a tank for molten sulfur and a bulk carrier, is used. The tank trailer carries molten sulfur on one trip and then carries a bulk commodity like fertilizers on the return trip. The type of trailer which carries molten sulfur and then fertilizers is called a backhaul double and is generally used in Florida by fertilizer producers to improve trucking economics. They are also used in Western Canada but carry sulfur and fuel instead.

Table 8.4 shows molten sulfur truck transportation costs for customers within 50 and 100 miles of the facility in Taylorville provided by CTL Transportation along with Nexant estimates. The cost to ship molten sulfur is the same for facilities 50 miles or 10 miles from the supplier. The truck rates include a 17 percent fuel surcharge and a US$35 charge to pump out the product from the 3,800 U.S. gallon capacity trailer (approximately US$1.33 per metric ton).

Table 8.4 Molten Sulfur Truck Rates

Nominal Dollars per Metric Ton

	Actual					Est.	Forecast				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
50 miles	13	26	30	32	44	20	25	33	37	40	45
100 miles	16	33	38	41	56	25	32	43	47	52	57

Source: CTL Transportation, LLC and Nexant Estimates

8.2.3 Netback to Taylorville

The current sulfur netback to Taylorville is approximately $16 per metric ton, about $16 per metric ton lower than the sulfur price in Tampa, based on sulfur transportation costs by barge. If the sulfur were shipped by rail, the current sulfur netback to Taylorville would be about $2 per metric ton. For facilities within 100 miles of Taylorville, the current sulfur netback is approximately $14 per metric ton, compared to the $20 per metric ton netback obtained for a customer within 50 miles.

Nexant's historical and forecast sulfur prices in Tampa and Illinois with netbacks to Taylorville are presented in Figure 8.3 and Table 8.5 for each of the transportation scenarios. The netbacks are slightly different for each scenario, reflecting different fuel surcharge rates for the rail transportation costs and tariffs for the barge transportation costs. For transport between St. Louis and Taylorville, two options were considered, namely rail and truck transport. Rail was the method of transport used in the netback model as it is lower cost, for most of the forecast period.

Figure 8.3 Taylorville Sulfur Netbacks
Nominal Dollars per Metric Ton

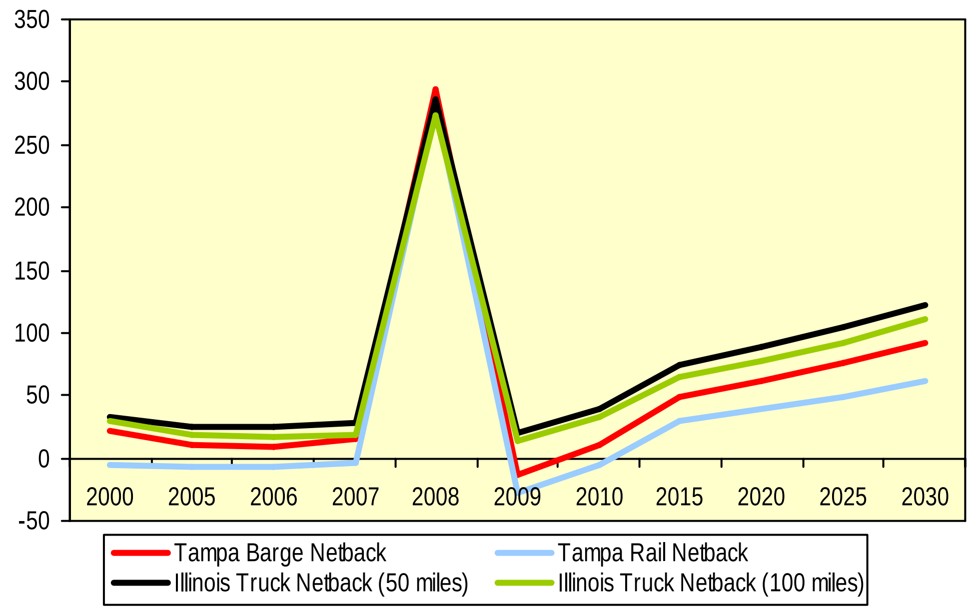

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Table 8.5 Taylorville Sulfur Netbacks Values

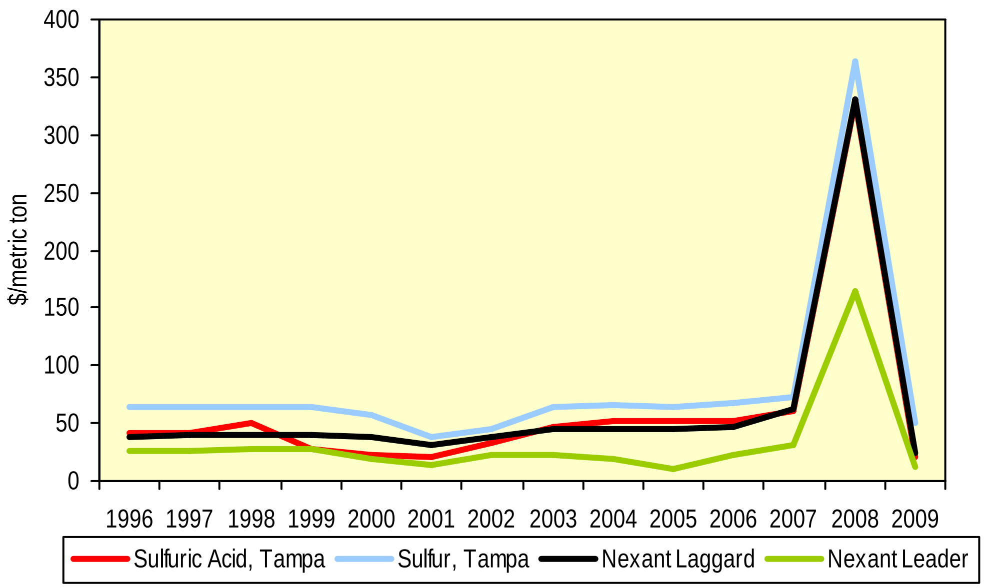
Nominal Dollars per Metric Ton

	Actual					Est.	Forecast				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
Tampa Contract Price	56	64	66	71	358	50	75	119	138	160	186
Barge Costs, Rail to St. Louis	35	53	57	55	64	64	65	71	77	85	93
Sulfur Netback, Taylorville	21	11	9	16	294	-14	10	49	61	75	92
Tampa Contract Price	56	64	66	71	358	50	75	119	138	160	186
Rail Costs, Rail to St. Louis	61	71	73	75	78	78	80	89	100	111	125
Sulfur Netback, Taylorville	-5	-7	-7	-4	280	-28	-5	30	39	49	61
Illinois Price - 50 miles	46	51	55	60	330	40	65	107	125	144	167
Truck Costs	13	26	30	32	44	20	25	33	37	40	45
Sulfur Netback, Taylorville	33	25	26	28	286	20	39	74	88	104	123
Illinois Price - 100 miles	46	51	55	60	330	40	65	107	125	144	167
Truck Costs	16	33	38	41	56	25	32	43	47	52	57
Sulfur Netback, Taylorville	30	18	17	19	274	14	32	65	77	93	110

8.3 SULFURIC ACID

The price of sulfuric acid is tied in large part to the supply and price of sulfur. When sulfur is in short supply, the price of sulfur and in turn sulfuric acid increases. Tampa spot prices, taken over time, for sulfur and sulfuric acid are used as representative of transactions by large buyers and sellers, namely the fertilizer producers. Nexant profiles industry production economies by employing the concept of Leader and Laggard cash cost of production. The Leader plant is a modern double absorption sulfuric acid plant which can take full credit from production of byproduct steam. A Laggard plant is an older single absorption facility which is unable to use any portion of the steam byproduct credit. A Laggard plant typically represents the highest cost component of the industry, and thus can be seen as the marginal source of supply, whereas a Leader plant is more indicative of the economics of a new acid producer. Tampa sulfuric acid prices have generally been set by Laggard production economics, except for 2000/2001 when overcapacity and intense competition drove down prices to approach Leader production economics. The link between sulfur prices and sulfuric acid prices in Tampa is presented in Figure 8.4.

Figure 8.4 Tampa Historical Sulfuric Acid Price Setting Mechanism



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In the United States, sulfur market pricing is determined by the quarterly price negotiations between sulfur producers and the phosphate fertilizer industry, which in turn is one factor in determining the price of sulfuric acid.

It should be noted that demand for sulfuric acid is also a key price-setting factor that may drive the price independently of the price of sulfur. One example of this is the sulfuric acid oversupply in 2000/2001 that caused a price drop.

The sections below discuss the historical and forecast pricing of sulfuric acid, along with relative freight rates to ship the product around the country and the netbacks for the facility at Taylorville.

8.3.1 FOB Pricing

Due to undersupply in PADD II and an oversupply in PADD I, Midwest sulfuric acid prices tend to be at a premium to Tampa sulfuric acid prices.

As shown in Figure 8.4, sulfuric acid pricing, outside of the recent flyup period, has been somewhat volatile through the historical period. The price volatility can be primarily attributed to Canadian sulfur producers and the delicate balance they struck between oversupplying the market, achieving positive returns, and a growing sulfur inventory stockpile. As stated previously, sulfuric acid prices are closely tied to sulfur prices, so price volatility in sulfur generates price volatility in the sulfuric acid market. In early 2008, sulfur and sulfuric acid prices sharply increased, reaching record levels in the third quarter of 2008. During the first quarter of 2009, the prices have fallen significantly due to the decline in crude oil prices and the global economic crisis.

As discussed above, Nexant has forecast Tampa sulfuric acid prices at Laggard cash costs of production. Figure 8.5 and Table 8.6 present the United States sulfuric acid price forecast for Tampa and the U.S. Midwest.

Figure 8.5 US Sulfuric Acid Price Forecast

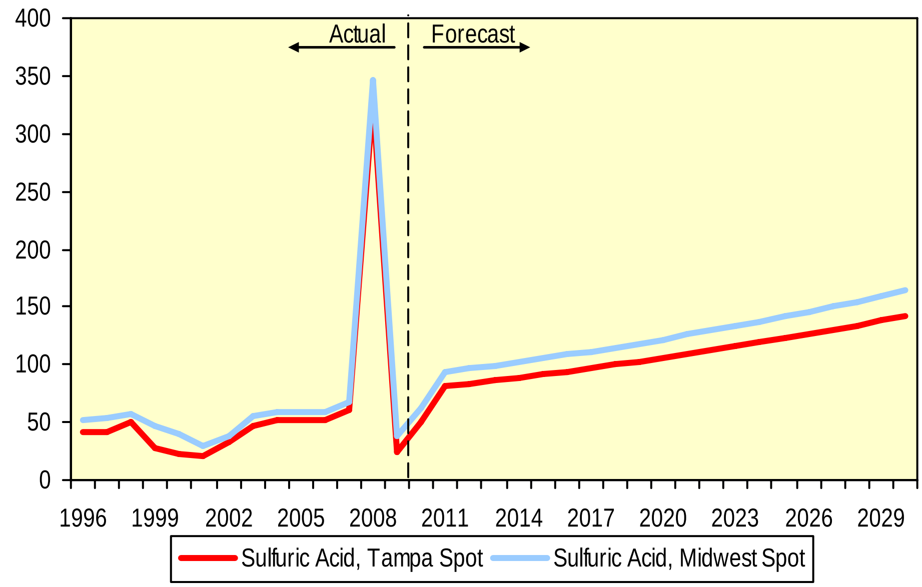

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Table 8.6 United States Sulfuric Acid Price Forecast
Nominal Dollars per Metric Ton

	Actual					Est.	Forecast				
	2000	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
Sulfuric Acid, Tampa Spot	22	53	52	61	329	25	50	91	106	123	142
Sulfuric Acid, Illinois Spot	40	59	59	67	346	38	63	105	122	141	164

8.3.2 Freight Costs

Sulfuric acid is typically transported by rail or barge. Rail costs from St. Louis to New Orleans are currently around $50 per ton, and costs from St. Louis to Tampa are in the range of $60 per ton. Barge costs for shipments from St. Louis to New Orleans are around $50-60/ton, with costs of further barging to Tampa from New Orleans in the range of $30/ton. This barge route is generally not done, PADD II (the Midwest) is an importing region, while PADD I (the East Coast) is an exporting region. Additionally if large quantities were to be shipped consistently, Nexant believes that economies of scale may be achieved with freight companies. Rail and barge rates to Tampa from Taylorville over the forecast period are given in Table 8.8 and 8.9.. Costs for shipping sulfuric acid by truck for distances within 50, and 100 miles are presented in

Table 8.7 below. Rates are based upon fully loaded trucks of 45,000 lbs per load, using 2009 as the base year for the forecast, with a 17 percent fuel surcharge and a $35 per truck pumping fee. Changes in future truck shipping rates are tied to changes in Nexant's forecast price for diesel fuel, which is the major variable cost of shipping by truck.

Table 8.7 Sulfuric Acid Trucking Rates from Taylorville

Nominal Dollars per Metric Ton

		Actual				Est	Forecast			
	Units	2000	2005	2008	2009	2010	2015	2020	2025	2030
50 Miles	$/MT	14	29	49	22	28	37	41	45	50
100 Miles	$/MT	18	36	62	28	36	47	52	57	63

Source: CTL Transportation, LLC and Nexant Estimates

Table 8.8 Sulfuric Acid Rail Rates from Taylorville

Nominal Dollars per Metric Ton

		Actual			**Est.**	**Forecast**				
	Units	2000	2005	2008	2009	2010	2015	2020	2025	2030
Taylorville to St. Louis (Rail)	$/MT	24	27	30	30	31	34	38	43	48
St. Louis to Tampa	$/MT	28	44	49	50	50	53	57	62	67
Taylorville to Tampa	$/MT	52	72	80	80	81	88	96	105	115
Taylorville to St. Louis (Truck)	$/MT	18	36	62	28	36	47	52	57	63
St. Louis To Tampa	$/MT	28	44	49	50	50	53	57	62	67
Taylorville to Tampa	$/MT	46	81	112	78	86	100	109	119	130

Source: CSX, Norfolk Southern, CTL Transportation and Nexant Estimates

Table 8.9 Sulfuric Acid Barge Rates from Taylorville

Nominal Dollars per Metric Ton

		Actual			**Est.**	**Forecast**				
	Units	2000	2005	2008	2009	2010	2015	2020	2025	2030
Taylorville to St. Louis (Rail)	$/MT	24	27	30	30	31	34	38	43	48
St. Louis to Tampa	$/MT	45	71	79	80	80	85	92	99	107
Taylorville to Tampa	$/MT	69	98	109	110	111	120	130	142	155
Taylorville to St. Louis (Truck)	$/MT	18	36	62	28	36	47	52	57	63
St. Louis To Tampa	$/MT	45	71	79	80	80	85	92	99	107
Taylorville to Tampa	$/MT	63	107	141	108	116	132	144	156	170

Source: Kirby, CTL Transportation, Norfolk Southern , and Nexant Estimates

8.3.3 Netback to Taylorville

Netback values for sulfuric acid to Taylorville, based on shipping by barge, rail and truck are presented in Figure 8.6 and Table 8.10. As barge and rail to Tampa from Taylorville must be sent via St. Louis, two options were considered for transport between Taylorville and St. Louis, namely rail and truck. Rail rates were approximately $30/ton, which is more costly than the trucking option, which is what is shown in the netbacks. Barge netbacks to Taylorville are negative in most of the forecast period. The historical period, due to wild price fluctuations has both the highest and lowest netbacks. These netbacks also show that there is a cost advantage in shipping sulfuric acid by rail as opposed to barge, in the range of around $15 per ton. Trucking within 100 miles offers a greater netback to Taylorville than either barge or rail, throughout the entire time range of interest.

Figure 8.6 Taylorville Sulfuric Acid Netback Values

Nominal Dollars per Metric Ton

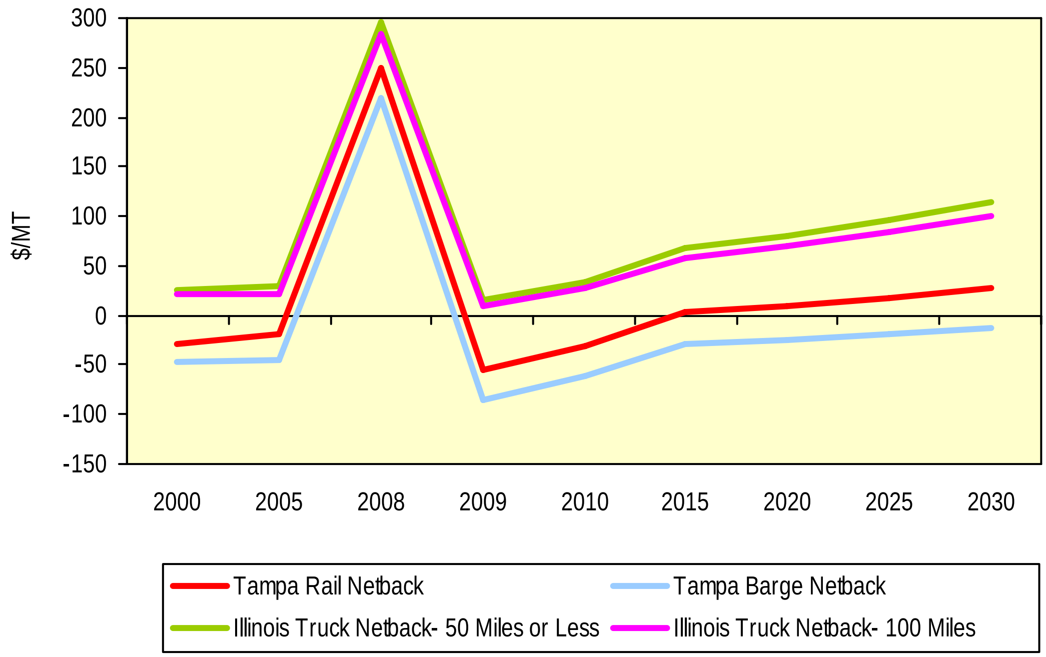

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Table 8.10 Taylorville Sulfuric Acid Netback Values

Nominal Dollars per Metric Ton

	Units	2000	2005	Actual 2008	Est. 2009	Forecast 2010	2015	2020	2025	2030
Tampa Price	$/MT	22	53	329	25	50	91	106	123	142
Rail Costs, Rail to St. Louis	$/MT	52	72	80	80	81	88	96	105	115
Sulfuric Acid Netback to Taylorville	$/MT	-30	-19	249	-55	-31	4	10	18	27
Tampa Price	$/MT	22	53	329	25	50	91	106	123	142
Barge Costs, Rail to St. Louis	$/MT	69	98	109	110	111	120	130	142	155
Sulfuric Acid Netback to Taylorville	$/MT	-47	-45	220	-85	-61	-28	-25	-19	-13
Illinois Price	$/MT	40	59	346	38	63	105	122	141	164
Trucking Costs	$/MT	14	29	49	22	28	37	41	45	50
Sulfuric Acid Netback - 50 Miles	$/MT	25	30	297	16	34	68	81	96	114
Illinois Price	$/MT	40	59	346	38	63	105	122	141	164
Trucking Costs	$/MT	18	36	62	28	36	47	52	57	63
Sulfuric Acid Netback - 100 Miles	$/MT	22	22	284	10	27	58	70	84	101

8.4 CONCLUSIONS

The following is a summary of conclusions regarding pricing for sulfur and sulfuric acid.

8.4.1 Sulfur

- In addition to Tampa, Florida, FOB Vancouver sulfur pricing is a key indication of global sulfur pricing, reflecting the major quantities of sulfur produced and exported from Western Canada and the remote location of some of the region’s major production locations.
- Sulfur pricing has generally been stable between 2000 and 2007, with prices in the $30 to $60 per metric ton, however, sulfur price peaked at over US$639 per ton in the third quarter of 2008 due to a flyup in commodity prices
- During the first quarter of 2009, the price of sulfur has collapsed due to the decline in crude oil prices and the global and United States economic slowdown, reaching about US$5 per ton in Vancouver
- Sulfur can be transported by barge or rail over long distances and by truck for short distances
- The current sulfur netback to Taylorville is negative byt approximately $14 per metric ton, about $64 per metric ton lower than the sulfur price in Tampa, based on sulfur transportation costs by barge
- The current sulfur netback to Taylorville if shipment were by rail would be negative by about $28 per metric ton.
- Based on truck transportation, for facilities within 100 miles of Taylorville, the current sulfur netback is approximately $14 per metric ton, compared to the $20 per metric ton netback obtained for a customer within 50 miles

8.4.2 Sulfuric Acid

- Tampa, Florida sulfuric acid pricing is a key factor for sulfuric acid pricing in the United States
- Sulfuric acid prices are tied closely to sulfur prices and Tampa prices are projected to be at Laggard cash costs.
- During the first quarter of 2009, the price of sulfuric acid has collapsed due to the decline in sulfur prices, driven by crude oil prices and the global and United States economic slowdown
- Sulfuric acid can be transported by barge or rail over long distances and by truck for short distances
- The current sulfuric acid netback to Taylorville is currently negative for barge and rail; while remaining negative for barge shipments, rail shipments will become slightly positive reaching $4 per ton by 2015, and $28 per ton by 2030
- The capital cost for a 660-715 STPD sulfuric acid plant is roughly 25 million dollars in 2009 dollars

Tenaska wants to decide whether to recover sulfur or convert the recovered sulfur into sulfuric acid. From a market standpoint, both products have large markets. Nexant concludes that sulfuric acid potentially offers a higher netback than sulfur. This is due to the fact that PADD II is a net importer of acid, but a net exporter of sulfur. Therefore, the netbacks on acid sales will likely be closer to those assuming sales in Illinois presented above, say $30 to $114 per metric ton over the forecast period, but sulfur netbacks may be closer to those assuming sales to Tampa, say $10 to $90 per metric ton.

However, the marketing of sulfuric acid is complicated due to the highly fragmented nature of the market. Tenaska would need to retain an experienced sulfuric acid marketer to perform this task. There are several potential marketers in PADD II, including Chemtrade Logistics and PVS Sulfur Solutions, who also have a national and international sulfuric acid business position. Nexant believes a choice between selling sulfur and sulfuric acid can only be made after negotiating a sulfuric acid marketing agreement. Nexant has had some initial discussions with Chemtrade Logistics and they suggested potential interest in providing the capital for building the sulfuric acid plant.

The capital cost for a 660-715 STPD sulfuric acid plant is roughly 25 million dollars in 2009 dollars.