2008 Minerals Yearbook

NITROGEN [ADVANCE RELEASE]

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NITROGEN

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In 2008, U.S. ammonia production was 7.85 million metric tons (Mt) of contained nitrogen, about an 8% decrease from production in 2007, and apparent consumption decreased by about 10% from that in 2007. Exports of ammonia were higher than those in 2007, although they were still significantly lower in quantity than imports, which decreased compared with those of 2007. Most of the imports in 2008 were from Canada, Russia, and Trinidad and Tobago. About 89% of the domestically produced ammonia consumed in the United States was used in fertilizer applications. Global ammonia production in 2008, which was estimated to be 133 Mt of contained nitrogen, was slightly higher than that estimated in 2007. China, India, Russia, and the United States were the leading producers, together accounting for about 55% of the total.

Legislation and Government Programs

The Food, Conservation, and Energy Act of 2008 (Pub. Law 110–246), enacted into law June 2008, governed the bulk of Federal agriculture and related programs for the next 5 years. The Act's 15 titles included administrative and funding authorities for a wide range of agricultural programs covering agricultural commodities, conservation, trade, rural development, and renewable energy sources. The law continued many of the agricultural commodity programs introduced in recent farm legislation, adjusting payment levels and eligibility, introduced a new average crop revenue election program and a permanent disaster assistance program, and adjusted some details of the long-standing crop insurance program. Conservation provisions emphasized and expanded working land conservation and environmental practices, including the new Conservation Stewardship Program, which redesigned and expanded the previous Conservation Security Program. Wetland restoration and farmland preservation programs continued, as did land retirement programs, although at reduced funding levels. The trade title repealed several export assistance programs while continuing and expanding market development programs. Rural development programs continued to emphasize business and economic development and enhanced infrastructure. Value-added agricultural activities, including renewable energy and locally and regionally produced agricultural products, also received greater attention. The energy title expanded existing programs and added a number of new ones to encourage production, use, and development of biobased and other renewable energy sources (U.S. Department of Agriculture, Economic Research Service, 2008).

In May, the U.S. Department of Commerce issued its final decision to allow MCC EuroChem to import solid urea fertilizer it manufactures and exports from Russia to the United States without any tariffs. In addition, urea manufactured and exported from other companies in Russia will continue to have a 64.93% tariff imposed on it as part of the existing antidumping duty order, which was not scheduled for review until 2010 (U.S. Department of Commerce, International Trade Administration, 2008).

The U.S. Congress enacted the Secure Handling of Ammonium Nitrate Act on December 26, 2007, which amended the Homeland Security Act of 2002 by requiring the U.S. Department of Homeland Security (DHS) to regulate the sale and transfer of ammonium nitrate by an ammonium nitrate facility. To fulfill the requirements of the Act, the DHS issued an advanced notice of proposed rulemaking in October. The notice sought industry comments on the new DHS program, which would require the DHS to regulate the sale and transfer of ammonium nitrate to enhance security and keep the product out of the hands of terrorists or those with criminal intent. Written comments were to be submitted to the DHS by December 29, 2008 (Green Markets, 2008d).

Production

Industry statistics for anhydrous ammonia and derivative products were developed by the U.S. Census Bureau. A summary of the production of principal inorganic fertilizers by quarter was reported in the series MQ325B. In 2008, production of anhydrous ammonia (82.2% nitrogen) decreased by 8% to 7.85 Mt of contained nitrogen compared with a revised figure of 8.54 Mt in 2007 (table 1). Of the total production, 89% was for use as a fertilizer; the remaining 11% was used in other chemical and industrial sectors (table 2).

The United States was a leading producer and consumer of elemental and fixed types of nitrogen. In declining order, ammonium nitrate, urea, ammonium phosphates [diammonium phosphate (DAP) and monoammonium phosphate (MAP)], nitric acid, and ammonium sulfate were the major downstream products derived from domestic and imported ammonia in the United States. Their combined production was 8.72 Mt of contained nitrogen, with ammonium nitrate and urea accounting for 28% each of the total and ammonium phosphates and nitric acid accounting for 20% and 18%, respectively, of the production (table 3).

Ammonia producers in the United States operated only at about 73% of design capacity in 2008; this percentage included capacities at plants that operated during any part of the year and did not include plants that were idle for all of 2008. Of the total available U.S. ammonia production capacity, more than 59% was concentrated in the States of Louisiana (35%), Oklahoma (19%), and Texas (5%), where there are large reserves of feedstock natural gas. Koch Nitrogen Co., Terra Industries Inc., PCS Nitrogen, Inc., L.P., CF Industries, Inc., and Agrium Inc., in descending order, accounted for 79% of total U.S. ammonia production capacity (table 4).

In April, Dyno Nobel Ltd. entered into an agreement with Koch Nitrogen to market 100% of the urea-ammonium nitrate solution (UAN) produced at Dyno Nobel's Cheyenne, WY, manufacturing facility. Koch Nitrogen agreed to supply Dyno Nobel with the ammonia necessary for the production of approximately 263,000 metric tons per year (t/yr) of UAN. Production of the UAN was scheduled to begin in the third quarter of 2008 (Dyno Nobel Ltd., 2008).

LSB Industries Inc. was seeking permits to bring the long-idled Pryor, OK, nitrogen facility back online and was looking for a potential partner to commit to take all the UAN produced at the facility. The amount of UAN produced was expected to be 295,000 t/yr (Green Markets, 2008g).

Eastman Chemical Co. took over as 100% owner and sole developer of the $1.6-billion Beaumont, TX, industrial gasification project with the acquisition of the 50% of the project owned by Green Rock Energy LLC. The project was scheduled to be operational in 2011. The property contained an idled 204,000-t/yr anhydrous ammonia plant (Green Markets, 2008e).

Terra Industries Inc. restarted its Donaldsonville, LA, ammonia plant in the third quarter of 2008. The 454,000-t/yr-capacity plant had been idle since December 2004. However, in December, Terra again idled the plant because of market conditions resulting from the economic slowdown (Fertilizer Week America, 2008b).

CF Industries Holdings Inc. announced that it had suspended installation of a coal gasification facility at its Donaldsonville nitrogen complex. The high degree of uncertainty regarding several aspects of the project, including capital costs and future government policies on carbon dioxide emissions, led to a conclusion that the project could not be economically justified (Green Markets, 2008b).

In November, The Mosaic Company temporarily halted production at its Faustina, LA, ammonia complex because of the economic slowdown. The plant had the capacity to produce 508,000 t/yr of anhydrous ammonia (Fertilizer Week America, 2008a).

Terra Industries idled the Woodward, OK, manufacturing plant in December in order to manage inventories as a result of the economic slowdown. The Woodward facility had the capability of producing 399,000 t/yr of ammonia with about 277,000 t/yr sold as a finished product. Earlier in May, Terra announced its intention to build a 476,000-t/yr UAN solution plant at the Woodward facility, increasing the facility's capacity to 748,000 t/yr and decreasing available merchant ammonia capacity to 90,000 t/yr. The UAN plant was expected to be completed by yearend 2010 (Terra Industries Inc., 2008).

Environment

Hypoxia has become a controversial environmental concern for the fertilizer industry and an issue that spawned significant research efforts to determine its cause. Hypoxia happens where water near the bottom of an affected area in a large body of water, such as the Gulf of Mexico, contains less than 2 parts per million of dissolved oxygen. Hypoxia can cause stress or death in bottom-dwelling organisms that cannot move out of the hypoxic or "dead" zone.

Dead zones in coastal oceans have now been reported in more than 400 ecosystems, affecting a total area of more than 245,000 square kilometers worldwide. The number of dead zones has approximately doubled each decade since the 1960s. More recently, dead zones have developed in continental seas, such as the Baltic Sea, the Black Sea, the East China Sea, the Gulf of Mexico, and the Kattegat (Diaz and Rosenberg, 2008).

The U.S. Environmental Protection Agency (EPA) (2008, p. 1–9) published an update report by the EPA Science Advisory Board on the state of the science regarding hypoxia in the northern Gulf of Mexico and potential nutrient mitigation and control options in the Mississippi-Atchafalaya River Basin (MARB). The report reaffirmed the major finding of the integrated assessment, namely that contemporary changes in the hypoxic area in the northern Gulf of Mexico primarily are related to nutrient loads from the MARB. The goal to reduce or make significant progress toward reducing the size of the dead zone to less than 5,000 square kilometers by 2015 remained reasonable but may not be an achievable goal. Reasons for not reaching this goal are limited implementation of policies, programs, and strategies to reduce nutrients as well as a lag time between nutrient reduction and the response of the ecological system. The report indicated that an adaptive management approach that would couple nutrient reductions with continuous monitoring and evaluation may provide valuable information to improve future decisions. Declines in discharge of nitrogen and phosphorus to the Gulf of Mexico were proceeding through voluntary actions by farmers, advisors, and suppliers (Better Crops, 2008).

The Mississippi River/Gulf of Mexico Watershed Nutrient Task Force released the 2008 action plan, a product of a reassessment that was called for in the 2001 action plan. This plan described a national strategy to reduce, mitigate, and control hypoxia in the northern Gulf of Mexico and to improve water quality in the Mississippi River Basin. The 2008 action plan increased accountability through the inclusion of an annual operating plan and an annual report to maintain and track progress between reassessments, introduced State-led nutrient reduction strategies and complementary Federal strategies, and implemented an outreach plan to engage stakeholders (Mississippi River/Gulf of Mexico Watershed Nutrient Task Force, 2008, p. 2–5).

Consumption

In 2008, apparent consumption of ammonia was 13.5 Mt of contained nitrogen, about 10% lower than that in 2007. Apparent consumption is calculated as production plus imports minus exports, adjusted to reflect any changes in stocks. Consumption of nitrogen fertilizers in the United States for the 2008 crop year (ending June 30, 2008) is listed in table 5. Consumption was estimated to be 11.9 Mt of contained nitrogen, which was slightly lower than that of 2007. Nitrogen solutions, mostly UAN solutions containing 29.8% to 29.9% nitrogen, and anhydrous ammonia were the principal fertilizer products, representing 27% and 26%, respectively, of fertilizer consumption. Urea (45.9% nitrogen) constituted 20% of fertilizer consumption during the 2008 crop year. Ammonium nitrate (33.9% nitrogen) constituted 3% of 2008 nitrogen

fertilizer consumption. Fertilizer consumption of ammonium sulfate, based on nitrogen content, was 2% of the total U.S. nitrogen-base fertilizer market. The leading nitrogen-consuming States in the 2008 crop year were, in descending order, Iowa, Illinois, Nebraska, Kansas, and California.

Honeywell International Inc. developed a new technology to produce a highly effective, safer ammonium nitrate-based fertilizer with significantly lower explosive potential. The new technology received SAFETY Act designation from the DHS under the Support Anti-Terrorism by Fostering Effective Technologies Act, which was created to provide incentives, including liability protections, for the development and deployment of antiterrorism technologies that can help mitigate security threats. The technology combines ammonium sulfate with ammonium nitrate, providing the nitrogen and sulfur needed for plant nutrition and ensuring improved safety and storage. The new product contained 26% nitrogen and 14% sulfur. Honeywell planned to have limited quantities for sale in certain regions of the United States in 2009 (Green Markets, 2008f).

Stocks

Stocks of ammonia at yearend 2008 were 368,000 metric tons (t), an increase of 134% from comparable revised stocks at yearend 2007, according to data published by the U.S. Census Bureau (table 6).

Transportation

Ammonia was transported by refrigerated barge, rail car, pipeline, and tank truck. Three companies served 11 States with 5,090 kilometers (km) of pipelines and 4,800 km of river barge transport; rail and truck were used primarily for interstate or local delivery.

NuStar Energy L.P. continued to operate the Gulf Central ammonia pipeline. The 3,200-km ammonia pipeline originated in the Louisiana Delta area, where it had access to three marine terminals and three anhydrous ammonia plants on the Mississippi River. The capacity of this pipeline was about 2 million metric tons per year (Mt/yr) of ammonia, with a storage capacity of more than 1 Mt. In 2008, about 1.5 Mt of ammonia was shipped through the Gulf Central ammonia pipeline (NuStar Energy L.P., 2009, p. 14).

On June 1, Magellan Midstream Partners, L.P. assumed operations of its ammonia pipeline from a third-party pipeline company. The 1,750-km pipeline system, which transported and distributed ammonia from production facilities in Oklahoma and Texas to various distribution plants in the Midwest, had a delivery capacity of about 820,000 t/yr. In 2008, 746,000 t of ammonia was shipped through Magellan's pipeline compared with 650,000 t in 2007 (Magellan Midstream Partners L.P., 2009, p. 34). The Tampa Pipeline Corp. operated the 135-km Tampa Bay Pipeline system, which moved ammonium phosphate and nitrogen compounds for fertilizer producers in Hillsborough and Polk Counties, FL.

Prices

Midyear and yearend prices for nitrogen materials are listed in table 7. The average gulf coast ammonia price began the year at $438 per short ton ($483 per metric ton), and in general increased through September to reach the high for the year of $880 per short ton ($970 per metric ton). Beginning in October, the average ammonia price began to decrease rapidly. The price drop followed a general pattern of increase in the Henry Hub natural gas price through the summer and decline through yearend as the economy weakened. At yearend, the ammonia price was $120 per short ton ($132 per metric ton), an 86% decrease in price from the average high at the end of September.

The average granular urea price fluctuated for the first half of 2008, beginning the year at $434 per short ton ($478 per metric ton). The average price increased to $815 per short ton ($898 per metric ton) at the end of July. The average price trended downward through the rest of 2008, reaching $200 per short ton ($220 per metric ton) at yearend.

The average ammonium nitrate price, which began the year at $383 per short ton ($422 per metric ton), generally increased through the end of August. The average price rose to $588 per short ton ($648 per metric ton) by early September and then decreased to $315 per short ton ($347 per metric ton) by yearend.

Typically, ammonium sulfate prices do not follow the same trend as other nitrogen products, which correlate to natural gas prices, mainly because a substantial portion of the material is produced as a byproduct of caprolactam production. Caprolactam, an organic compound, is the precursor to Nylon 6, a widely used synthetic polymer. The average price began the year at about $268 per short ton ($295 per metric ton) and increased steadily throughout most of 2008 to reach a high of $490 per short ton ($540 per metric ton) in mid-October. At the end of October, there was a sharp decrease in the average price to $200 per short ton ($220 per metric ton), which by yearend reached an average of $205 per short ton ($226 per metric ton).

Price increases in 2008 for nitrogen compounds could be attributed to such factors as a strong domestic and global demand for fertilizers, low fertilizer inventories, and the inability of producers to adjust to the level of demand. By late 2008, global demand had softened in response to record-high fertilizer prices, declining crop prices, and the overall slowdown in the global economy (Huang, 2009, p. 18).

Foreign Trade

Ammonia exports were about 32% higher than those in 2007 (table 8). Canada was the leading destination for United States exports of ammonia; the total quantity exported to Canada increased by 412% from that in 2007. Canada became the leading destination for United States exports after the 2007 closure of Agrium's ammonia plant in Alaska. Canada represented the destination for 92% of total United States exports of ammonia in 2008.

Ammonia imports were about 8% lower than those in 2007 and were more than 30 times greater than the quantity of exports. The average value of ammonia imports increased to $597 per metric ton from $339 per metric ton in 2007 (table 9). Trinidad and Tobago (52%) continued to be the leading import source. Russia (20%) and Canada (13%) were the remaining significant import sources.

Tables 10 and 11 list trade data for other nitrogen materials and include information on principal source or destination countries. Exports of nitrogen materials increased in 2008, with the exception of ammonium nitrate and urea. Changes in import quantities of nitrogen materials were mixed compared with imports in 2007. The materials with the largest quantity of imports (ammonia, nitrogen solutions, and urea) had lower imports compared with those in 2007, with the exception of nitrogen solutions whose imports were higher than those in 2007.

World Review

Anhydrous ammonia and other nitrogen materials were produced in more than 70 countries. Global ammonia production in 2008, estimated to be 133 Mt, was slightly higher than that in 2007 (table 12). China, with 33% of total production, was the leading world producer of ammonia. Asia contributed 50% of total world ammonia production, and the Commonwealth of Independent States (CIS), Estonia, and Lithuania produced 13% of the global total. North America represented 10% of the total; Middle East and Western Europe, 7% each; Central America and South America together, 6%; and Africa, Eastern Europe, and Oceania together contributed the remaining 7%.

In 2008, world ammonia exports, estimated to be 15.4 Mt of contained nitrogen, were lower than those in 2007. Canada, Indonesia, Russia, Trinidad and Tobago, and Ukraine accounted for about 65% of the world export total. North America (primarily the United States) imported 42% of global ammonia import trade, followed by Asia (22%) and Western Europe (20%) (International Fertilizer Industry Association, 2009).

European Union.—The European Commission (EC) suspended antidumping duties on imports of urea from Belarus, Croatia, Libya, and Ukraine into European Union (EU) States as of March 17. The EC would continue to monitor the imports of urea from these countries and, if needed, reinstate the antidumping measures (Nitrogen + Syngas, 2008a).

In July, the EC passed a regulation to remove antidumping measures of up to $73 per metric ton of ammonium nitrate and $31 per ton of UAN for exports to the EU by Russian producers JSC Acron and EuroChem. However, the two companies would have quotas for ammonium nitrate and UAN exports of about 100,000 t/yr each (Fertilizer Week, 2008a).

Algeria.—In June, Sonatrach, the Algerian state fertilizer company, signed a contract with Spain's Fertiberia, S.A. for a $1 billion ammonia project, which would involve the construction of a 1.1-Mt/yr-ammonia plant. The new company, known as el Bahia Fertilizer [owned by Fertiberia (51%) and Sonatrach (49%)], planned to complete the project by 2011. Fertiberia would be responsible for the construction and operation of the plant, and Sonatrach would be responsible for marketing the final product (Nitrogen + Syngas, 2008g).

Sharkai El Djazairia El Omani LiL Asmida (AOA) (a joint venture between Suhail Bahwan Group Holding LLC of Oman and Sonatrach) awarded contracts to Haldor Topsoe Inc. and Mitsubishi Heavy Industries Ltd. (MHI) for the fertilizer complex. Haldor Topsoe would supply process technology and catalysts for two ammonia plants, and MHI would license the urea technology for the project. The fertilizer production complex would be in Arzew, about 300 km northwest of Algiers, consisting of four plants—two ammonia plants, each producing 2,000 metric tons per day (t/d), and two urea plants, each producing 3,500 t/d. The complex was expected to be operational by 2012 (Nitrogen + Syngas, 2008l).

Sorfert Algerie (a joint venture between Orascom Constuction Industries and Sonatrach) planned to invest $2 billion in a new ammonia and urea production complex in Arzew. The new facility would consist of two ammonia plants, each with a production capacity of 2,200 t/d, and a urea plant with a production capacity of 3,450 t/d. The plant was expected to be completed in 2011 (Nitrogen + Syngas, 2008k).

Australia.—Australian Energy Co. intended to build a plant in Victoria's LaTrobe Valley to produce urea by gasifying brown coal, rather than using natural gas. The plant was expected to have a production capacity of 1.2 Mt/yr and be operational by 2012 (Reed Business Information, 2008).

Construction of a $20 million petrochemical plant for Bloodwood Creek, Queensland, began in May. CarbonEnergy Ltd. was the world's first company with the capability for commercial-scale, oxygen-injected underground coal gasification (UCG) syngas production. Coal resources at the site consist of more than 100 Mt of high-quality coal. The site has a potential production capacity of 1,000 t/d of ammonia. CarbonEnergy signed an $11 million agreement with Incitec Pivot Ltd. that planned to use the ammonia produced at the plant in its fertilizers (Australian Broadcasting Corporation, 2008; CarbonEnergy Ltd., 2008).

Indian fertilizer producer Krishak Bharati Co-Operative Ltd. (Kribhco) and Australia's North West Chemicals and Fertilizers Pty Ltd. signed a memorandum of understanding to set up in Australia an ammonia-urea complex based on coal gasification technology. The plant would have a capacity of 2 Mt/yr of urea (Fertilizer Week, 2008c).

Canada.—Yara International ASA entered into an agreement to acquire Canadian nitrogen producer Saskferco Products Inc. for $1.6 billion. Yara would acquire the nitrogen manufacturing plant near Belle Plaine, Saskatchewan, and storage facilities in Saskatchewan and Manitoba. Yara's production would increase by an additional 650,000 t/yr of ammonia, 980,000 t/yr of urea, and 230,000 t/yr of UAN. The acquisition of Saskferco increases Yara's production and marketing position in North America (Yara International ASA, 2008a).

Natural Resources Canada (NRCan) developed new regulations under Canada's Explosives Act, which includes provisions to improve the security of explosives and explosives precursors, including ammonium nitrate and eight other chemicals. Sellers of the listed materials must register with NRCan's Explosives Regulatory Division and comply with security measures for storage, recordkeeping, and customer identification. The Canadian restrictions for ammonium nitrate began June 1 (Green Markets, 2008a).

In December, Agrium's Fort Saskatchewan, Alberta, nitrogen facility was idled. The plant had a production capacity of 465,000 t/yr of ammonia and 430,000 t/yr of urea. Agrium had idled its 280,000-t/yr Redwater #1 ammonia plant, also in Alberta, earlier in the year. Significant buildup in fertilizer inventories and declining available storage capacity were cited as the principal reasons for the shutdowns (Green Markets, 2008h).

China.—Sichuan Meifeng Chemical Industry Co. was investing $366 million to build a new nitrogen production park in Sichuan Province. The production facilities would be built in two phases. Phase I would have the capacity to produce up to 350,000 t/yr of ammonia and 600,000 t/yr of prilled urea. In phase 2, a 600,000-t/yr compound fertilizer plant would be built. The nitrogen park was expected to be completed within 3 to 4 years (Nitrogen + Syngas, 2008j).

Hangfeng Evergreen Inc. and Shandong Mingshui Great Chemical Group finalized a joint venture for the construction and operation of a polymer coated urea (PCU) production facility in Shandong Province. The plant would have a production capacity of 100,000 t/yr of PCU and would cost about $8.8 million. The facility was expected to be completed in 2009 (Nitrogen + Syngas, 2008d).

Jinwantai Fertilizer Co. began the construction of an ammonia production facility in Xinle, Hebei Province. The new facility was expected to cost about $102 million and produce 300,000 t/yr of ammonia (ChinaRealNews, 2008).

In November, the Chinese Government released its newest tariff rates for many products, including urea, to discourage exports during periods of high domestic demand. The surcharge for urea would be 110% during the high seasons, which were from February 1 through June 30 and September 1 through November 15 (Green Markets, 2008c).

Egypt.—Canada's Agrium entered into an agreement with MISR Oil Processing Co. (MOPCO) of Egypt, whereby MOPCO would acquire the EAgrium project and Agrium's shareholders would obtain an equity interest in MOPCO. Agrium would own a 26% stake in MOPCO, which includes the completed 675,000-t/yr urea plant that started commercial production in summer 2008. Two additional urea trains are expected to be constructed on the MOPCO site. Agrium's share of the production would be 175,000 t/yr of urea until 2011, after which it would increase to 525,000 t/yr (Agrium Inc., 2008).

Egyptian Chemical Industries planned to construct a new ammonia plant in Aswan with a production capacity of 1,200 t/yr. Cost for the plant was expected to be $1 million, and the output would be used for urea and ammonium nitrate fertilizers (NPK Perspectives, 2008a).

France.—In November, Yara announced that it would temporarily stop production of ammonia and urea at its plant in Le Havre. The plant would restart production when the market conditions improved (Green Markets, 2008i).

India.—Gujarat Narmada Valley Fertilizers Co. planned to expand its fertilizer complex at Bharuch, Guijarat, at a cost of about $700 million. The project would increase ammonia capacity to 630,000 t/yr from 486,000 t/yr and increase urea capacity to 750,000 t/yr from 648,000 t/yr. The company also planned to change feedstock to natural gas from fuel oil (NPK Perspectives, 2008b).

Indian Farmers Fertiliser Cooperative Ltd. (IFFCO) planned to increase its urea production capacity to 1.3 Mt/yr at a cost of $1 billion in response to favorable investment and pricing rules for fertilizer manufacturers announced by the Indian Government in August. Pricing policies in India had forced producers to sell below market value, with deficits compensated for by a massive subsidy program. This resulted in India importing 25% of its annual urea demand (Nitrogen + Syngas, 2008c).

Italy.—Yara temporarily stopped urea and ammonia production on November 1 at its Ferrara site in northern Italy. The plant had a production capacity of 600,000 t/yr of ammonia and 500,000 t/yr of urea. The decision to temporarily stop production was related to the international urea markets, where lower activity and price levels affected profitability (Green Markets, 2008j).

Libya.—Morocco's Office Cherifien des Phosphates (OCP) and the Libya-Africa Investment Portfolio signed a $1 billion memorandum of understanding to set up a joint venture to build three production facilities, which included an ammonia unit expected to be operational by 2012. The 800,000-t/yr-capacity ammonia unit would be built in Libya (Fertilizer Week, 2008d).

Yara entered into a joint venture with the National Oil Corp. of Libya (NOC) and the Libyan Investment Authority to focus on upgrading existing production facilities, including the ammonia and urea plants located at Marsa El Brega. The existing operations produced about 700,000 t/yr of ammonia and 900,000 t/yr of urea. The joint venture would also conduct a study to investigate the feasibility of adding new fertilizer plants (Nitrogen + Syngas, 2008e).

Mozambique.—India's Rashtriya Chemicals and Fertilizers Ltd. was awarded a $1.9 million contract to construct an ammonia-urea and phosphates factory in the southern Province of Inhambane. The plant would have a capacity of 1.2 Mt/yr urea and would take 3 to 4 years to construct (NPK Perspectives, 2008c).

Netherlands.—Uhde GmbH was commissioned by Yara Sluiskil BV to design and build a new urea plant near the port city of Terneuzen, to replace an old plant. Yara was investing $600 million in the project, which would include modernization of existing onsite facilities. The plant's production capacity would be 3,500 t/d of urea, and construction was expected to be completed by 2011 (Nitrogen + Syngas, 2008n).

In November, Yara announced that it was temporarily reducing ammonia and urea production at the Sluiskil plant to 900,000 t/yr of ammonia and 200,000 t/yr of urea. The plant was expected to operate at reduced capacity until market conditions improved (Fertilizer Week, 2008f).

Peru.—Petroperu S.A. and Petrobras Energia S.A. Peru planned to invest in a new petrochemical complex to produce ammonia. The investment for the project was estimated to be between $800 million and $1 billion and would include a 750,000-t/yr ammonia plant (Nitrogen + Syngas, 2008h).

Poland.—Zaktady Azotowe Pulawy S.A. was expanding its urea and ammonia production after reaching an agreement with Air Liquide Polska Sp. z.o.o. to build an air separation unit to produce oxygen and nitrogen on land leased by Pulawy in the Starachowice Special Economic Zone. The project, which would cost about $312 million, would comprise two stages, with

the upgrade of urea production unit scheduled for stage two. The new unit, with a production capacity of 270,000 t/yr of urea, would increase total urea production capacity to 1.22 Mt/yr. Ammonia production capacity also would increase by 170,000 t/yr of ammonia, bringing the total to 1.1 Mt/yr. In addition, Pulawy would spend $69 million to revamp the urea production facilities in the Starachowice Special Economic Zone (Nitrogen + Syngas, 2008i).

Qatar.—The Indian Government established a 50:50 joint venture with the Government of Qatar to build a 1.6-Mt/yr fertilizer plant, with a buy-back arrangement allowing India to purchase urea at a fixed price. Qatar had agreed to supply the gas required for the fertilizer plant (Nitrogen + Syngas, 2009).

Ukraine.—In response to complaints from domestic producers of unfair pricing because of lower natural gas costs in Russia, Ukraine imposed in May a 5-year antidumping duty of 11.91% on imports of ammonium nitrate from Russia for all producers except JSC Dorogobuzh and EuroChem. Because Dorogobuzh and EuroChem cooperated with the Ukranian Economy Ministry, the rate was fixed at 9.76% for Dorogobuzh and at 10.78% for EuroChem (Fertilizer Week, 2008e).

United Kingdom.—GrowHow UK Ltd. (a joint venture owned by Yara and Terra) unveiled plans to increase ammonium nitrate production at Billingham. The capacity in 2008 was 550,000 t/yr and was expected to be increased to 620,000 t/yr by early 2009. Planned plant improvements would also reduce environmental emissions (Nitrogen + Syngas, 2008f).

GrowHow UK was investing $22 million to upgrade the Ince ammonia plant at Cheshire in order to improve energy efficiency and reliability. The 1,000-t/d plant supplied ammonia to fertilizer manufacturing operations and industrial customers (Nitrogen + Syngas, 2008b). In December, however, GrowHow UK announced that it would temporarily stop ammonia and ammonium nitrate production at its plants in Ince and Billingham. Production at both plants was to resume when market conditions improved (Yara International ASA, 2008b, c).

Vietnam.—Haldor Topsoe was awarded a contract to license ammonia technology for Vietnam's Ninh Binh plant by Vietnam National Chemical Corp. (Vinachem). Topsoe was contracted to supply the license, engineering, proprietary equipment, and catalysts for the ammonia synthesis unit in the new coal-based urea plant. This would be Vietnam's second ranked fertilizer plant with an expected capacity of 560,000 t/yr of urea and was expected to be completed by 2011 (Nitrogen + Syngas, 2008m).

Ha Bac Nitrogen Fertilizer and Chemical Co. (a subsidiary of Vinachem) secured a loan to upgrade its Ha Bac urea plant. The upgrade would increase production capacity to 300,000 t/yr of ammonia and 480,000 t/yr of urea from the existing 108,000 t/yr of ammonia and 180,000 t/yr of urea. Work was expected to start in 2009 and be completed by 2011 (Fertilizer Week, 2008b).

PetroVietnam began construction on its new ammonia and urea plant in Ca Mau Province. The plant would have a capacity of 800,000 t/yr of urea and was scheduled for completion in 2011. The cost for the plant was $900 million, and the plant was being built by Chinese firms China National Machinery and Equipment Import and Export Corp. (Sinomach) and Wuhuan Engineering Corp. (Fertilizer Week, 2008b).

Outlook

According to the U.S. Department of Agriculture (USDA), U.S. corn growers intended to plant 34.4 million hectares (Mha) of corn for all purposes in the 2009 crop year, a slight decrease from that in 2008, the second consecutive year-to-year decrease since 2007 (U.S. Department of Agriculture, National Agricultural Statistical Service, 2009, p. 1). The decrease in projected plantings for many States was in response to lower corn prices compared with record highs in 2007.

According to long-term projections from the USDA, projected plantings for the eight major field crops (barley, corn, oats, rice, sorghum, soybeans, upland cotton, and wheat) in the United States were expected to decrease slightly to about 101 Mha during the projection period (2009–18) from about 102 Mha in 2008, as high prices prompted by strong demand combined with reduced acreage enrollment in the Conservation Reserve Program keep projected U.S. cropland use high. Corn, soybeans, and wheat were expected to account for about 89% of acreage for the eight major field crops during the projection period. During the 10-year period, the crop mix was expected to shift to corn and away from soybeans. Continued increases were projected for corn used to produce ethanol during the next 10 years; however, the pace was expected to slow down from the rapid gains of 2007 and 2008. Projected gains were largely in line with moderate expected increases in overall gasoline usage in the United States. Relatively high prices for crude oil would contribute to favorable returns for ethanol production, which, when combined with Government programs, would provide economic incentives.

Feed and residual use of corn was projected to bottom out in the initial years owing to reduced meat production and increased feeding of distillers grains (a coproduct of dry mill ethanol production). Feed use was expected to rise through the rest of the period as meat production increases and growth in availability of distillers grains slows with the decrease in corn-based ethanol expansion. Gains in food and industrial uses of corn (other than for ethanol production) were projected to be smaller than increases in population. Consumer dietary concerns and other changes in tastes and preferences limit increases in the combined use of corn for dextrose, glucose, and high-fructose corn syrup to about one-half the rate of population gain. U.S. corn exports are likely to rise in response to stronger global demand for feed grains to support growth in meat production, with the U.S. share of global corn trade holding in the 55% to 60% range. Larger corn crops increase the demand for nitrogen fertilizers (U.S. Department of Agriculture, Economic Research Service, 2009).

Natural gas prices have risen significantly in many key nitrogen-producing regions of the world, because of the rising cost of energy, particularly crude oil. Natural gas prices in the United States typically are higher than those in the rest of the world. This means that ammonia capacity at older, higher cost U.S. plants is still at risk of closure. Depending on its price, natural gas can account for approximately 90% of the U.S. cash cost of producing ammonia. For example, in 2008, natural gas costs in Algeria and the Middle East were estimated to be about $0.60 per million British thermal units and $0.80 per million British thermal units, respectively, and in Trinidad and Tobago,

the cost was estimated to be $5.30 per million British thermal units (Potash Corp. of Saskatchewan, 2008, p. 47). These costs compared favorably with an estimated cost of $11.00 per million British thermal units in the United States. The U.S. Department of Energy projected that the Henry Hub natural gas spot price in the United States would average $4.22 per thousand cubic feet in 2009 ($4.34 per million British thermal units), $3.85 below the 2008 average, and $5.93 per thousand cubic feet in 2010 ($6.10 per million British thermal units) (U.S. Department of Energy, Energy Information Administration, 2009, p. 8).

Since winter 2001 when natural gas prices began to spike, which continued to increase through the third quarter of 2008, U.S. ammonia production capacity has declined by 4.3 Mt/yr, or 25% of the 2001 capacity. A sharp decrease in natural gas prices in the third quarter of 2008 was a result of the downturn in the global economy. The futures market was projecting that U.S. natural gas prices would remain weak in the near term and increase as the global economy begins to recover. The interest that United States firms have shown in constructing new plants outside the United States, particularly in Trinidad and Tobago, indicates that in the future, much of the United States supply of ammonia was expected to be met by foreign production.

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TABLE 1

SALIENT AMMONIA STATISTICS[1, 2]

(Thousand metric tons of contained nitrogen unless otherwise specified)

		2004	2005	2006	2007	2008
United States:						
Production		8,990	8,340	8,190	8,540 r	7,850 p
Exports		381	525	194	145	192 p
Imports for consumption		5,900	6,520	5,920	6,530	6,020 p
Consumption, apparent[3]		14,400	14,400	14,000	15,000 r	13,500 p
Stocks, December 31, producers'		298	254	201 r	157 r	368
Average annual price, free on board Gulf Coast[4]	dollars per short ton	274	304	302	309	590
Net import reliance as a percentage of apparent consumption[5]		38	42	41	43 r	42 p
Natural gas price, wellhead, average price[6]	dollars per thousand cubic feet	5.46	7.33	6.39 r	6.37 r	8.07 e
World:						
Production		117,000	122,000 r	126,000	132,000 r	133,000 e
Trade[7]		14,600	15,600	15,900	15,800	15,400

[e]Estimated. [p]Preliminary. [r]Revised.

[1]Data are rounded to no more than three significant digits.

[2]Synthetic anhydrous ammonia, excluding coke oven byproduct; data are for calendar year and are from the U.S. Census Bureau unless otherwise noted.

[3]Calculated from production plus imports minus exports and industry stock changes.

[4]Source: Green Markets.

[5]Defined as imports minus exports; adjusted for industry stock changes.

[6]Source: Monthly Energy Review, U.S. Department of Energy.

[7]Source: International Fertilizer Industry Association Statistics, World Anhydrous Ammonia Trade.

TABLE 2

ANHYDROUS AMMONIA SUPPLY AND DEMAND IN THE UNITED STATES[1]

(Thousand metric tons of contained nitrogen)

	2006	2007	2008[p]
Production:			
Fertilizer:			
January–June	3,450	3,890 [r]	3,640
July–December	3,820	3,720 [r]	3,320
Total	7,270	7,610 [r]	6,960
Nonfertilizer:			
January–June	463	478 [r]	434
July–December	458	452 [r]	459
Total	921	930 [r]	893
Grand total	8,190	8,540 [r]	7,850
Exports:			
January–June	116	56	53
July–December	78	89	139
Total	194	145	192
Imports for consumption:			
January–June	3,000	3,320	3,300
July–December	2,920	3,210	2,720
Total	5,920	6,530	6,020
Stocks, end of period:			
January–June	221 [r]	222	224
July–December	201 [r]	157 [r]	368
Apparent consumption:[2]			
January–June	6,790 [r]	7,630 [r]	7,310
July–December	7,180	7,340 [r]	6,150
Total	14,000	15,000 [r]	13,500

[p]Preliminary. [r]Revised.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Calculated from production plus imports minus exports and industry stock changes.

Source: U.S. Census Bureau.

TABLE 3

MAJOR DOWNSTREAM NITROGEN COMPOUNDS PRODUCED IN THE UNITED STATES[1, 2]

(Thousand metric tons)

	2007						2008[p]					
	January–June		July–December[r]		Total[r]		January–June		July–December		Total	
	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content
Ammonium nitrate	3,710	1,260	3,770	1,280	7,480	2,540	3,640	1,230	3,470	1,180	7,110	2,410
Urea	2,780 [r]	1,280 [r]	2,810	1,290	5,590	2,570	2,690	1,240	2,550	1,170	5,240	2,410
Ammonium phosphates[3]	6,550 [r]	1,010 [r]	6,700	1,040	13,300	2,050	6,200	963	5,160	815	11,360	1,780
Nitric acid	3,660 [r]	804 [r]	4,170	918	7,830	1,720	3,500	769	3,750	825	7,250	1,590
Ammonium sulfate[4]	1,390 [r]	294 [r]	1,470	311	2,860	605	1,410	298	1,110	234	2,520	532

[p]Preliminary. [r]Revised.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Ranked in relative order of importance by nitrogen content.

[3]Diammonium phosphate and monoammonium phosphate.

[4]Excludes coke plant ammonium sulfate.

Source: U.S. Census Bureau, Current Industrial Reports MQ325B.

TABLE 4

DOMESTIC PRODUCERS OF ANHYDROUS AMMONIA IN 2008[1]

(Thousand metric tons per year of ammonia)

Company	Location	Capacity[2]
Agrium Inc.	Borger, TX	490
Do.	Kennewick, WA[3]	180
CF Industries, Inc.	Donaldsonville, LA	2,040
Coffeyville Resources Nitrogen Fertilizers, LLC	Coffeyville, KS	375
Dakota Gasification Co.	Beulah, ND	363
Dyno Nobel Inc.	Cheyenne, WY	174
Do.	St. Helens, OR	101
Green Valley Chemical Corp.	Creston, IA	32
Honeywell International Inc.	Hopewell, VA	530
Koch Nitrogen Co.	Beatrice, NE	265
Do.	Dodge City, KS	280
Do.	Enid, OK	930
Do.	Fort Dodge, IA	350
Do.	Sterlington, LA[3]	1,110
LSB Industries, Inc.	Cherokee, AL	159
Do.	Pryor, OK[3]	210
Mosaic Co., The	Faustina (Donaldsonville), LA	508
PCS Nitrogen, Inc., L.P.	Augusta, GA	688
Do.	Geismar, LA[3]	483
Do.	Lima, OH	542
Do.	Memphis, TN[3]	372
Rentech Energy Midwest Corp.	East Dubuque, IL	278
Terra Industries Inc.	Beaumont, TX[3]	231
Do.	Donaldsonville, LA	454
Do.	Port Neal, IA	336
Do.	Verdigris, OK	953
Do.	Woodward, OK	399
Do.	Yazoo City, MS	454
Total		13,300

Do. Ditto.

[1]Data are rounded to no more than three significant digits; may not add to total shown.

[2]Engineering design capacity adjusted for 340 days per year of effective production capability.

[3]Idle.

TABLE 5

U.S. NITROGEN FERTILIZER CONSUMPTION, BY PRODUCT TYPE[1, 2]

(Thousand metric tons of nitrogen)

Fertilizer material[3]	2007	2008[e]
Single-nutrient:		
Nitrogen solutions[4]	3,260	3,210
Anhydrous ammonia	3,160	3,110
Urea	2,380	2,340
Ammonium nitrate	325	320
Ammonium sulfate	262	258
Aqua ammonia	71	70
Other[5]	341	336
Total	9,800	9,640
Multiple-nutrient[6]	2,240	2,210
Grand total	12,000	11,900

[e]Estimated.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Fertilizer years ending June 30.

[3]Ranked in relative order of importance by product type.

[4]Principally urea-ammonium nitrate solutions, 29.9% nitrogen.

[5]Includes other single-nutrient nitrogen materials, all natural organics, and statistical discrepencies.

[6]Various combinations of nitrogen (N), phosphate (P), and potassium (K): N-P-K, N-P, and N-K.

Source: Terry, D.L., and Kirby, B.J., 2008, Commercial fertilizers 2007: Lexington, KY, Association of American Plant Control Officials Inc. and The Fertilizer Institute, 41 p.

TABLE 6
U.S. PRODUCER STOCKS OF FIXED NITROGEN
COMPOUNDS AT END OF PERIOD

(Thousand metric tons of contained nitrogen)

Material[1]	2007	2008 [p]
Ammonia:		
January–June	222	224
July–December	157 [r]	368
Nitrogen solutions:[2]		
January–June	105 [r]	261
July–December	101 [r]	407
Urea:		
January–June	37	32
July–December	36 [r]	53
Ammonium phosphates:[3]		
January–June	59	49
July–December	38 [r, 4]	30 [5]
Ammonium nitrate:		
January–June	44	48
July–December	41 [r]	66
Ammonium sulfate:		
January–June	13	27
July–December	34	66
Yearend total[6]	407 [r]	990

[p]Preliminary. [r]Revised.
[1]Ranked in relative order of importance.
[2]Urea-ammonium nitrate and ammoniacal solutions.
[3]Diammonium and monoammonium phosphates.
[4]Monoammonium phosphates data withheld.
[5]Diammonium phosphates data withheld.
[6]Calendar year ending December 31.

Source: U.S. Census Bureau, Current Industrial Reports MQ325B.

TABLE 7
PRICE QUOTATIONS FOR MAJOR NITROGEN COMPOUNDS AT END OF PERIOD

(Dollars per short ton)

Compound	2007		2008	
	June	December	June	December
Ammonium nitrate, free on board (f.o.b.) corn belt[1]	325	380–385	400–410	300–330
Ammonium sulfate, f.o.b. corn belt[1]	205–240	245–250	400–420	200–210
Anhydrous ammonia:				
F.o.b. corn belt[1]	415–450	590–620	725–860	450–650
F.o.b. gulf coast[2]	280	350	500–520	120
Diammonium phosphate, f.o.b. central Florida	370–372	500	1,025–1,070	300–305
Urea:				
F.o.b. corn belt,[1] prilled and granular	350–365	465–490	685–705	270–330
F.o.b. gulf coast, granular[2]	318–322	435–445	680–715	190–210

[1]Illinois, Indiana, Iowa, Missouri, Nebraska, and Ohio.
[2]Barge, New Orleans, LA.

Source: Green Markets.

TABLE 8

U.S. EXPORTS OF ANHYDROUS AMMONIA, BY COUNTRY

(Thousand metric tons of ammonia and thousand dollars)

Country	2007 Gross weight	2007 Value[1]	2008 Gross weight	2008 Value
Belgium	3	NA	2	385
Canada	42	NA	215	32,000
Italy	(2)	NA	1	110
Korea, Republic of	116	NA	5	510
Liberia	(2)	NA	2	356
Taiwan	7	NA	3	649
Other	8	NA	6	1,506
Total	177	NA	234	35,500

NA Not available.

[1]Value data suppressed by U.S. Census Bureau.

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9

U.S. IMPORTS OF ANHYDROUS AMMONIA, BY COUNTRY[1]

(Thousand metric tons of ammonia and thousand dollars)

Country	2007 Gross weight	2007 Value[2]	2008 Gross weight	2008 Value[2]
Canada	920	400,000	933	736,000
Russia	1,640	560,000	1,440	827,000
Trinidad and Tobago	4,360	1,390,000	3,810	2,140,000
Ukraine	347	111,000	553	339,000
Venezuela	272	94,200	213	117,000
Other	404 r	134,000 r	371	211,000
Total	7,940	2,690,000	7,320	4,370,000

[r]Revised.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Cost, insurance, and freight value.

Source: U.S. Census Bureau.

TABLE 10

U.S. EXPORTS OF MAJOR NITROGEN COMPOUNDS[1]

(Thousand metric tons)

Compound	2007 Gross weight	2007 Nitrogen content	2008 Gross weight	2008 Nitrogen content	Principal destinations in 2008
Ammonium nitrate[2]	194	66	189	64	Mexico, 49%; Canada, 45%.
Ammonium sulfate[2]	846	228	1,620	437	Brazil, 37%; Canada, 19%; Peru, 9%.
Anhydrous ammonia	177	145	233	192	Canada, 92%.
Diammonium phosphate	4,180	752	4,530	815	India, 64%; Japan, 6%; Mexico, 4%.
Monoammonium phosphate	2,450	270	2,490	274	Canada, 49%; Australia, 13%; Brazil, 9%.
Urea	310	142	302	139	Mexico, 25%; China, 24%; Chile, 20%.
Total	8,160	1,600	9,360	1,920	

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes industrial chemical products.

Source: U.S. Census Bureau.

TABLE 11

U.S. IMPORTS OF MAJOR NITROGEN COMPOUNDS[1]

(Thousand metric tons and thousand dollars)

Compound	2007 Gross weight	2007 Nitrogen content	2007 Value[2]	2008 Gross weight	2008 Nitrogen content	2008 Value[2]	Principal sources in 2008
Ammonium nitrate[3]	1,110	376	278,000	707	240	230,000	Canada, 63%; Netherlands, 10%; Georgia, 9%.
Ammonium nitrate and limestone mixtures	81	22	18,800	6	2	2,540	Belgium, 61%; Lithuania, 22%.
Ammonium sulfate[3]	405	86	67,900	395	84	99,100	Canada, 99%.
Anhydrous ammonia[4]	7,940	6,530	2,690,000	7,320	6,020	4,370,000	Trinidad and Tobago, 52%; Russia, 20%; Canada, 13%.
Calcium nitrate	188	32	21,400	205	35	29,200	Norway, 98%.
Diammonium phosphate	15	3	10,100	31	6	13,400	Belgium, 48%; Mexico, 26%; Germany, 13%; China, 11%.
Monoammonium phosphate	58	6	31,000	176	19	158,000	China, 51%; Russia, 14%; Israel, 13%.
Nitrogen solutions	3,200	957	769,000	6,950	2,080	930,000	Poland, 67%; Russia, 12%; Canada, 6%; Romania, 6%.
Potassium nitrate	136	19	56,000	133	19	80,200	Chile, 65%; Israel, 25%.
Potassium nitrate and sodium nitrate mixtures	(5)	(5)	174	(5)	(5)	191	Canada, 99%.
Sodium nitrate	82	14	23,000 r	157	26	31,700	Chile, 91%; Germany, 5%.
Urea	6,550	3,010 r	2,220,000	5,460	2,510	2,870,000	Canada, 28%; China, 13%; Kuwait, 12%; Saudia Arabia, 10%.
Total	19,800	11,100	6,180,000	21,500	11,000	8,810,000	

[r]Revised.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Cost, insurance, and freight value.

[3]Includes industrial chemical products.

[4]Includes industrial ammonia.

[5]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 12

AMMONIA: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons of contained nitrogen)

Country	2004	2005	2006[e]	2007[e]	2008[e]
Afghanistan[e]	20	20	20	20	20
Albania[e]	10	10	10	10	10
Algeria	543	550	470	524 [r]	500
Argentina	705	655	727 [3]	726 [r]	726
Australia[e]	790	790	1,200	1,200	1,200
Austria[e]	440	440	440	440	440
Bahrain	311	330	370 [r, 3]	344 [r, 3]	350
Bangladesh[4]	1,380	1,380	1,250	1,300	1,300
Belarus	767	774	815	830	805 [3]
Belgium	857	860	850	850	850
Bosnia and Herzegovina[e]	1	1	1	1	1
Brazil[e]	1,077 [3]	950	950	950	950
Bulgaria	320	320	309	310 [r]	310
Burma[e]	35	30	30	30	30
Canada	4,107	4,100	4,100	4,498 [r, 3]	4,781 [3]
China	34,770	37,850	40,660 [3]	42,480 [3]	44,000
Colombia	98	100	100	100	100
Croatia	404 [r]	320 [r]	319 [r, 3]	320 [r]	320
Cuba[e]	51	28	42 [3]	47 [r, 3]	47
Czech Republic	233	250	250	225 [r]	200
Denmark[e]	2	2	2	2	2
Egypt	1,675	1,640	1,800	1,750	1,750
Estonia	166	170	170	170	170
Finland[e]	61	63	62	62	62
France	1,120	1,206	616 [3]	800	800
Georgia[e]	130	130	140	150	150
Germany	2,741	2,789	2,718 [3]	2,746 [3]	2,819 [3]
Greece	132	130	130	130	130
Hungary	274	275	275	300	300
India[e, 5]	10,718 [3]	10,800	10,900	11,000	11,100
Indonesia	4,120	4,400	4,300	4,400	4,500
Iran	1,088	1,020	1,020	2,000	2,000
Iraq[e]	30	30	10	10	10
Italy	532	525	480 [3]	460	460
Japan	1,101	1,083	1,091 [3]	1,114 [r, 3]	1,110
Korea, North[e]	100	100	100	100	100
Korea, Republic of[e]	163 [3]	165	90	100	100
Kuwait	413	467	470	450	450
Libya[e]	577	507 [r]	512 [r]	517 [r]	520
Lithuania	424	430	453 [3]	936 [3]	950
Malaysia[e]	843 [3]	920	950	960	950
Mexico	560	423	487 [3]	487 [3]	625 [3]
Netherlands[e]	1,970	1,700 [3]	1,800	1,800	1,800
New Zealand	124	120	120	125	125
Norway	420	300	350	350	350
Oman	--	620	1,000	1,000 [r]	1,000
Pakistan	2,114	2,114	2,200	2,250	2,300
Peru[e]	5	5	5	5	5
Poland	1,984	2,080	2,007 [r, 3]	1,995 [r, 3]	2,000
Portugal	244	244	244	244	244
Qatar	1,428	1,754	1,784 [r, 3]	1,800	1,800
Romania	1,180 [r]	1,300 [r]	1,300 [r]	1,300	1,300

See footnotes at end of table.

TABLE 12—Continued

AMMONIA: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons of contained nitrogen)

Country	2004	2005	2006[e]	2007[e]	2008[e]
Russia	9,800	10,000	10,500 [3]	10,500	10,425 [3]
Saudi Arabia	1,726	1,780	2,000	2,600	2,600
Serbia	138 [r, e, 6]	111 [6]	80	85 [r]	85
Slovakia	275	236 [r]	241 [r, 3]	525 [r, 3]	500
South Africa	459	460	480	480	480
Spain	404	460	400	400	400
Switzerland	32	32	32	32	32
Syria[e]	115 [3]	120	120 [r]	120 [r]	120
Taiwan[e]	11	11	12	12	12
Tajikistan[e]	45	45	35	25	25
Trinidad and Tobago	3,875	5,187	5,111 [3]	5,129 [r, 3]	5,130
Turkey	329	305 [r]	92 [r, 3]	-- [r, 3]	50
Turkmenistan[e]	200	220	250	270	270
Ukraine[e]	3,900	4,300 [3]	4,200	4,200	4,000
United Arab Emirates	380	360	380	380	380
United Kingdom	1,071	1,080	750	1,050	1,100
United States[7]	8,990	8,340	8,190 [3]	8,540 [r, 3]	7,850 [3]
Uzbekistan	875	880	940	1,000	1,000
Venezuela	1,012	900	1,160	1,160 [r]	1,160
Vietnam[e]	216 [3]	220	230	300	300
Zimbabwe[e]	48	30	10	35 [r]	30
Total	117,000	122,000 [r]	126,000	132,000 [r]	133,000

[e]Estimated. [r]Revised. -- Zero.

[1]World totals, U.S. data, and estimated data have been rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through June 10, 2009.

[3]Reported figure.

[4]May include nitrogen content of urea.

[5]Data are for years beginning April 1 of that stated.

[6]Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

[7]Synthetic anhydrous ammonia; excludes coke oven byproduct ammonia.