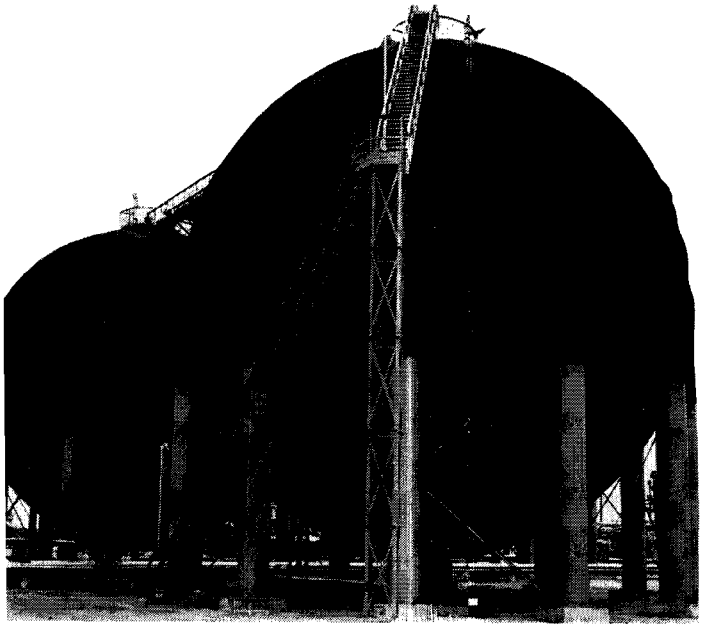

The Nitrogen Picture—1957 Model

A Staff Report

SPRING 1957 was a season ammonia makers will be talking about for a long time. Even now, conclusions can't be fully drawn, but for the first time since the Korean War, anhydrous was in short supply in many sections of the country.

Mixed fertilizer movements in April, May, and June were relatively slow—but demand for nitrogen materials was good. Anhydrous set production records this year—334,000 tons in May; 322,000 tons in April; 321,000 tons in March; 294,000 in February; and 303,000 in January. In fact, in each month since November 1956, production has exceeded that of the corresponding month a year before by at least 4000 tons.

Despite all this production growth, inventories decreased. Ammonia stocks at producing plants were down to 65,000 tons on May 31, 1957, lowest level in two years. This was 38% below the month before, and 46.5% under the same date in 1956. Several producers tell AG AND FOOD they had no inventory to speak of in mid-July, "the first time that's happened since the plant was built." Why?

The largest single reason was undoubtedly weather. In two highly significant geographical sectors, South Central and North Central, climatic conditions cut demand for solid mixed goods, but helped along a flurry in direct application of ammonia (especially for late spring side dressing) which reversed a previous regional trend. Three new midwestern plants that had been expected on stream by early summer were delayed somewhat, and hence were unable to help meet peak demand.

Optimism Subsides

Now that these rather widespread "spot" shortages of anhydrous ammonia are completely over, producers have taken a careful, second look. They are satisfied that there is almost no likelihood of the situation's recurring in the foreseeable future. Many doubt that the severe dislocations caused in nitrogen consumption patterns by changes in planned crop-planting are permanent. It certainly is too early to assume they represent the start of a new and dependable trend. Most producers think they do not.

Another factor enters. Through the years, the industry as a whole has had little anhydrous ammonia storage capacity. It looked too expensive. New plants, now coming on stream, are changing this picture. At Hammond, Ind., Calumet Nitrogen has seven Hortonspheres—which can hold about three months' production capacity. Two storage tanks hold a fourth of annual ammonium nitrate solution potential. Tank car fleets provide additional space. Provision for storage is typical of many recently built facilities.

Some industry people feel that lower inventories of ammonia and ammonium nitrate are not due only to increased demand. (Fertilizer-grade ammonium nitrate stocks were only 32,500 tons on May 31, 1957. This compared with 244,000 on Dec. 31, 1956, and 134,000 on May 31, 1956.) Additional factors are curtailed production and substantial movement of nitrogen materials into the export market at low, unattractive returns. Both factors were due to fears of heavy domestic oversupply for this spring.

Today, oversupply is back in the picture again. Many industry people, rightly or wrongly, blame USDA's "excessively optimistic predictions" and Government wartime encouragement for the situation. In 1952 a goal of 2.92 million tons of nitrogen capacity was set for 1955. This was amended two years later to 3.5 million tons for Jan. 1, 1957, and included by-product nitrogen as well as synthetic in the total.

What happened? Unfortunately, too many producers decided the ammonia business looked good, and reached this decision about the same time. By the beginning of this year, synthetic ammonia capacity—by itself—exceeded the total nitrogen goal. Government figures show synthetic capacity at that date as 3.56 million tons of N, equivalent to 4.33 million tons of ammonia. By the end of 1957, synthetic capacity will be just below 5 million tons of ammonia. Capacity increase is then expected to taper off.

Few new plants are expected in 1958. On the West Coast, California Ammonia (Best Fertilizer) is planning a 100-ton-per-day plant for September 1958. Several other facilities are being considered for California, Arizona, and Utah. Contrary to reports, Du Pont officials firmly say they are not now planning a new ammonia

Surplus Capacity

	1000 tons of N		
Fertilizer Year	*Total U. S. Demand For All Uses Including Export*	*Total Capacity and Imports*	*Surplus Capacity*
1952–53	2395	2632	237
1953–54	2611	2909	298
1954–55	2891	3543	652
1955–56	3021	3738	717
1956–57	3189	4150	961

U. S. Synthetic Ammonia Capacity

Year	*Rated annual capacity, millions of tons of N*
1940	0.4
1950	1.5
1954	3.0
1955	3.3
1956	3.6
1957 est	4.1
1958 est	4.2
1959 est	4.3

plant. A major midwest oil company is also studying the situation, but its intentions have not been clarified.

Ammonia operations will run near 75% of capacity this year. The rate could increase to 80% in 1958, and 85% in 1959—but this is quite doubtful. Additional plants are coming into production about as quickly as demand can be created. Western operations are running below the national average. Today they use about 70% of rated capacity. This rate will continue in 1958 if area farmer cooperatives go ahead with planned ammonia construction.

Ammonia supply and demand will not really come into balance before 1960; and few producers expect it then. A survey of industry opinion shows that most producers believe 1962 will be the date. Some feel even that is two years too soon. The 1962 figure is predicated on the addition of no new capacity beyond that now contemplated, and continuation of existing demand trends.

Demand and supply will not come together as quickly in the Far West as in the East. The West simply has a greater overcapacity problem. Only one thing could abruptly change the picture—a surge in military or industrial consumption.

Nonfertilizer use of ammonia chemicals has been growing, but compared with 1953, growth rate has not kept pace with expanding fertilizer use. Over-all industrial use in 1953 accounted for 32%. This dropped to 28% in 1954, and today is 24 to 25%.

There seems to be little likelihood that new, major, industrial markets for ammonia will open up; rather the prospect is for gradually increasing demand for established uses. But USDA's Commodity Stabilization Service predicts that industrial applications will soon account for more than a fourth of total end-use. It forecasts expanding uses for ammonia in production of chemicals, plastics, explosives, and synthetic fibers.

New agricultural uses have been widely discussed. Full commercial tests in forest fertilization for the paper and pulp industry are now under way in Florida. These, coupled with fertilization of roadsides, lakes, and range and pasture land could really jump demand.

Ammonia-makers have learned, in some cases the hard way, that potential markets must be the major consideration in plant location. They are even more important than raw material availability. The 10 World War II plants (from which the industry really grew) were designed with military, not economic, considerations in mind.

Generally, these plants were in good

U. S. Synthetic Nitrogen Producers

(who already have their ammonia plants in operation, or are expected to be on stream this year)

Company	*Location*	*Capacity (1000 tons NH_3)*
Allied Chemical & Dye	Hopewell, Va.	400
	South Point, Ohio*	320
	La Platte, Neb.*	75
American Cyanamid	Avondale, La.	54
Apache Powder	Benson, Ariz.	10
Atlantic Refining	Philadelphia, Pa.	35
Calumet Nitrogen	Hammond, Ind.	105
Collier Carbon & Chemical	Brea, Calif.	90
Columbia-Southern	Natrium, W. Va.	33
Commercial Solvents	Sterlington, La.	140
Cooperative Farm Chemicals	Lawrence, Kans.	63
Deere & Co.	Pryor, Okla.*	66
Dow Chemical	Freeport, Tex.	90
	Midland, Mich.	24
	Pittsburg, Calif.	7
DuPont	Belle, W. Va.*	232
	Niagara Falls, N. Y.	10
Escambia Chemical	Pace Junction, Fla.	70
W. R. Grace	Memphis, Tenn.*	88
Hercules Powder	Hercules, Calif.	50
	Louisiana, Mo.	40
Hooker Electrochemical	Tacoma, Wash.	23
Ketona Chemical	Ketona, Ala.	47
Mississippi Chemical	Yazoo City, Miss.	97
Mississippi River Chemical	Selma, Mo.	71
Monsanto (Lion Oil)	El Dorado, Ark.	210
	Luling, La.	146
Northern Chemical Industries	Searsport, Me.	44
Olin-Mathieson	Lake Charles, La.	110
	Niagara Falls, N. Y.	6
	Morgantown, W. Va.	200
Pennsalt Chemicals	Wyandotte, Mich.	32
	Portland, Ore.	15
Petroleum Chemicals	Lake Charles, La.	100
Phillips Chemical	Etter, Tex.	192
	Pasadena, Tex.	192
Phillips Pacific	Kennewick, Wash.	73
Rohm & Haas	Deer Park, Tex.	under 50
San Jacinto Chemical	Pasadena, Tex.	40
Shell Chemical	Pittsburg, Calif.	118
	Ventura, Calif.*	80
Sohio Chemical	Lima, Ohio*	105
Southern Nitrogen	Savannah, Ga.*	88
Spencer Chemical	Military, Kans.	175
	W. Henderson, Ky.	74
	Vicksburg, Miss.*	70
St. Paul Ammonia	Pinebend, Minn.	71
Standard Oil of Calif.	Richmond, Calif.	105
Sun Oil	Marcus Hook, Pa.	110
Tennessee Valley Authority	Wilson Dam, Ala.	90
Texas Co.	Lockport, Ill.	63
U. S. Industrial Chemical	Tuscola, Ill.	50
U. S. Steel	Geneva, Utah	70
Westvaco (FMC)	S. Charleston, W. Va.	22

* Urea plants at these locations

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market areas for the agricultural needs of the late '40's and early '50's. In other cases, conditions were not so favorable. The entire industry knows instances of producers' having absorbed freight equalization costs of $20 or more per ton to maintain economic operational levels.

Today the North Central states have the greatest growth potential. If any place now exists where it might be most favorable to put up an ammonia plant in 1958–59—and no producer will even say he's thinking along those lines—it would be in the Corn Belt, probably between eastern Nebraska and Des Moines, Iowa.

The smallest economical ammonia unit is about 50 tons per day—but 150 to 200 tons is more usual. To realize operating economies, groups of smaller companies have sometimes joined forces to build one large plant rather than several smaller ones. The most profitable nitrogen material today, from the manufacturer's standpoint, is probably ammonium nitrate, followed by ammonia and ammoniating solutions. Synthetic ammonium sulfate has undoubtedly been poorest from a profit view. Its recent rise in price to $34 per ton (causing a $2.00 differential between it and coke-oven sulfate) will help. Last year, and in first-quarter 1957 (prior to the increase for synthetic), 45% of total ammonium sulfate was coke-oven.

U. S. Steel still looks at coke-oven sulfate primarily as a method of cleaning up the coke-oven gas (by scrubbing with sulfuric acid). Ammonia recovery is secondary with the steel companies. To date, the use of phosphoric acid instead of sulfuric has not caught on. Diammonium phosphate is today produced mainly by Colorado Fuel & Iron, Shell Chemical, Ford, and TVA. Kaiser is producing some.

Future

Ammonia producers are now trying to ride out the problems of overcapacity and hoping for the best in the future. Those with large captive outlets for ammonia and other nitrogen materials are naturally in the best situation. Energetic selling, educational, and similar programs are being used by all. AG AND FOOD asked some of the newer producers why they built now with an unfavorable economic outlook ahead—for at least five years. They point to increased use of nitrogen by the farmer ahead; the trend to 1-1-1 ratio, and eventually perhaps even to 2-1-1. They planned to get in ultimately, and felt it was wiser to get in now and to start building a market for the years ahead.

TECHNICAL SECTION

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