Crossing the Stream Ahead

Keynote address presented at the Salt Lake Symposium.

R.R. Baxter, President
CF Industries, Inc.
Chicago, Ill.

The Greek philosopher Heraclitus once observed, "We never go down to the same stream twice." When you think about the statement, you soon realize that the stream may appear the same, but the passage of water and time make it different than the one visited before. In the interval between visits we, too, have changed.

The current fertilizer situation–short supplies, high prices–may seem like the same stream visited in the 1960's. It seems the same on the surface. But the factors which caused it, as well as the companies and individuals involved, have changed. And depending on which bank you're standing on, the stream presents a varied scene.

From the producer's standpoint, the industry has never been more vigorous–all production can be sold, and prices, profits and earnings are at all-time highs. The farmer-consumer views it as a disaster–supplies are short and prices exhorbitant. He worries about whether he'll get enough fertilizer, where, what will happen to his production. At a time when he can pull out all stops and maximize output, he is held back by limited farm inputs. The short-term fertilizer outlook for both producer and consumer is more of the same–with a generous dollop of inflation.

What happened?

Blame for the fertilizer shortage, especially nitrogen, must in large part be laid at government's doorstep. A cumulative sequence of government actions over the years helped to create it. In 1954 the U.S. Supreme Court decided that the Federal Power Commission should regulate natural gas prices. The commission, by keeping the wellhead price low relative to the cost of financing and producing new gas, discouraged exploration and development of new reserves. Wildcat drilling, a barometer of industry activity, declined by 40% in the five years from 1965 to 1970, and the nation's natural gas reserves dwindled at an alarming rate. The incentive to explore for, and develop new reserves was further reduced in 1968 when the Revenue Act that year cut oil and gas depletion allowances from 27.5 to 22%.

The Clean Air Act of 1970 forced many utilities, institutions and factories to switch from coal to low-sulfur-content fuels. Most changed over to clean-burning natural gas. So, as natural gas reserves declined, use increased dramatically.

Fertilizer producers warned government five years ago that the nation was headed toward a natural gas crisis. The warnings were ignored. It became impossible to secure long-term, noninterruptible natural gas contracts for ammonia plants. Without such contracts, no company was willing to risk the substantial investment required to build an ammonia plant when they could not be assured of obtaining feedstock. And, with ammonia prices down, no one was willing to pay higher natural gas prices.

In 1973 natural gas supplies became so tight that government was forced to establish priorities for use. Ammonia received a Priority of Use Category VIII. It was not until various nitrogen plants had been shut down or production reduced and protests by industry and agriculture, that government realized nitrogen's importance in food production, and ammonia production was granted a Priority of Use Category II, after home heating and institutional use.

Coupled with these governmental actions affecting the feedstock for ammonia plants, were several outside factors which contributed to the worsening situation. High farm prices provided farmers with an incentive to increase production. To help them boost output, government released 40 million acres from the set-aside program. Twenty-six million acres came back into production last year, and the remainder came into production this year. But much of the set-aside land was marginal, requiring higher-than-normal fertilization. As a result, demand for nitrogen, phosphate and potash fertilizers soon exceeded the fertilizer industry's capacity.

Government efforts to control prices in this inflationary period made matters worse. Domestic fertilizer prices were frozen, but offshore prices were free. Many overseas countries, trying to feed their people and short of fertilizer to boost yields, came knocking at our door, bidding for the available fertilizer supply. Soon the export price of fertilizers was double the domestic price, and a number of producers moved their product into the export market, reducing the already short domestic supply.

Since the Cost of Living Council lifted fertilizer price controls in late October, 1973, slightly more nitrogen fertilizer is available to the farmer, but prices have climbed–in the case of ammonia, to about $200.00 per ton.

What's happening

As indicated earlier, producers are enjoying the best years in the history of the fertilizer industry. With ammonia prices high, everyone is willing to pay higher natural gas costs. Suddenly, the wallflower of the 60's has sex appeal.

Almost every nitrogen manufacturer has announced an expansion of capacity—either as additions to plants or new plants. Our company, CF Industries, has announced construction of two 1,200 ton/day ammonia plants and a 1,500 ton/day urea plant, scheduled for completion in 1976 in Alberta, Canada, and we're not alone. The roster of major producers adding capacity reads like a directory of the fertilizer industry—Farmland, Agrico, Grace, Cominco, Simplot, Beker—to name a few.

North American nitrogen demand should continue to exceed supply for the next 4 to 5 years due to the delay in getting new ammonia plants constructed. If, however, all ammonia projects now under consideration in North America, Mexico and the Caribbean go forward, over 13 million tons of annual capacity will be added to the current North American capacity of 19 million tons—28% of this new capacity will be in Canada; 62% in the U.S.; 7% in Mexico, and 3% in Trinidad. This rapid expansion of ammonia capacity is a matter of concern to "old hands" in the fertilizer industry. The worries are related to over capacity, how well projects are planned, and where the plants are located.

What's the buzz?

In moves reminiscent of the 60's, some inexperienced consortiums, attracted by the high profits, are considering construction of ammonia facilities under the impression that the material is in such demand that someone will appear at the plant gate to carry product away once the plant comes onstream. It just doesn't work that way. When an ammonia plant is in the planning stage, it is the planner's responsibility to determine the storage, distribution, and marketing facilities necessary for efficient operation of the plant. Neither the company nor the planner can assume that a plant's output will be absorbed by existing facilities—he is almost guaranteed that it will not.

The cost of building a 1,200 ton/day anhydrous ammonia plant today is in the neighborhood of $55 million dollars. Supporting storage, distribution, and marketing facilities for such a plant require an additional investment of $81 million dollars. Thus the total investment for making 420,000 ton/year of ammonia and getting it to the farm gate is about $136 million dollars. Working capital for product inventories could peak at $50 million dollars.

Of course it is a lot easier to invest the smaller amount in the plant, but to what result? A plant which cannot dispose of its output is going to either shut down when available storage fills up or another round of price wars will be initiated in an attempt to capture someone else's market. The someone else cannot afford to lose market and the battle is joined. Even though total investment would be less than half the capital if storage, distribution and marketing facilities are ignored, that investment would be dangerously exposed. Poor planning could bring a repetition of the industry experience in the 60's except that there are very few marginal producing facilities that would be phased out.

Another disturbing note is the natural gas supply. Though nitrogen production utilizes less than 3% of the natural gas supply, the lack of long-term noninterruptible contracts has limited nitrogen expansion in the U.S. A suggested possible solution is for government to allocate natural gas to the producers to insure equitable supplies.

I believe this would be a mistake. Once government controls raw materials, the industry would be faced with more problems. For example, the logical next step, it would seem, would be for government to license new ammonia plants. That poses the question of who gets a license. Such a state of affairs would invite government production of all ammonia.

The better solution would be for government to free natural gas prices for new-found gas, stimulating exploration and development; also, producers should be given the right to transport it interstate as a raw material. The current plethora of ammonia projects in the U.S. indicates that ammonia economics can stand a major increase in natural gas prices—at least as long as the ammonia price is sufficiently high.

Another step to solving the natural gas supply problem has been taken already. Many new plants are being built outside of the U.S. in areas of surplus natural gas. Fortunately, many of these plants will be located in Canada, our good neighbor to the north, with which the U.S. already has mutual dependence for the other two plant nutrients, phosphate and potash. Fertilizer accounts for 30% of all food and fiber production, and has a direct relationship to the amount of food produced and the price of food to the consumer. With fertilizer of such vital importance in the food chain and natural gas the limiting factor in nitrogen production, reliability of supply is a key factor.

Insuring the future

There is a way in which the U.S. can insure its economic independence, strengthen the dollar in world markets, and bolster the fertilizer industry and agriculture—by reversing the role. Our planet, Earth, is raw-materials and food limited. Underdeveloped nations have known it for centuries; developed countries have ignored it for centuries. With a burgeoning world population to feed, as well as starvation facing hundreds of thousands of men, women and children in the Sahel and Indian subcontinents, world agriculture is faced with a formidable task.

North America's greatest asset is its agricultural production. Blessed with arable land, a moderate climate, and an unsurpassed agricultural technology, North America has become the greatest food producer the world has ever known. North America not only can feed its own population, but can also sell or grant tens of millions of tons of food and feed grains to other nations. A disastrous crop year for a country like Russia brings their representatives to our shores seeking agricultural products. Consider the Canadian wheat sales to China several years ago and U.S. sales to India, as well as the millions of tons of food we have supplied in aid to starving nations. While we haven't reached the stage where we can feed the whole world—and probably never will—given sufficient fuel, fertilizer and other farm inputs, North America could become the granary of the world.

Food is a more essential commodity than oil, natural gas and other raw materials. However, everyone in the U.S., the developed countries and the underdeveloped nations must realize that the costs of food and energy are interrelated.

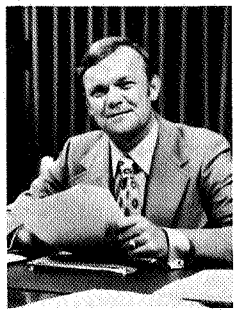
To provide an adequate return on investment and to pay for the inputs and operating costs of agriculture, food costs must rise. Despite higher prices, the dollars earned may prove useless in the trade of food for energy except as a measure of relative value. With various resources in short supply in different countries, we may return to the barter system, trading a resource for a resource. It may take the form of American grain for Arab oil, or it may involve more than two countries, that is, U.S. grain for European equipment for Middle East oil. With more stable supplies of energy, we can produce more ammonia, to produce more food—building an agricultural colossus which will assure economic stability.

Wrapping it up

In summary the current nitrogen shortage is a result of government actions, lack of industry investments, high crop prices and more available land which, acting together, have generated an unprecedented demand.

Many producers are expanding nitrogen production facilities or building new ones. Some inexperienced in the fertilizer industry are planning plants without considering equally important storage, distribution and marketing systems to support the plant. Such lack of planning can only be detrimental to the companies involved, and the industry as a whole. To insure adequate energy sources for continued production of fertilizer and to maximize food production, food costs must rise.

As chemical engineers we face the responsibility for planning, designing, building and operating the ammonia plants necessary to make a miracle happen. How well we do our jobs will determine the future. #



BAXTER, R. R.