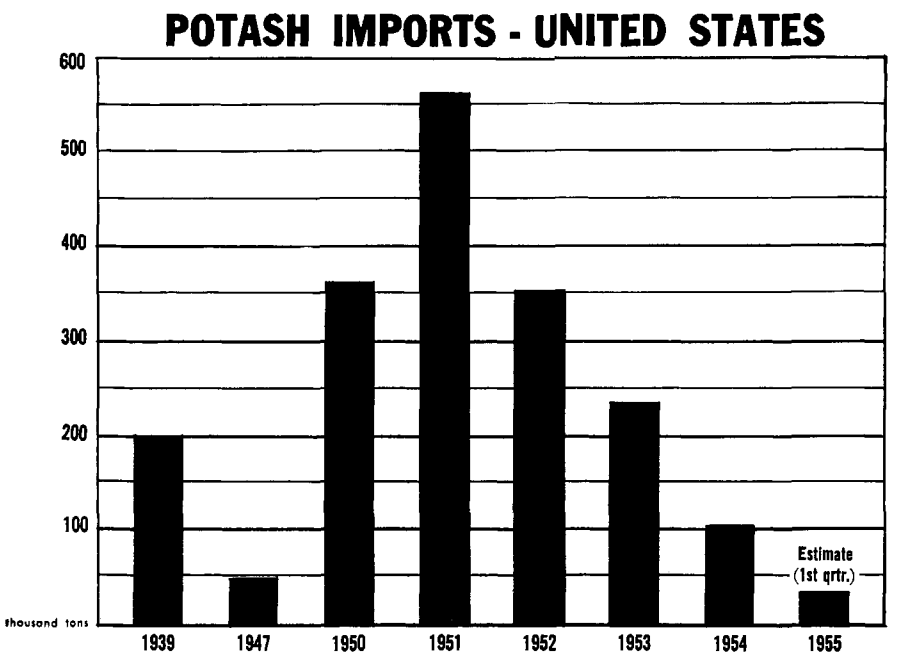


western Potash Corp., Ltd; the Potash Company of America; and the Duval Sulphur and Potash Co. The last two are American concerns. Western Potash appears to be a Canadian-American project that will be financed in both countries under the direction of F. H. McGraw and Co., to the extent of $17,500,000. At mid-June 1955 this had not yet been arranged. Financing must be completed by July 5.

Others reported contemplating development of Saskatchewan potash are International Minerals and Chemical Corp., Poplar Oils Ltd., and Palmer Drilling Co., Ltd.

An idea of the costs involved will be seen in the story published by the *Toronto Financial Post* last month that Potash Company of America is spending $3,000,000 in sinking a shaft near Saskatoon. The shaft is concrete-lined and freezing operations will be employed to reach the potassium deposits more than 3000 feet down. Before it suspended operations pending financial arrangements, Western Potash had sunk a shaft in the Unity area about one-third down to deposits at the 3400-foot level.

What will be the effect of the Canadian development in the world potash market assuming it is eventually brought to a large-scale producing basis? It may be tremendous, according to the more enthusiastic. In their view the Saskatchewan and New Mexico deposits are large enough to swing the balance of world market control to the North American Continent, with export surpluses over our domestic needs. This would mean for the first time a reversal of the potash movement of former years, when European potash dominated the markets.

The European cartel is now made up of Spain, France, and Western Germany, and while the United States brought up its production from virtually nothing after the first World War to around 3,500,000 tons annually, our exports hardly offered any competition in foreign markets. There is also the production of countries independent of the cartel—Israel, East Germany, and the U.S.S.R.

Our exports of potassium salts have been restricted to such nonproducing agricultural countries as Japan, Brazil, Mexico, Australia, and Cuba. These have been placed at 12,000 tons for 1953–54; 52,000 tons for 1954–55; and 100,000 tons for 1955–56. Omitting what potential exports may result from Canada's new industry, some feel that the American industry should be able to export about 10% of its yearly production, or approximately 350,000 tons. This goal, it is believed, may be reached by 1960.

This export figure may be reached or surpassed sooner than that, in the view of those concerned with American potash exports. A great increase took place in export shipments this year. Those for the first quarter of 1955 were around 40,000 tons, or 14 times greater than the potash exported during the corresponding period a year ago. This indicates to factors in the business that as far as potash exports are concerned the industry is cutting its eye teeth.

Our potash exports are even meeting about one half of Canada's requirements, or 30,000 tons on a K_2O basis. The remainder is supplied by European producers. This picture, of course, must change drastically when the Dominion is placed on the map as a source for the potassium salts.

American interests appear to dominate in that development at this stage, and there is no doubt that it is a welcome participation. The future may find Canada and the United States partners in a new world market venture, or it may find both in competition with each other in international potash trade. It took the United States many years to attain the position of a potash exporter. The trial will be much shorter for Canada.

Ammonia Safety

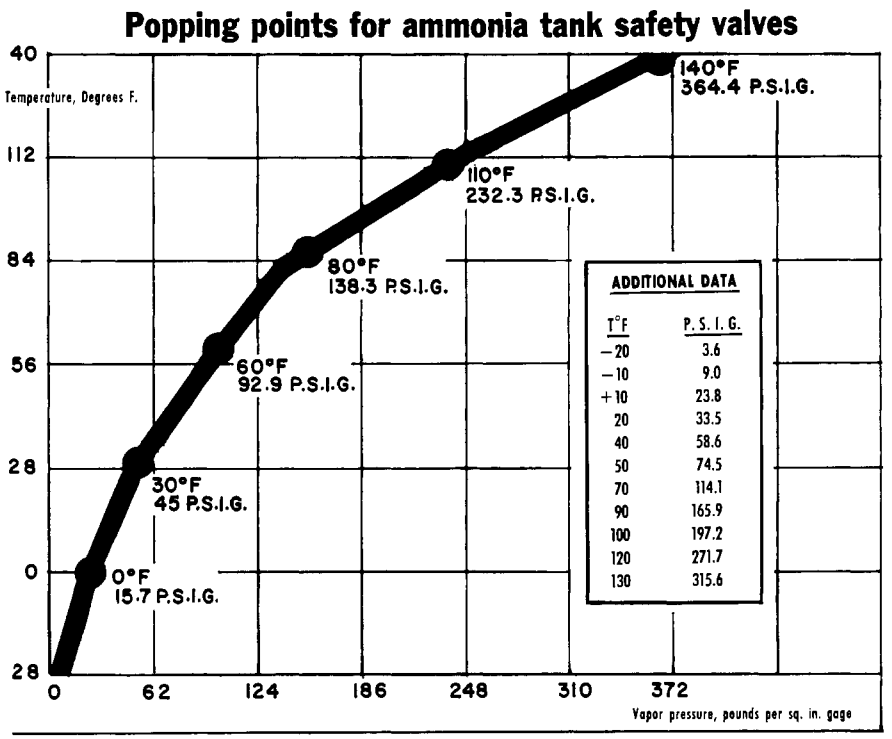
Industry moves toward standard anhydrous ammonia handling practice, although points of contention still exist

AMMONIA EQUIPMENT manufacturers are faced with a 15-pound area of disagreement among distributors and producers. The argument continues to pop up over whether storage tanks should be designed for pressures of 250 or 265 pounds per square inch. But for a product as new as agricultural liquid ammonia, the number of such areas of disagreement is small.

Anhydrous ammonia (and ammonia solutions) handling and storage standards, drawn up by the Compressed Gas Association, were submitted recently to the American Standards Association for adoption as an American Standard. This does not mean that all bodies who have prepared such standards agree on every point, but it does show that the industry is moving gradually toward a set of universally accepted practices for handling this useful though somewhat hazardous fertilizer.

While the lay public regards ammonia mainly as an obnoxiously fragrant gas, it can be lethal within a few minutes in concentrations of 0.6 to 1.0% by volume in air. Fortunately, it is detectable by nose at concentrations (50 parts per million) far smaller than this, and drives most people away before any physiological damage is done. The real problem is that anhydrous ammonia is a compressed gas, and must be handled accordingly. It is flammable between 16 and 25% concentration by volume in air, but such concentrations seldom occur at the distribution level, and combustion difficult to induce even within the stated theoretical limits.

Among those who have established anhydrous ammonia handling standards are the Agricultural Ammonia Institute, the Manufacturing Chemists' Association, the National Safety Council, and, of course,



the Compressed Gas Association. Many states and the Interstate Commerce Commission also have regulations, and all the basic producers give recommendations and free engineering advice to their customers. All of these people agree completely on broad principles and on most specific points. They agree, for instance, that alloys containing copper and zinc should not be used with ammonia, which attacks them readily. (Some LPG firms had trouble on this score when they first entered the ammonia business.) They agree that a storage tank should not be filled with anhydrous ammonia to more than about 85% of its volume, depending somewhat on the temperature to be encountered. They agree generally that new storage tanks should be radiographed and stress relieved before use, although this is still a hot topic in some areas. But there is basic disagreement on the working pressure of anhydrous ammonia storage and handling equipment. 250 or 265?

The Compressed Gas Association says that permanent, nonrefrigerated storage tanks should be designed for 250 pounds per square inch minimum working pressure, and that all portable and cargo tanks should be designed for 265 pounds. ICC requires 265 pounds per square inch for all tanks moving in interstate commerce. The state of Louisiana requires 250 pounds per square inch for aboveground tanks, and farm trailer or tractor containers. Olin-Mathieson, Shell, and Spencer recommend 265 pounds per square inch minimum for all portable and cargo tanks. The state of California (which does not yet have specific regulations) recently gave an official opinion in the same vein. Lion Oil, on the other hand, recommends 250 pounds per square inch minimum working pressure.

A 15-pound-per-square-inch differential might not seem important, since it corresponds to a temperature difference of only 4° F. Many, in fact, including most of the LPG people in the ammonia business (who as a group have had extensive experience in handling compressed gases) feel that 250 pounds per square inch is a safe working pressure for any ammonia storage tank. Everyone agrees that it is a safe working pressure for a permanent, stationary tank which can be shaded, sprinkled, and otherwise cooled and protected, and is subject to minimum abuse.

But those who favor 265 pounds per square inch minimum do so because they feel that 250, while only 15 pounds per square inch lower, is not a safe working pressure. They point out that air temperature does not necessarily correlate with the pressure in the tank. In one case, with an air temperature of 101° F., the outer tank surface temperature was 147° F. and tank pressure as 267 pounds per square inch, which corresponds to a temperature of 119° F. on the anhydrous ammonia vapor pressure-temperature curve.

Relief Valves Pop

Relief valves on anhydrous ammonia equipment could be heard popping even in the East and Middle West last summer, which was unseasonably hot in those areas. What this can lead to is well illustrated by a case in the Southwest (in an area accustomed to very high temperature) in which the relief valve on a 250-pound-per-square-inch tank was found to be set for more than 300 pounds. This would indicate a need for regular inspection. Such a need becomes very practical in a state like Louisiana, which holds the ammonia dealer responsible for the fitness of all storage, handling, and dispersing equipment used by his customers.

Considering the inherent hazard of its product, the anhydrous ammonia industry is seen by the record to have a much better safety record than many might have expected it to have at the outset. A few serious accidents have occurred, however, and probably will occur again so long as their prevention is subject, as it ultimately must be, to human fallibility. Adequate, universally accepted, and well enforced handling and storage standards are, therefore, a necessity. The particular firm involved in an accident certainly suffers most directly, but in the end the entire industry bears the onus in the form of bad public opinion, and in the very practical forms of higher insurance rates and possibly restrictive legislation.

Should the pressure be 250 or 265 pounds per square inch?