

## CHRONOLOGY OF THE USE OF WATER ON GRAIN

The issue of adding water to grain is not new. As far back as the early 1700's French grain merchants were accused of using water to "freshen" grain and swell its volume. [Kaplan, 1984]. The problem resurfaced many times between that first documented record and the current concerns over the use of water to suppress dust or to add weight to grain. The addition of moisture to overdry grain that has been stored for an extended period of time has been demonstrated to improve its appearance and odor, i.e. to "freshen".

In 1914 J.W.T. Duvel of the Bureau of Standards, USDA accused grain elevators of "spraying dry wheat with water prior to loading for shipment, for the purpose of increasing the weight" [Duvel, 1914]. In the fall of 1915, the practice of adding water to oats created a scandal of sufficient magnitude that Agriculture Secretary Houston added a statement to the regulations authorizing grades for oats: "Nothing herein shall be construed as authorizing the adulteration of oats by the addition of water, by the admixture of clippings or hulls, decomposed salvage oats, other grains, or any other foreign material, or otherwise, in violation of the Food and Drugs Act of June 30, 1906". [USDA, 1919] Again in 1925, USDA informed the grain industry that adding water to grain was "unethical and inimical to good business", and had been declared illegal adulteration under the Federal Food, Drug and Cosmetic Act [Besley, 1925] Note that the addition of water to grain **regardless of the purpose** will increase its bulk and weight. FDA officials, elaborating on the ruling, based the definition of adulteration on "the intentional addition of water to grain to increase its bulk or weight or make it appear better or of greater value..." [Hile, 1985] This interpretation required enforcement agencies to determine motive in order to differentiate between good management practices and illegal actions. FDA extended the prohibition to cover almost every alternative mechanism for adding water. Once the motive is established, the wording of the adulteration clause covers all methods of adding water including misting, aeration, uncovered trucks during a rainstorm, blending wet and dry grain together, and presumably harvesting soybeans in the early morning instead of late afternoon. Motive is exceedingly difficult to prove, especially when the end result is the same regardless of the motive.

A series of devastating grain dust explosions in the late 1970's attracted the attention of Congress. Hearings were held in 1978 before the Subcommittee on Compensation, Health and Safety pertaining to OSHA Oversight on Grain Dust Explosions. The Honorable Joseph M. Gaydos, presided. Congressman Gaydos stated the following:

"In the last 17 years alone, 137 grain elevator explosions have been reported in 33 of the 48 contiguous continental states. Additionally, more than 29,000 grain elevator fires were reported from 1964 to 1973. This is an average loss of more than \$33 million. Such statistics are shocking and every attempt must be made to improve the safety and health conditions in our grain industry." [U.S. House of Representatives, 1978].

Two of the explosions occurred at almost the same time: (1) Westwego-Dec. 1977 with 36 fatalities including seven FGIS employees and (2) Galveston-Dec. 1977 with 18 fatalities including 6 FGIS employees.

Following the 1977 grain elevator explosions, litigations, hearings, symposiums and workshops, the grain elevator industry responded by installing numerous pneumatic dust control systems. It is possible that threat of litigation was a major incentive. Law suits following a grain dust explosion seeking damages in the order of \$200 million were not uncommon.

The loss of life and money associated with the explosions prompted the grain industry to initiate and fund a number of studies dealing with prevention of dust explosions. One of these studies became the basis for subsequent action by FGIS. Lai, Miller and Martin from the U.S. Grain Marketing Research Laboratory, USDA prepared a publication for the National Grain and Feed Association in which they reported on the effectiveness of water, soybean oil, and mineral oil for reducing dust emissions in corn, wheat, and soybeans. [Lai, et al., 1982a] A second publication by Lai et al. [1986] provided additional scientific data on the effectiveness of water, oil and lecithin as dust suppression additives.

Congress was also actively searching for solutions. Between 1981 and 1994, 20 bills were introduced into House and Senate committees in the U.S. Congress that related to dust control or contained a reference to the use of water on grain. The 1993 hearings revisited issues that had been raised repeatedly in previous debates or legislative proposals.

Research published by Oklahoma State University in 1981 demonstrated that rewetted and naturally wet grain had essentially the same storability characteristics. The ensuing controversy and heated exchanges in correspondence and in the press, forced the Food and Drug Administration (FDA) to clarify its prohibition against rewetting in correspondence between Dr. C. T. Haan, a professor at Oklahoma State University and the Associate Commissioner of FDA. "Paragraph 8 of your letter asks if blending of wet and dry wheat or aeration of dry wheat during humid periods are permissible practices. If the purpose of blending is to conceal damage or inferiority, make the grain appear to be of greater value, or similar reasons, such blending would be illegal. Mixing unadulterated wet wheat with dry wheat for the sole purpose of making the former suitable for safe storage is an acceptable practice. Aeration of wheat during humid periods for the purpose of increasing its bulk or weight in order to maximize profits is not acceptable and is illegal for the reasons outlined above." [Hile, 1981]

Dust control in the export market channel became an issue in Congress and the national press. Allegations were made that U.S. exported grain contained more dust than grain exported from other countries. In response to this allegation, Congress included in the Grain Quality Improvement Act (GQIA) of 1986, HR 5407 [U.S. Congress, 1986] a prohibition on the recombination of grain dust with grain once it was removed. FGIS had the responsibility of implementing this act and in this process of implementation, they requested and received numerous public comments [Federal Register, 1987]. Recombination of grain dust was separated into three classifications:

1. adding dust to grain from dust bins,
2. adding dust sweepings from the elevator floors, equipment and other areas to grain, and

3. reintroducing the dust removed from grain by a dust collection system (recirculation dust).

The final rule disallowed classes 1 and 2. In other words, dust collected in a bin and from floor sweepings could not be recombined with grain.

In 1987, FGIS issued a final rule permitting the use of additives (including water) to grain for purposes of dust control. In addition, the ruling required that if additives are applied during loading to outbound grain after sampling or weighing, or applied to inbound grain before sampling or weighing for the purpose of insect or fungi control, dust suppression or identification, the inspector and/or weight certificate must show a statement that describes the type and purpose of the additive application. These regulations, however, only applied to officially inspected or weighed grain and did not limit the application or restrict the usage of water in other situations where official grades were not used. FGIS issued the 1987 ruling after receiving comments on the proposed rule issued Nov. 26, 1984. A total of 15 comments were received during the rule making process. Only 2 commentators opposed the provision to allow additives for dust suppression. Three of the 12 supporting the rule raised questions about the possibility that it would allow the use of additives to increase the weight of grain [Federal Register, 1987b]. FGIS finalized the rule on the grounds that the provisions would allow the industry to make use of the available cost-effective technologies for reducing the danger of dust explosions.

The primary motive for the ruling by FGIS was that allowing additives would reduce the danger of dust explosions, especially at export elevators. Additional incentives for dust control and suppression were simultaneously generated by several new and revised government regulations as well as by economic and safety considerations at operating firms. Increasingly restrictive controls and limits were imposed on the industry by the Environmental Protection Agency, affecting both port and inland elevators. New regulations by the Occupational Safety and Health Administration, restricting the levels of dust allowed in designated priority housekeeping areas, provided additional impetus for finding techniques for reducing levels of dust in grain elevators.

Following the 1987 FGIS ruling, several export elevators initiated some form of water application to reduce airborne dust in their facilities and at the load out spout. However, foreign buyers, concerned about the effect of water on quality and the economic implications of the additional weight, registered complaints requesting that water not be added to their grain. FGIS received several complaints from both foreign and domestic grain merchants expressing their concern about the practice of applying water to grain regardless of the motives for the practice. [Federal Register, 1993a] and [U.S. House of Representatives, 1993] Buyers and processors correctly recognized that the end result on weight and quality depended on the quantity of water and method of application -- not on the motive. With foreign buyers requesting certification that no water had been added, exporters shifted to other strategies for dust control. Many port and inland elevators had alternative technologies in place; others installed new equipment. The alternatives were almost always more expensive, resulting in a differential cost advantage for those elevators using water misting as a dust control method versus those elevators using more costly alternatives of oil application or pneumatic systems for dust control. The economic

advantage created for those elevators using water, generated complaints from other grain marketing firms. [Federal Register, 1993a]. Some of the pressure for prohibiting water application was generated by grain handlers whose motives were related to differential economic advantage.

FGIS responded to these complaints with three additional rulings.

- (1) In January 1993, FGIS amended sections 800.88 and 800.96 of the USGSA to require a disclosure on official export inspection and weight certificates whenever water was applied to export grain at export port locations. [Galliat, 1993] The action was taken in part because of the concerns expressed by foreign buyers and the potential effect that water application might have on the confidence of foreign buyers in the U.S. inspection system.[Federal Register, 1993a,].
- (2) Continued complaints, industry debates, and documentation of abuses prompted FGIS to issue a proposed rule for comment that would prohibit the addition of water to grain. "FGIS has determined that water, which is sometimes applied as a dust suppressant, can be too easily misused to increase the weight of grain" [Federal Register, 1993b].

After many vigorous debates, industry associations adopted a resolution favoring the ban on water for dust control. "We are writing to you [Secretary Espy] today to urge you to take all action necessary to immediately promulgate a rule to ban the addition of water to grain, ...". The letter was signed by the Grain Elevator and Processing Society, the National Grain and Feed Association, the National Grain Trade Council, and the North American Export Grain Association. [NGFA, 1994].

Congressional committees entered into the discussion in 1993 by creating a bill in each of the Senate and the House Agricultural committees. [Senate: S.1490, U.S. Senate, 1993 and the U.S. House of Representatives, 1993]. The debate was accelerated when the House version called for complete prohibition on water addition while the Senate version would allow application for dust control under a system of licensing of the technology and supervision by FGIS. The two hearings, held specifically to discuss the issue of adding water to grain, generated more than 346 pages of testimony.

- (3) On October 14, 1994 FGIS issued a final rule in the Federal Register, effective Feb. 11, 1995, prohibiting the application of water to grain, except for milling, malting or similar processing operations. [Federal Register, 1994].

The results from the hearings were inconclusive. There was strong support and equally strong opposition to the prohibition on the use of water consensus, or even a clear direction. Of 341 comments received by FGIS, 215 favored the proposal, 126 opposed it. Of those opposing the ban, 77 recommended that application could be permitted under licensing or regulation. Eleven of those opposing the ban recommended that grain be marketed on the basis of the dry matter it contained thereby removing the incentive for abuse. [Federal Register, 1994]. Most of the opposition came from grain handlers.

However, a survey of farmers conducted by Meyocks & Priebe shows that farmers supported a prohibition on the use of water on grain in about the same proportion as the several sectors responding to the FGIS request for comments. Of the 184 respondents to the phone survey, 58.2% favored the prohibition, 29.3% opposed it, and 12.5% had no opinion [Jeske, 1994].