Deadlock Over Explosive Dust

Grain elevator blasts have killed scores of people since 1977; the experts say they know how to stop the disasters, but the industry finds the remedy draconian

Grain dust is more explosive than coal dust or gunpowder, but for most of this century the grain-handling industry has treated it as though it were not much worse than cobwebs. Housecleaning in U.S. grain elevators has been notoriously lax. Until a series of devastating explosions ripped through several elevators in Christmas week of 1977, killing dozens of people, the industry had absolutely no guidelines aimed at preventing such disasters. A couple of weeks after these explosions, in January 1978, the National Grain and Feed Association issued a one-page list of suggested good practices. But the industry still has not adopted any safety standards.

Now, 6 years later, the National Grain and Feed Association is attacking a proposed federal safety standard drafted last December by the Labor Department's worker protection arm, the Occupational Safety and Health Administration (OSHA). For almost 6 months the proposal has been bottled up in the White House, preventing OSHA from publishing it or seeking public comment. With advice from the Grain Association's attorney, Marc Fleischaker, the Office of Management and Budget (OMB) has held up the proposal for an extended and perhaps terminal "review."

Fleischaker says that he has had one meeting with the OMB and has sent everything to OSHA which has been sent to the White House. "It's all on the public record." He maintains that the industry is not blocking the standard, but asking that it be based on sound economics and science. OSHA's proposal is not sound, he claims, and it makes no sense to publish a less-than-adequate rule. His chief dissatisfaction is with a minimum dust level requirement, which he regards as arbitrary, bureaucratically rather than scientifically derived, probably ruinous to small companies, and likely to divert money from practical measures.

This review, according to OSHA's director of safety standards, Barry White, has run through all of the technical issues which have been researched for the past 5 years by the National Academy of Sciences, the government, and the grain industry. The discussions now turn on highly subjective issues—such as whether or not small grain elevators will be put out of business—the kind of issues that public hearings can best illuminate.

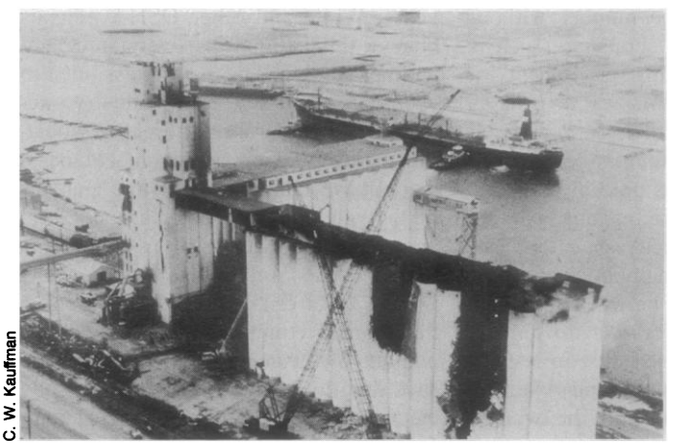
An interesting element of these OMB discussions is their secrecy. White prefers to call this quality "informality." All meetings and telephone negotiations are discreetly kept off the record. The complaints come from the industry to the White House, whence they are passed by the OMB staff to the solicitor's office at the Labor Department. There the queries and assertions are put on paper by the solicitor's staff and sent to OSHA. Detailed responses are prepared on blank paper, without the OSHA heading, without dates, and without signatures. If the rule were public, this kind of interference from outside would be considered an ex parte communication and therefore illegal. But since the proceeding is still supposedly a confidential government review, normal administrative law does not apply.

In addition to this activity, the industry has cooperated since 1978 in funding a $3-million research program. White says that the grain-handling industry has probably undertaken more research than any other he has dealt with in safety rulemaking. This enthusiasm for basic research is generally viewed as commendable. But two members of the National Academy of Sciences (NAS) panel that investigated grain elevator explosions said recently that much of this work seems aimed at obfuscating the issues and causing delays. These skeptics are Charles W. Kauffman, associate research scientist in aerospace engineering at the University of Michigan at Ann Arbor, and Albert Townsend, president of National Agra Underwriters Inc., which insures grain elevators.

They were members of the Academy group that looked into the 1977 explosions and issued a four-volume investigative report (*1*), a classic of its genre. It describes the hazard in succinct terms, lays out concrete recommendations, and concludes that such disasters are easily preventable. The chairman, Roger Strehlow, an aeronautics engineering professor at the University of Illinois, told an incredulous House agriculture subcommittee last year (*2*) that "at least 80 percent" of the grain elevators in this country are dusty enough to sustain disastrous explosions.

The chief hazard, this group concluded, is layered dust. It is allowed to pile up inside the elevator house and, when shaken into the air by small explosions in the elevator shaft or leg, it serves as the fuel for extremely powerful secondary blasts that can rip holes in massive concrete silos. The panel said the solution is to clean up the dust regularly and to find and stifle ignition points in the leg, such as hot bearings, broken pulleys, misaligned belts, and so on. The panel suggested that no more than one sixty-fourth of an inch of surface dust be tolerated inside the elevator building. The recommendation may seem stringent, but as Kauffman says, "When you go into a petroleum refinery, you don't expect to see puddles of petroleum on the floor, do you?" He points out that, pound for pound, grain dust contains more explosive energy than TNT.

OSHA incorporated many of the Academy panel's recommendations into its rule, but softened the one-sixty-fourth-inch standard to one-eighth of an



C. W. Kauffman

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In spite of a $3-million dust control system, the Municipal Export Elevator had dust drifts under a main conveyor belt. Nine died and over 30 were injured when the dust ignited.

inch. As White concedes, that was a political decision and a compromise between what the experts viewed as safe and what the industry wanted, which was no dust standard at all. "We didn't just make the number up," White says. OSHA justifies the figure on the grounds that it was used by the Factory Mutual Research Corporation, which has insured many elevators. It is also the recommended maximum dust level set by the Canadian government. "If we were to go to one-quarter of an inch," which is what the OMB was suggesting at one point, White says, "then we would have to say we made the number up." A fabricated number would not stand up to legal challenge, he believes.

Others, including Townsend, argue that OSHA's proposed one-eighth-inch standard will not stand up either. Townsend points out that the Canadian and Factory Mutual standards came from the same source, a staffer at Factory Mutual who simply chose the number without citing any reason for choosing it. "It is unsafe," Townsend insists. Recent industry research suggests that as little as one-hundreth of an inch of powdered corn starch can sustain an explosion. White agrees that it is possible that the standard should be stricter, but says this is the kind of technical issue that can best be thrashed out in public hearings, if the White House ever permits them to be held. It was not uncommon to find an inch or more of layered dust in a grain elevator, Kauffman says, and when he investigated one explosion, he walked down a flight of steps into dust that went above his head.

Christopher DeMuth, the assistant OMB director responsible for this review, could not be reached for comment. However, in earlier testimony on this topic, he indicated that his primary concern was that the industry might be forced to spend hundreds of millions of dollars meeting a standard that still would not prevent explosions. OMB also notes that if OSHA may take 4 years to write a standard, the White House should have adequate time to review it too.

Because unsafe conditions in grain elevators persist, according to a 1983 study by the Arthur D. Little Company (*3*), workers in this industry can expect each year to endure over 2000 fires, 26 explosions, 950 injuries, and 24 deaths. These figures are based on the historical records, which include the terrible year of 1977. OMB at one point wanted to toss that year out of the data base, but OSHA would not agree. In 1983, a year in which grain shipments have declined and the industry has been worried about federal regulation, the record has improved. As one Washington lobbyist noted with pride, there have been no deaths so far in 1983 and no explosions since May.

Why has the industry fought so hard to maintain its unregulated status? Objections have been raised about the cost of compliance. Many companies would be required to install or modify dust collecting and grain sieving equipment. The Little report estimates that these changes would cost no more than 1 percent of revenues in any segment of the industry, or about $750 million over 10 years. White and other OSHA officials believe this estimate is overstated, and another study has been commissioned to check its accuracy. The industry, according to the Grain and Feed Association's executive director, James Maness, has not yet made an economic analysis of the rule's impact. This has not prevented it from passing along complaints to the OMB. According to White, the OMB's chief criticism at the moment is that "small country elevators" will be put out of business by the rule. White says that he has not personally met any elevator operator who makes this claim. In any case, the $750-million price tag appears less imposing when one considers that OSHA's rule could save $687 million in losses, according to the Little report.

"There is no mystery about grain elevator explosions," says Townsend.

Industry spokesmen object most vigorously to OSHA's proposed "action level" that would require an elevator owner to start cleaning if more than an eighth of an inch of dust accumulates in a 200-square-foot area. OSHA would issue a citation only if a company refused to start cleaning. It is a clumsy measure of safety, many people say. OMB has ordered OSHA to come up with some other options, one of which is likely to be a proposal that elevators be swept clean every day, and the other a requirement that some minimal amount of dust removal equipment be installed. But at this stage the dust rule is only an unpublished proposal, one that could be changed if it seems unworkable after a public review.

In a sense it is surprising that OSHA has been able to get this far in designing a standard. Until the Academy report appeared, the industry maintained that dust was a factor in the explosions, but not a well-understood element. As a result, spokesmen said, the data were too weak to justify writing any safety standard based on dust. One reason information about explosions was so poor was that the industry never supported a good investigative program. State agencies and the U.S. Department of Agriculture (USDA) also failed to persevere in their research on dust explosions. When the Academy panel began its research, it found that some excellent work had been done in the first two decades of the century following a series of disasters, notably one at a feed mill in Buffalo in 1913 which killed 33 people. The USDA investigators concluded that the key was to insist that the mills and elevators be kept free of dust. They launched an educational campaign to encourage this. But the NAS panel had to build its own data file and reporting system for more recent elevator explosions. The truth was that no one was keeping good records on what was happening.

"There is no mystery about grain elevator explosions," says Townsend. The source of the danger is dust, and the dust can be removed by large vacuum cleaners known as pneumatic dust control systems. Many such systems in use today "have been an abysmal failure because the people who designed them and installed them didn't understand the mechanics." He says there have been "some incredible misconceptions among the leading consulting engineers" in the field, misconceptions that have been passed on from year to year. "Believe it or not, there have never been any basic source materials for the design of these systems."

To correct that inadequacy, Townsend chaired an Academy panel that wrote a report spelling out exactly how to build a workable dust removal system (*4*). Furthermore, as proof that the concept works, Townsend points to a system he designed, which has been installed by Mac Pneumatics at the Garvey international elevator in Wichita, Kansas. Townsend claims that this system, in combination with dust removal in the pit where grain is delivered, reduces the hazard to the point that "we have never measured a concentration of dust in the elevator leg higher than one-sixth the lower explosive limit." The grain trade associations argue that it will take years to learn how to solve the dust problem, Townsend says. "Well, that's hogwash."

Maness, the Grain and Feed Association's spokesman, says that research funded by his group is looking into

Townsend's claims, but he has doubts about the accuracy of Townsend's dust level readings. The dust aspiration device in the Garvey elevator may be of marginal benefit, Maness says, because an owner must be concerned about dust not only in the leg but throughout the plant. Maness argues that the sensible approach would be to ask industry to abide by performance standards for dust control. The problem is too complex to be codified into a simple rule.

According to David Bossman, treasurer of the American Feed Manufacturers' Association, "probably the key point" in mandating a dust-free environment is the economic value of the dust itself. Even the best grain in this country may contain as much as 2 percent dust and foreign matter. Other nations like Australia and Canada do not permit such high levels of junk material, but no one who processes grain in this country is willing to throw away the dust because there is no law forbidding its resale and no one wants to discard the enormous revenues. "If you remove 1, 2, 3, or 4 percent of your purchased material in the form of dust," Bossman asks, "what do you do with it?" Do you set up an elaborate parallel system to collect and package it, or "Do you leave it where it is and treat it as best as you possibly can?"

The problem is complicated, Bossman says, because dust is dangerous to handle and difficult to transport. The elevators at the ends of the distribution system probably handle enough volume to justify an investment in dust pelleting equipment on a profit-making basis. They could package and resell the dust to feed manufacturers. But the smaller elevators at the starting end of the distribution system do not handle a volume large enough to pay for the $100,000-plus pelleting operation. "They'll either disobey and put the dust back in or they'll store it," which would be unsafe, Bossman claims. He is convinced the industry will fight the one-eighth-inch standard "down to the wire."

—ELIOT MARSHALL

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New Security Measures Denounced

New government attempts to tighten controls against security leaks, including increased use of lie detector tests, were portrayed as unproductive, undignified, and undemocratic at recent hearings held by Representative Jack Brooks (D–Texas).

One of the issues is a presidential fiat, issued last March, whose primary purpose is to stem leaks to the news media. Known as National Security Decision Directive 84, it requires all employees with access to classified information to sign a nondisclosure agreement. More significantly, it requires people with access to Sensitive Compartmented Information (SCI)—who number about 127,000—to submit any intelligence-related material prepared for public consumption to prepublication review. This is not time-limited, and would presumably apply to anything from a letter to the editor to Reagan's memoirs. The directive also permits agencies dealing with classified information to require employees—at the risk of "adverse consequences"—to submit to polygraph tests in the course of an investigation of a leak.

Most witnesses were highly critical of the directive. The American Association of University Professors expressed alarm at its broad sweep and "intimidating character," and suggested that the existence of prepublication censorship would discourage academics from accepting government responsibilities. Former Deputy Under Secretary of State George W. Ball said he was "deeply disturbed by the potential harm" the measure could do. "Only those with ignorance or contempt of our laws and traditions could have written" such a directive, said Ball. He added: "Our current obsession with the Soviet Union must not lead us to imitate their practices."

Another controversial policy statement, depicted as a logical extension of Directive 84, was unveiled at the hearings by Justice Department official Richard K. Willard, the architect of Reagan's secrecy initiatives. Willard proposed that agencies inaugurate their own programs of random polygraph screening of employees cleared for Special Access Programs for the purpose of uncovering or deterring breaches of security. Anyone who refused to cooperate would be denied future access to classified information.

Meanwhile, the Department of Defense (DOD) wants to increase its use of polygraphs. It has proposed expanded use of testing as a condition of access to various high-level intelligence programs, as well as random checks on employees with special intelligence clearances.

Willard and Richard D. Stilwell of DOD expressed high confidence in polygraphs. Stilwell said the Central Intelligence Agency experience has been "extraordinarily successful," with polygraphs uncovering "significant information" in 46 percent of cases. Willard said "the overwhelming majority of studies" show an accuracy rate of 70 to 95 percent, and opined that government results were closer to 95 percent because of the high quality of its procedures.

These assertions do not jibe with findings contained in a recent study by the Office of Technology Assessment (OTA) on "The Scientific Validity of Polygraph Testing." OTA director John H. Gibbons testified that his staff reviewed several thousand studies and concluded that "meaningful evidence" of validity of polygraphs exists only for criminal investigations. He said the accuracy of polygraph results ranges from 17 percent to 100 percent. He added that even with 98 percent accuracy, the technique would be inappropriate for screening large numbers of people since the tests would produce too many false positives. Gibbons observed that polygraph use by the United States government far outstrips that in any other free country, and has tripled in the past 10 years.

Some skepticism toward the secrecy initiatives has been building in Congress, which has amended the DOD appropriations bill to prevent DOD from implementing its polygraph proposal before next 15 April. The day after the Brooks hearings the Senate passed an amendment to the State Department authorization bill postponing implementation of the prepublication review process for 6 months.—CONSTANCE HOLDEN