

*Dale Sullivan\**

## **Mediating Controversial Technology: The Case of Monsanto's Attempt to Introduce Genetically Modified Wheat in North Dakota**

### **Abstract**

When Monsanto attempted to release transgenic wheat in the upper Midwest of the U.S., localization efforts to accommodate stakeholders were unsuccessful. This paper explores this break down, focusing on the rhetoric of a group of people who attempted to establish protocols that would make co-existence between transgenic and organic producers possible. Their goal was to document best management practices that would satisfy both parties. The case points to the need for co-existence groups of this kind, but also indicates that there is still much we need to learn about negotiating controversial technology.

### **0. Philosophical Implications of Introducing Controversial Technology**

Philosophers of technology have sometimes characterized technology as an autonomous force that has escaped human control, creating a reversal, the technological imperative, in which people must adapt to technology rather than adapt technology to their own needs (Ellul 1973: 135; Winner 1977: 229). The worst-case scenarios arising from such perspectives prophesy a world in which the technological imperative transforms humans into servants of technology and replaces traditional cultures with a monolithic technological culture (Huxley 1942). Other philosophers and critics of technology argue that technology, as the means of production, is ultimately controllable only when people in community appropriate the forces of material production as a whole

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\* *Dale Sullivan*  
*North Dakota State University, English Department*  
*USA*  
*dale.sullivan@ndsu.edu*

(Marx 1978: 191). The worst-case scenarios arising from these perspectives describe Luddite uprisings doomed to defeat (Vonnegut 1952). Although both perspectives may lead to fatalism, it is more often the case that people holding either perspective, awakened to critical awareness, band together in their common opposition to technologies they perceive as detrimental to human culture or the environment. Such is the case with technologies as widely varied as bio-genetic manipulation of animal and plant life, nuclear power, large swine or poultry production technologies, coal-fired power. In situations in which these and other controversial technologies are introduced locally, the technology either slips past “sleeping dogs” and is accepted without controversy; or, when resistance groups form, proponents and opponents of the technology tend to fight to win rather than to modify the technology or to find ways to co-exist with each other. In such cases, local communities need to find ways to mediate the technology and the opposing factions. In this paper I explore the need for forums in which protocols governing the release or implementation of new and controversial technology can be developed prior to the release. I will get at this issue by telling the story of one multi-national company seeking to introduce the technology of transgenic wheat in the upper Midwest of the United States in an area where hard-red spring wheat, used primarily in the baking and pasta industries, is grown.

## **1. Description of the Case and Players**

Although we normally think of multi-nationals outsourcing production to countries where wages are comparatively low, a company may seek local production space for other reasons, such as government support and producer cooperation, if these factors maximize profits. Such is the case presently as global seed companies seek farmers who are willing to plant and harvest genetically modified (GM), or transgenic, seeds. A case in point is that of transgenic wheat in the states of Minnesota, South Dakota, and North Dakota. The players in this case are Monsanto, a multi-national company and leader in developing and marketing genetically modified crop seed; the colleges of agriculture at the University of Minnesota, South Dakota State University, and North Dakota State University; the Canadian Wheat Board; local producers (farmers); The Dakota Resource Council; and the Northern Plains Sustainable Ag-

riculture Society. The last two are local groups who have taken on the role of resisting the new technology.

### **1.1. On the Current State of Debate over Food Containing Genetically Modified Organisms (GMOs)**

There has been a long history of controversy about genetic engineering. Craig Waddell's study of the moratorium in Cambridge, MA, on genetic engineering research documents the hearings associated with the issue. He analyzes both the logical and emotional appeals employed by those who testified before the Cambridge Experimentation Review Board (1990). Genetic research and engineering at that time was confined to the laboratory; in the last decade, however, genetically-modified organisms have spread throughout the environment in the form of genetically modified plants. Introduced for commercial production in 1996, genetically modified corn and soybeans have enjoyed remarkable success in the U.S. For instance, Kathleen Hart reports that farmers planted one million acres of Roundup Ready soybeans in 1996 and twelve million acres in 1997 (17% of the crop). By 2001, more than 60% of the soybean crop in the U.S. was Roundup Ready (2002: 5). On April 1, 2004, *The Fargo Forum* reported, "Gene-altered soybean varieties are expected to make up about 83 percent of Minnesota's crop and 81 percent of North Dakota's [in 2004]" (Zent 2004). Roundup Ready soybeans and corn are varieties that have undergone genetic engineering—genes from other organisms have been spliced in, making the organism transgenic – to create resistance to Monsanto's herbicide, Roundup. Farmers can plant fields of the modified seeds and spray Roundup, eradicating all plant life except the transgenic plants. Another transgenic corn, Bt corn, which has genes implanted in it to kill pests that feed on the plant, has also been widely adopted. Brewster Kneen has criticized this technology, saying that it produces monocultures that survive only by eradicating "their neighbors and co-habitants" (Kneen 1999: 11). Large percentages of the corn crop are used for animal feeds or ethanol production. A smaller percentage makes it into the human food supply. Although Bt corn has not been approved for human consumption, in 2000 some Bt corn was accidentally mixed with approved corn and ended up in taco shells. When there were several reports of allergic reactions, the case brought unwanted publicity to GM production (Hart 2002: 3). De-

spite this incident, farm production in the U.S. has been a friendly production environment for transgenic crops and leads world production of GM crops. Farmers in Canada, Argentina, and China have also adopted this technology, but their combined production is considerably smaller than that of the U.S.

In the U.S., where there is no law requiring that food containing genetically modified organisms (GMOs) be labeled and no law requiring testing for safety of genetically modified food products, the public has been largely unaware that genetically modified products have become part of their food supply. In Europe and Japan, on the other hand, there has been much debate about, and resistance to, GMOs (Lambrecht 2001: Chapters 12-14). Alan McHughen, a partisan who supports GM technology, has criticized this public debate for being uninformed scientifically: “The current state of debate over GMOs, especially in the UK, has been of such an appalling standard that, if we had a council to referee, all sides would be declared disqualified” (2000: 2). Nevertheless, GMOs were banned in the European Union until recently, when the ban was replaced with a law requiring mandatory labeling. So, even though the public in the U.S. continues to be unaware and uninvolved, U. S. farm producers have become very much aware of the controversy because of its effects on their global markets. In Europe, although some farmers see advantages to themselves if they were to adopt this technology, they have not adopted the technology because of market constraints and environmentalist resistance.

## **1.2. The Localization Process for Transgenic Wheat**

Early in 2004, Monsanto announced plans to release transgenic—Roundup Ready—hard red spring wheat for farmers to plant in the spring of that year. This kind of wheat, grown in northern climates, is used by the baking industry, so there is a clear connection between the wheat in the field and the food on the table. Originally a chemical company, Monsanto got into the life-sciences business when it saw opportunity to sell their herbicide in tandem with seed genetically modified to be resistant to it. After a relatively small company, Calgene, identified, isolated, cloned, and patented the gene for resistance to glyphosate (the generic name for Roundup), Monsanto invested large amounts of money in research and development to perfect their own genetic en-

gineering methods and their own Roundup-resistant genetic profile for plants (McHughen: 38). The genetic information and the transfer technology belong to them, and they patent all seed into which they transfer their genetic profile, so that they can collect license fees (Hauck 2004). However, crop seeds have been adapted to local conditions all over the world by long years of breeding and development; that is, seed varieties are localized. Monsanto's technology is not localized until it has been transferred into a viable seed, and so Monsanto seeks to transfer their genetics into seeds that have been developed locally for local conditions. Most wheat varieties (75%) have been developed by land-grant universities that produce varieties of wheat suitable for climate conditions (Hauck 2004). These seeds belong to the public—they are not patented—because they were developed with public funds. Soybean and corn varieties, conversely, have been developed in the private sector by seed companies like DeKalb and Pioneer and were already patented before GM technology appeared (Hauck 2004).

### **1.2.1. A Time-Line Model**

The first stage, therefore, of the localization process for transgenic wheat was to gain cooperation from local researchers at land grant universities who had developed local varieties. Already, at North Dakota State University (NDSU) a controlled licensing program, named Roughrider Genetics, had been developed by the University Research Foundation to keep track of licensed materials. The process, then, would be to work out an agreement between Roughrider Genetics and Monsanto that would permit NDSU to develop and begin to multiply Roundup-ready local varieties of hard red wheat. Once these varieties were fully developed, they would be released to seedmen, who would multiply them further, developing registered and certified seed to sell to farmers as "Roughrider wheat" (Zetocha 2004). In this case, localization—Monsanto's attempt to find local producers—needed to pass from Monsanto to local researchers to local seedmen to local farmers, the actual producers. If the technology had not become controversial, the process of mediating this technology would have been rather straight forward, consisting primarily of creating business contracts, monitoring the development and multiplication of the new transgenic varieties, and teaching local producers how to work with the new technology.

In the past, such localization efforts in U. S. agriculture had been quite successful: new technology and production methods had diffused through the farm economy pretty much as predicted by Everett Rogers' diffusion theory. In the case of hybrid corn a half century earlier, there had been early adopters of new seed varieties, who had become agents of change persuading other farmers to adopt the new technology (Rogers: 1995). This adoption process has come to be taken for granted because of the land-grant universities' success in establishing extension services and hierarchies of knowledge. Extension programs are charged with bringing the findings of scientific research to novices, in this case to the farmers, who are expected to adopt the innovations and to place their operations on a 'scientific' basis. Although the extension services at many of these universities are beginning to establish a more dialogic relationship with local producers, recognizing that the farmers' local knowledge complements the researchers' scientific knowledge, the traditional relationship has been unidirectional and asymmetrical, the scientist enjoying the priestly role of expert (Lessl 1989). Mediation under these two models is markedly different. In the traditional expert-to-novice model, mediation is little more than a transfer of knowledge and skill. In the scientific-knowledge/local knowledge model, mediation involves discussion and adaptation of new knowledge to local conditions. The first instantiates the technological imperative; the second resists it.

When Monsanto approached North Dakota State University about developing transgenic wheat, Duane Hauck, Director of the NDSU Extension Service, felt pressure to buy into the program because the University of Minnesota and South Dakota State University had already agreed to do so through unilateral, executive decisions at the top. The Dean of the College of Agriculture, Food, and Environmental Sciences at the University of Minnesota, Charles Muscoplat, a former Vice President at MGI PHARMA, Inc., a bio-genetics company, was a zealous advocate of GM technology. Having recently made the move from industry to the academy, he was used to making executive decisions and handing them down for implementation, and that is what he did in this case when he announced that Minnesota would work with Monsanto. Minnesota is considerably larger and more influential than either South or North Dakota, and so South Dakota State University's dean made a similar executive decision. The introduction of this technology and the local licenses promised to produce considerable profits for

both Monsanto and the universities, an exciting prospect in times when there was reduced government support for education. Despite pressures caused by neighboring universities' quick buy-in, Hauck, having been approached by concerned members of the Northern Plains Sustainable Agriculture Society, felt that it was important to open dialog with various constituents in North Dakota and to try to gain consensus before entering the agreement. In other words, Hauck had a scientific knowledge/local knowledge model in mind for mediating the new technology, whereas executives at Minnesota and South Dakota had the traditional expert-to-novice model in mind. Eventually, while continuing dialog with local constituents, NDSU entered an agreement with Monsanto because of fears that NDSU's breeding program would become defunct if varieties of Roundup Ready wheat developed in Minnesota and South Dakota took over the market. Hauck said that they needed to buy in to remain competitive. At this first stage of the localization process, the local situation can be described as being in a state of tension created by fear of losing competitive standing on the one hand and concern for local constituents on the other. This was, in other words, a situation that called for mediation among interested parties.

### **1.2.2. Standards Regulating the Release of Genetically Modified Wheat**

The adoption process needed to be embraced by most of the major players (universities, researchers, extension agents, seedmen, and large-scale producers) for it to be successful. If any one geographical sector in the wheat-producing area opted out, that area could claim to have non-GMO wheat for the market, and wheat from that area would bring a premium in Japan and Europe. Transgenic wheat, conversely, would be confined mostly to domestic markets and would probably bring lower prices. Therefore, a cooperative spring wheat program was formed among North Dakota State University, South Dakota State University, the University of Minnesota, the Western Plant Breeders, and Monsanto. This group set standards that regulated the release of the wheat: the wheat would not be released until:

1. It received regulatory approvals in the United States, Canada, and Japan

2. Regulatory trade approvals and marketing agreements were in place for export markets
3. Grain handling protocols for handling the transgenic wheat were established
4. Agreements about how to manage wheat with the Roundup Ready trait were established
5. The varieties of wheat developed met standards for end use quality
6. Buyers were identified who would buy and use the transgenic wheat (Bringing New Technologies to Wheat).

These standards mapped out several hurdles that needed to be cleared if the transgenic wheat were to be released, and required at least the appearance of full buy-in from all stakeholders. Parts of this process could be taken for granted; others posed considerable obstacles. The FDA in the U.S. had been very favorable to the release of transgenic seed, and so there was little worry about the first standard in the States. The rhetoric involved for this standard would consist of producing the appropriate documentation, but would not entail mediation. However, Japan and Canada were not as clear cut. The second standard posed an obstacle because the European Union and Japan were likely to block imports. U.S. officials argued that their resistance was an end run around free trade agreements set up by the World Trade Organization. The third standard created a requirement for new handling procedures. Production and handling practices that would protect against transgenic and non-transgenic wheat being mixed during handling and storage needed to be developed and agreed upon. The fourth standard intimates that agreements needed to be reached between all producers, including organic farmers, about how to protect against unintended gene transfer. The fifth standard, meeting end-use quality, would be achieved if Monsanto's genetics could be successfully transferred into local wheat varieties without creating a demonstrable decline in quality and safety. In the U.S., the burden of proof is on those who suspect that the product is not safe, because if "substantial equivalence," based on compositional comparisons of GM and non-GM crops, can be established, the product has traditionally been released without animal or human testing (Millstone, et. al. 1999). Although the issue of ownership and the removal of seeds from the public domain did not find expression in the standards, it was a grave concern because the gene transfer would effectively



transfer seed from the public domain to the private, patentable domain (DeVore 2004). The sixth would be achieved if large-scale producers in the baking industry could be persuaded to purchase and use transgenic wheat. This condition was most likely to be met if U.S. policies against labeling GM foods could be maintained without consumer protest.

### **1.3. The Failed Localization Effort**

Ultimately, this localization effort failed: Monsanto announced its decision to withdraw its transgenic wheat early in May, 2004. They did not give specific reasons for the withdrawal, but people involved with the case speculate about the reasons. For instance, Kenneth Grafton, Dean of the College of Agriculture at NDSU said, “We had agreed that four things had to happen: 1. markets had to be ready, 2. separate handling systems had to be in place, 3. regulatory approval in the U.S., Japan, and Canada was required, and 4. Canada and the U.S. had to agree to simultaneous release of the transgenic wheat. Also Monsanto may have withdrawn because of potential greater market profits in other crops. Total acreage of hard red wheat compared to other crops is small” (Grafton 2004). Brad Brummon, an NDSU extension agent who worked closely with stakeholders in the case, suggested that Monsanto withdrew for economic reasons, recognizing that they had invested a great deal of money on a project that was not being readily accepted. They were probably cutting their losses (2005). Janet Jacobson, an organic farmer who was active in negotiations about GM wheat, says that she thinks Monsanto underestimated opposition from conventional farmers, who didn’t think the technology was needed and who worried about markets and about yet another Roundup Ready crop making crop rotation difficult (2005). Underlying these comments is an unstated acknowledgment that Monsanto withdrew because these standards of release were not met. More specifically, Canada decided that it would not participate, a working group on best practices broke down, a large number of conventional farmers were not convinced that the benefits would outweigh the potential for lost European and Japanese markets, and the issue was beginning to become a public issue for consumers rather than a relatively obscure business negotiation.

## **2. A Closer Look at Failed Mediation**

A great deal of rhetoric in the form of deliberation, negotiation, and public education needed to take place if this technology were to be successfully mediated into the cultural and economic context. Most of the “rhetoricians” in this case were not professional communicators; rather, they were decision makers, consultants, and stakeholders. There were, however, some professional communicators involved, namely public relations professionals, agriculture extension communicators, and writers associated with local resistance groups. A research project allowing me to describe fully the rhetoric associated with this process, such as interactions with the FDA or with the baking industry, would be a much larger project than this one. Even describing the readily-available polemic “educational” rhetoric associated with this case is beyond the scope of this paper. For this paper, I have focused my research on the rhetoric of a working group set up through the cooperation of NDSU Extension and organic farmers to discuss issues surrounding the organic producers’ concerns about genetic drift if transgenic wheat were to be released for widespread planting. From the perspective of mediating technology, this working group would be instrumental in satisfying the third and fourth standards for release described above.

### **2.1. The Formation and Collapse of the Coexistence Working Group.**

The debate about transgenic wheat was centered in North Dakota because of its prime location and because of North Dakota State University’s attempt to achieve local consensus rather than to force the new technology on the state. They did not ignore petitions received from organic and conventional farmers, and they did not make executive-level decisions without discussion because they knew that there was a strong local constituency composed of organic farmers, represented by the Northern Plains Sustainable Agriculture Society (NPSAS) and a constituency of conventional producers of hard red wheat suspicious of the technology, represented by the Dakota Resource Council (DRC). North Dakota is the largest producer of hard red wheat in the country, and it has the second largest concentration of organic farmers in the country, California being first. Ag Statistics show California at 148,664 organic acres and ND at 144,890 acres (Hauck 2004). Most of the organic farms

in ND are small family farms, but in California there are large corporate organic farms, so the total number of people involved in ND may be higher than in California (Hulse 2005). In an attempt to be open, NDSU put their policies out on the web in places easy to find (e.g., <http://www.ag.ndsu.nodak.edu/policy/gmo.htm>). Furthermore, in an attempt to satisfy local constituents, and responding to NPSAS concerns about genetic contamination of organic seeds and crops, they established a coexistence group, consisting of 18 members drawn from various constituencies (Mattern 2002). Brad Brummon, extension agent in Walsh County, worked with Theresa Podoll of NPSAS to write and receive a Sustainable Agriculture Research and Education grant (SARE) from the USDA to fund the coexistence group. Originally, the group was composed of organic farmers and NDSU representatives, but after the first couple meetings, they decided that they needed to widen participation by inviting conventional farmers, GM farmers, and Monsanto to the table. Monsanto agreed to provide additional money to give release time to Brummon so that he could devote more time to the coexistence project. Noticeably missing from the mix was representation from the general public and from consumer groups.

A professor of sociology from NDSU, Gary Goreham, facilitated the group, which was supposed to work together for two years. Brummon says that he feared he would lose one of the groups before the working group completed its work. He was in an awkward position. Being employed by NDSU Extension, and being released based on a Monsanto grant, but having also been past president of NPSAS, he had to avoid potential conflicts of interest. The working group's original purpose, according to the grant, was to explore ways to protect against genetic contamination by identifying issues associated with the potential release, writing best management practice protocols, and voting on the protocols (Jacobsen 2004).

Those representing organic farmers—Janet Jacobson, Theresa Podoll, Annie Kirschenmann, and Richard Gross—along with one conventional farmer, Richard Schlosser, who was sympathetic to their position, pulled out in February 2004 during the voting stage, 18 months into the project (Members 2004). They wrote a letter withdrawing from the group, claiming that it had failed to address overall objectives of the project, and saying: “We will not allow our participation in any way to be used as an endorsement of the Best Management Practices produced

or any other materials developed as part of this endeavor” (Jacobson 2004). Janet Jacobson, President of NPSAS, who participated in the co-existence working group as an Identity Preserved grower (IP), said that the organic representatives were frustrated because they were not allowed to propose Best Management Practices (BMPs) that started with the words “Producers of GMOs shall . . .” That is, the working group would not permit BMPs to be written that singled out and placed responsibilities on GM producers (Jacobson 2005). According to Brummon, there was no policy against such wording, but any wording of that kind inevitably resulted in the defeat of the proposed BMP (Brummon 2005).

Although the working group’s membership had been expanded to include GM producers and Monsanto, the makeup did not appear to be loaded one way or the other, but it turns out that the NDSU representatives voted with the GM side on most occasions. Gary Goreham thinks that NDSU representatives voted this way because they “knew which side their bread was buttered on” and because they didn’t want to be told what kind of research they could do. “For one department head, it was a matter of academic freedom” (Goreham 2005). Because BMPs that were aimed primarily at GM producers never passed, they never made it into the final documentation, and there wasn’t opportunity to write a minority position on them. Furthermore, from the organic producers’ perspective, the BMPs have no teeth in them because they are only suggested best practices and because the wording isn’t specific enough to dictate responsible action (Jacobson 2005). The technology was not mediated to accommodate the concerns of all stakeholders: to the organic farming community, the coexistence group’s document was an attempt to create the appearance of accommodation when, in fact, no accommodation to their concerns was being made.

Recognizing that the votes were producing results contrary to their position, organic producers withdrew and concentrated their efforts instead on educating the public and testifying before the state legislature. After Karl Limvere, a longtime food activist and minister in the Congregational Church, published a statement titled “A Response to Issues and Values Related to Genetically Modified Organisms,” on behalf of the Rural Life Committee of the North Dakota Conference of Churches, organic farmers enlisted his help in a campaign to get a law passed that would give the State Agriculture Commissioner authority to form an

advisory committee, hold public hearings, and decide whether or not GM wheat could be released in the state (Limvere 2004). This effort, known as the “Go Slow with GMOs” initiative required 12,884 signatures to get the issue on the ballot, but it never made the ballot, partly because Monsanto announced within a month that they would not release GM wheat (Springer 2004).

## **2.2. Documentation of the Coexistence Working Group’s Efforts.**

The coexistence working group, with the organic producers no longer represented, published a document in November, 2004, titled, *Suggested Best Management Practices for the Coexistence of Organic, Biotech and Conventional Crop Production Systems*. Despite their request in the February, 2004, withdrawal letter, names of the organic representatives appear on the document, with a note explaining that the BMPs were compiled and voted on in December 2003. There is no indication in the document that the organic group had withdrawn prior to publication or that they did not want their names to be associated with it. Gary Goreham explains that they decided to publish the document anyway because the organic group withdrew after the votes had been taken. He believes that organic producers missed an opportunity because they didn’t take the opportunity to write minority opinions for several BMPs (Goreham 2005). It was published through the NDSU Extension Service, and it acknowledges support from the Cooperative State, Research, Education and Extension Service, the U.S. Department of Agriculture, Nebraska Experiments, and Monsanto.

The *Suggested Best Management Practices* document contains a brief history of the working group, explains the procedures the group followed, lists the participants and date of the vote, and then reports the Suggested Best Management Practices (BMPs) as determined by the group’s vote. There are thirteen BMPs and a conclusion. Each BMP has the same series of headings: Passed (e.g., Passed 9-8); Rationale, explaining why the issue is important; Majority Recommendation; Minority Opinion; Sources. Of the thirteen BMPs, the first is the only one that is broad enough to address Monsanto, saying researchers and developers of regulated genetic material must follow established state and federal regulations. Some BMPs are addressed to producers, but the language

does not distinguish among GM producers, conventional farmers, and organic farmers. For instance, BMP 5 begins, “Producers need . . .” and BMP 6, “All producers and truckers should . . .” NDSU is singled out in some of the BMPs. BMP 8 recommends that the North Dakota State Seed Department “not develop seed certification standards.” It turns out that it is no longer possible to certify organic seed lots are 100% free of GM seeds because genetic drift in such crops as soybeans, corn, and especially canola is creating increasing percentages of GM seed even in rigorously controlled organic seed lots. Setting certification standards would make it impossible to adjust standards as GM contamination increases. BMP 9 recommends that North Dakota State Seed Department publicize its “already-established process for providing input.” BMP 11 says that NDSU must strictly isolate transgenic crops during planting and handling. And BMP 13 states that NDSU Extension will develop an educational brochure and website to provide “unbiased” information about how biotech, nonbiotech, and organic crops are produced. BMP 10 tacitly addresses identity-preserved producers and organic farmers: “If there is a concern of unintended presence [of transgenic seed in certified organic seed], the purchaser should pre-plant test the seed.”

Only two of the BMPs have minority opinions, BMP 1 and BMP 8, both of which had a vote tally of 9-8. These two BMPs address the third and fourth standards for release directly. In both cases the minority opinion represents the position of organic farmers. BMP 1 has to do with determining liability of “researchers and developers” when “regulated materials” (GM seeds) mix with non-GM seeds, a grave concern for identity-preserved and organic farmers. The majority opinion defers responsibility, saying only, “Researchers and developers of regulated genetic material must follow the established federal and state regulations as minimum standards to maintain purity and identity.” Similarly, BMP 8, which explores standards of purity needed for certifying non-GM seed, is of concern to organic farmers. Once again the majority opinion defers responsibility, recommending, as we have seen, “that the North Dakota State Seed Department not develop seed certification standards for the presence of nontransgenic seed.” In the first case, the majority protects GM researchers and developers by suggesting that they need only follow regulations; in the second, the majority protects the same constituency by resisting the move to establish standards of

purity, arguing that the “market place determines thresholds and standards for seed and product quality characteristics.”

Conversely, the minority opinions in both cases attempt to establish higher standards. In response to BMP 1, the minority opinion argues, “protocols and regulations in place may not be adequate to provide containment,” and, “Conducting open-air research without the ability to verify the adequacy of their protocols is not sound science nor is it defensible in the face of liability.” In response to BMP 8, the minority argues that there is “little hope of avoiding or minimizing the occurrence of GM traits” in organic crops unless standards are set and enforced. They claim that transgenic wheat genetic drift would be comparable to what occurred with pedigreed canola seed in Canada, where, they say, canola is “cross-contaminated at a high level.”

The conclusion of this document tacitly acknowledges that consensus was not achieved, saying, “We must remember that coexistence is a journey, not a destination.” When I interviewed Janet Jacobson a couple months after the document was published, she had not yet seen it and was surprised to learn that her name, along with the names of the others who had withdrawn from the working group, appeared on it. She was also surprised to learn that Monsanto had helped fund the working group. Although none of the people I talked with said so, this failure left standards three and four for release unsatisfied and probably contributed to Monsanto’s decision to withdraw transgenic wheat.

### **3. Potential Roles for the Technical Communicator as Interpreter of Technology**

Retrospectively, I see ways that technical communicators with sociopolitical awareness could have entered into the mediation process as negotiators of technology. Traditionally, the practice of technical communication has been defined as the process of “bridging” between higher levels of technical knowledge and lower levels. Technical communicators, in other words, are translators of technical knowledge, and traditionally, the flow of knowledge has been unidirectional, from the expert producer to the novice user. In this role, the professional communicator who is employed by an agency that produces scientific and technical knowledge and products (as is the case with Monsanto and Roughrider Genetics) is something like a popularizer of science. Com-

municators in the extension services usually fill a role of this kind: they are charged with making knowledge accessible in an objective manner (Koch 2004). To be recognized within the organization as an effective communicator, the writer needs to identify with the organization she represents and “adopt the position of one who speaks on behalf of those she represents” (Sullivan, Martin, Anderson 2003). When the agency paying the salary is an agency that develops scientific and technological innovations, “making science accessible in an objective manner” has strong public-relations and marketing overtones. The unstated objective is to encourage adoption rather than mediation and accommodation (Fahnestock 1986; Dobrin 2004). Translating complex knowledge into simplified versions and publishing that information in accessible materials is one way to facilitate adoption.

Materials produced by NDSU Extension Service are good examples of documents that translate scientific knowledge into simpler, more accessible form, and, in so doing, perform public relations and marketing functions. The brochure titled *Bringing New Technologies to Wheat* spells out the standards for release of GM wheat, as we have already seen, but it also attempts to preempt possible objections by giving reassurance that GM wheat will not become an uncontrollable weed, that market strategies will be developed, that breeding programs will improve competitiveness by working with Monsanto, and that Roundup Ready wheat will bring value to wheat growers. Another brochure, *Agriculture Biotechnology: What are the Issues?*, provides answers to the following questions:

- What is biotechnology, and why is it being used in our food supply?
- What is genetic engineering?
- How long has genetic engineering been used in agriculture and food production?
- What are the goals and potential benefits of agricultural biotechnology?
- Are there potential risks associated with agricultural biotechnology?
- Which foods might contain ingredients made from genetically engineered plants?



- How can consumers be sure that biotech foods are safe to eat?
- What about dairy and meat products?
- Why aren't biotech foods labeled?
- What if I don't want to eat foods made with biotech ingredients?
- What other products are genetically engineered?
- What are the effects of agricultural biotechnology on the environment?

The answers impart real information and acknowledge certain concerns, but they are clearly written from a perspective that supports GM development. The answers, combined with images of wholesome food and smiling faces, have a calming effect, alleviating fears and concerns.

The technical communicator as translator of knowledge may work in routine production, as an in-service worker, or even as a “symbolic-analytic worker.” As Johndan Johnson-Eilola explains, Robert Reich described these as three areas of service work, and they represent a hierarchy of worker responsibility and status. I agree with Johnson-Eilola that a technical communicator who works at the level of a symbolic-analyst is doing challenging and important work, integrating “communication into a much broader range of technological contexts” than the typical technical writer (2004). The process of integration may indeed entail mediation of technology and mediation among stakeholders. However, the symbolic analyst could still think of herself as a translator, and if she does, she will attempt to preserve meaning when subject matter crosses boundaries (whether those boundaries are associated with language or conceptual complexity), and in so doing align herself with the producers or originators of innovation. As Slack, Miller, and Doak put it, the effort to translate knowledge is always an attempt to “ensure . . . the preferred meanings are the ones that get fixed” (2004). Even when the translator of knowledge attempts to fully understand the context of the reader and to incorporate the new information within reader's existing meaning structures, her goal is to fix meanings by offering an interpretation that recontextualizes and integrates preferred meanings.

### 3.1. The Technical Communicator as Mediator of Technology

If we broaden the technical communicator's role to include the task of mediating science and technology, we redefine the goal associated with her role and problematize the communicator's allegiance. I am imagining a role for technical communicators as mediators of technology, people who seek to mediate stakeholders' concerns and to modify the technology so that it embodies *integrated technical meanings and power relationships*. This is a role similar to the one envisioned by Slack, Miller and Doak when they suggest that technical communicators should think of their work as articulation instead of translation. Whereas a translator mediates only meaning, one who attempts to articulate meaning challenges existing articulations of power among sender, translator, and receiver.

Yet I am thinking of more than a writer reconstructing texts to reflect re-articulated power relations; instead, I am thinking of people actively involved in creating forums and facilitating meetings, as well as composing documents. In this role, the technical communicator creates the conditions for new contexts of understanding to emerge and invites those who hold opposing interpretations to enter into the process of creating that new context and meaning. As Robert Johnson suggests, instead of thinking of the audience as a targeted or invoked reader, we can strive to create an "involved" audience: "the *involved* audience brings the audience literally into the open, making the intended audience a visible, physical, collaborative presence" (2004). When technical communicators adopt this role, they are usually consultants, brought in from the outside to facilitate group work and to oversee the writing of documents. Julie Hile describes her experience in this role when she worked with several constituents from BNP railroad to rewrite the safety manual. Instead of interviewing people and then retreating to rewrite the manual in private, she and her co-workers gathered some eighty people from the company for an all-day writing session. These people included safety professionals, leaders from four different unions, veteran railroaders, and rookies (Hile 2001). By encouraging discussion and suggesting an alternative way of looking at the safety rules, a novel perspective that offered space to create common ground, Hile was able

to help constituents reach consensus and draft their own revised safety manual.

#### **4. Conclusion**

As Hile's experience demonstrates, technical communicators who facilitate negotiation and mediation do not align themselves with the originators of innovation, and they do not necessarily reinforce existing power and authority relations. Someone like Hile could have been helpful with the coexistence group discussed earlier. Although Gary Goreham, a professor of sociology who served as facilitator of the group, had extensive experience mediating small group discussions, he did not come as a completely non-aligned person. Having done extensive sociological research into the reasons people gave as to why they supported or didn't support GM development, he already had a pre-existing interpretive stance. Furthermore, as a tenured faculty member at NDSU, he might be suspected of aligning with NDSU, a school which cultivates partnerships with large seed companies. A professional technical communicator with expertise in articulating meaning and facilitating negotiations would be unaligned, unbiased, and unconcerned about future repercussions.

I am not claiming that there are no pitfalls associated with this scenario; the North Dakota wheat case teaches several lessons.

- The technical communicator/mediator must be non-aligned and must do extensive homework before negotiations begin, exploring both sides of the issue and learning about the participants. A lack of understanding the issues and stakeholders, especially in an issue as complex and controversial as the GM wheat issue, could severely weaken her ability to facilitate negotiations.
- The funding for hiring this person should come from a non-aligned source and not from stakeholders like Monsanto, NDSU, S.A.R.E. or NPSAS. Every funding agency involved in this case had a discernible stake in the outcome, and the use of funds from these organizations inevitably exerted influence.
- The working group needs to have representatives from all stakeholders. In the case of the coexistence working group, only developers (Monsanto and NDSU) and producers (various kinds of farm-

ers) were represented. No consumer or environmental groups were represented, and yet these groups would eventually weigh in on the subject, so they should have been brought in to the negotiations early on. Had such representatives been present, the BMPs that came from the group may have been entirely different.

- Participants need to be chosen based on their legitimacy as representatives for their constituencies and on the condition they to stick with the process to the end. Penalties associated with non-participation, or at least clear statements of what will happen if a participant fails to participate, need to be spelled out.
- The authority of the group and the rules for participation need to be clearly defined and enforced. Although the coexistence working group did establish rules for conducting business, the final publication disavows the authority of the group, claiming that the BMPs are not meant to be the basis for legislative action.
- If true mediation is sought, then rules need to insist that consensus be reached so that no published statements can come out without unanimous support. Although this requirement sounds severe, it forces the mediators to modify the technology rather than to ignore the concerns of minority stakeholders. Without this rule the most powerful are likely to have their way in the group and to run roughshod over the weaker.

Some readers will recognize in these recommendations an endorsement of Habermas's ideal speech situation (Roundy 1994), and so it is. What I have in mind is a forum in which "the actions of the agents involved are coordinated not through ego-centric calculation of success but through acts of reaching understanding" (Habermas 1984: 285-6). Although Habermas's ideal speech situation has been criticized for being utopian (Benhabib 1985), it offers a forum for negotiation in which technology itself is modified to serve human needs and to protect the interests of all parties and not just of those who control the capital.

We take it for granted that technological innovation is a good thing and that it will be adopted locally if we make it easy to understand and use. However, as the case with GM wheat in North Dakota shows, not all scientific and technical innovation is widely accepted as beneficial. In such cases, the task of the technical communicator needs to be more than that of an advocate for adoption who translates complex knowl-

edge into simple language. If technical communication is going to set itself apart from public relations and marketing, its practitioners need to seek ways of becoming mediators of technology, facilitating understanding, and creating opportunities for new interpretations and common ground to emerge.

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