TECHNOLOGY DIFFUSION AND THE BEEF

INDUSTRY: A COMMUNICATION

INVESTIGATION

By

MICHAEL DAVID WRIGHT

Bachelor of Science
Oklahoma State University
Stillwater, Oklahoma
1992

Master of Science
Oklahoma State University
Stillwater, Oklahoma
1995

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
July, 2007

TECHNOLOGY DIFFUSION AND THE BEEF

INDUSTRY: A COMMUNICATION

INVESTIGATION

Dissertation Approved:

Dr. Thomas L. Warren
_____
Dissertation Adviser

Dr. Carol Moder
_____

Dr. Richard Batteiger
_____

Dr. Paul Smeyak
_____

Dr. A. Gordon Emslie
_____
Dean of the Graduate College

Preface

This dissertation is an investigation of recent technology diffusion within the beef industry. Specifically, my goal was to examine recent debate surrounding the proposed National Animal Identification System and its accompanying technology from the perspective of livestock market owners and their customers.

What follows was designed as an ethnographic investigation into the technological needs and concerns facing livestock market owners and their customers. My investigation was supported by theories of technology diffusion, communication networks, communication theory, and linguistic theory.

I wish to thank Dr. Thomas L. Warren for his unending patience during this process and for his years of support during completion of this degree. I also wish to thank Dr. Carol Moder for her assistance in helping me to develop the linguistic concepts contained herein and for her mentorship. Finally, I wish to thank my entire committee for being willing to involve themselves in my future.

Michael David Wright
May, 2007

Table of Contents

Chapter	Page

List of Tables

Table   **Page**

List of Figures

Chapter 1

Introduction

The beef industry is one of tradition. It is an industry that does not change rapidly and does not readily adapt to change without good reason. Moreover, sometimes this industry has been unwilling to adapt to new technologies even when there would seem to be very good reason for it. Some sections of agriculture, namely the beef cattle industry, have been slower to adopt new ideas and technology. There are many technologies that the beef industry could use but hasn't (Wieland, 2001). Why is this? Wieland credits lack of serious desire to improve as the primary reason. But there are many factors that go into the lack of technological diffusion seen in the beef industry.

As of January, 2007, there have been almost no inquiries into why this technological stall has occurred. Yet, there have been substantial advances in other facets of the beef industry during recent years. For example, veterinary medicine has made remarkable advances in the treatment and prevention of many diseases and common animal sicknesses. Nasal sprays, injections, and other treatments enjoy widespread use to prevent animal deaths during transport and growth. Likewise, new techniques that include product branding, pre-packaging, and efforts to make beef products healthier have radically changed supply chain management and distribution. Yet, in one technological aspect, this industry has stood almost still. I speak of computer and software technology in general, and the slow pace at which the beef industry as a whole has adopted new methods of doing electronic business, even in the face of staggering consequences. While the beef industry seems perfectly willing to accept some types of

innovations, computer technology and animal identification have been shunned. I wanted to know why.

Their resistance to technology would be more understandable if the matters at hand were those of office automation and general communication. But beginning in December, 2003, when the first case of mad cow disease (*bovine spongiform encephalitis*) was discovered in the United States, things changed. In fact, they changed so much that United States beef exports fell from more than $3 billion in 2003 to barely $500 million in 2004 (Stecklow, 2006). The scare over the outbreak of mad cow disease led numerous countries to close their borders to US beef and it hurt domestic sales as well. In addition to natural disease concerns, recent events have led many to fear the prospect of Agriterrorism, which might produce an introduced disease.

These concerns led to the United States Department of Agriculture (USDA) initiative to implement a national animal tracking system that would allow animals to be tracked and traced to their point of origin in case of a disease outbreak. On paper, the idea is fairly simple. Animals would be tagged with an electronic radio frequency tag that contains a unique 15-digit identifier. This tag would then be scanned into computer software that stores the number, along with other statistics, in a database. Then, as the animal moves through the supply chain, the database administrators could track the animal on the basis of that number by continually updating the animal's location. This strategy should, in turn, allow for swift containment of any disease or of potential harm to consumers and boost both domestic and international confidence in US beef.

I have traveled large parts of the country talking with members of the beef supply chain. Their comments show that animals are difficult to track. Normally, beef cattle

move in a fairly predictable pattern through the supply chain. They are born on a private ranch, sold at a livestock auction, moved to either a feedlot or stocker pasture, and eventually delivered to a packing plant for processing before delivery to retailers. However, there are numerous paths that can be taken through this supply chain, and levels are sometimes skipped in the progression. Figure 1 shows the beef supply chain.

| Production (ranch) | | Livestock Markets | | Stocker or Feedlot | | Packer | | Retailer |
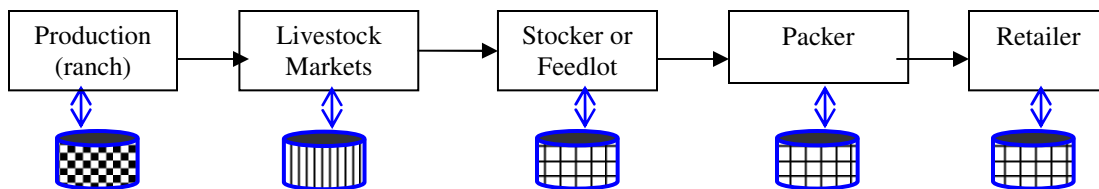
Figure 1: Basic beef supply chain with separate data holds.

Typically, an animal moves from its place of birth to a livestock market, where it is sold to either an order buyer or directly to a packing company. If the animal is purchased by an order buyer, it typically moves to either a stocker operation, where it will feed on grass, or to a feed lot, where it will be fed grain. In either case, the animal eventually moves on to a packer and then to a retailer like Wal-Mart or McDonald's.

My travel began when I became an employee of a company specializing in software that would allow companies to integrate individual animal data with livestock sale data while assigning unique identification umbers to those animals. Animals and financial data could then be moved and tracked together. However, as I met more and more livestock auction owners, I began to realize that their resistance to technology was

grounded not only in a resistance to the notion of animal identification, but in a fear of and resistance to computer technology itself.

I began to wonder why. And as I looked more deeply into the issue, I realized that there were cultural and economic barriers to the diffusion of technology within the beef industry, as well as an overall resistance to the proponents of the technology itself, such as the USDA and external business interests. Interestingly, although the resistance to technology among members of this community was almost uniform, their reasons for resisting technology were not. There are several prevalent themes.

One of those themes is that those who would need to accept new computer technology needed for disease tracking systems and computerized business are unwilling to do so. For example, Dr. Bob Kropp, Professor of Animal Science at Oklahoma State University, believes that computers and software technology are too foreign to most members of the beef community to be readily adapted. He adds that the current generation of beef cattle leaders did not use computers in college, if they even went to college, and they do not want to adapt now. In addition, according to Kropp, they are of an older generation that is not interested in learning new computer technology. Their culture will not change even in the face of a disease disaster like mad cow disease (Kropp, 2006).

Dr. Chris Richards, also of Oklahoma State University, agrees with much of this assessment, but adds that foot-and-mouth disease is an even bigger worry than mad cow disease, and it is one disease that could spread into a regional disaster without tracking measures (Richards, 2006). Although this assessment is probably true, at least from a national perspective, both diseases require significant increases in technology to allow for

4

their tracking in the event of an outbreak. Richards adds that computers are still a new technology in the beef industry, and that when you add terminology associated with both animal identification and computers, you have moved completely beyond the knowledge base of thousands of beef industry professionals. He sees it as a cultural issue. Richards sees talk about databases that are "secure but searchable," for example, as so foreign to the cattle industry that acceptance is almost impossible. Still another practicing expert in the field of beef cattle management and animal identification, Dennis Davis, speaks of livestock markets in particular when he says that livestock markets are taking the slow train to reality. He says, "What is reality? Reality is that if livestock markets are going to compete with other entities within the US beef industry that have obtained Quality System Assessment (QSA) certifications and established relationships with producers who have acquired Process Verified Program (PVP) certifications (both essential to tracking and age verification of animals), then their technology infrastructure is going to have to change" (Davis 2006). Davis believes that the livestock markets are hurting themselves by resisting change rather than getting involved in promoting inevitable market changes and technologies.

Computerization is essential if the beef industry is to move forward in the areas of animal identification and electronic commerce because of the sheer numbers of cattle processed in the United States each year. There are approximately 90-110 million beef cattle in the United States at any given time (Lawrence and Otto, 2005). Of these, packing companies slaughter between 35 and 40 million annually. To deal with high numbers of animal turnover in combination with animal identification, the USDA began development of the National Animal Identification System (NAIS). The proposed system

would integrate three components—premises identification, animal identification, and animal tracking.

Premises identification is done only once per site when a premises identification number is assigned to a homestead or ranch where animals are raised. It is a relatively uncomplicated process. However, animal identification and animal tracking would require significant upgrades in computer technology within the beef industry. In order for an animal to be tracked, it must be assigned a unique identification number. The USDA has proposed, and is currently endorsing, a system that requires a 15-digit unique identifier. This number would be assigned to the animal on the premises where it was born, then recorded, and tracked within a centralized database as the animal moves through the supply chain. The animal could then be traced to its origin in the event of a disease outbreak.

Tracking and tracing the national herd, then, would require approximately 100 million unique fifteen digit numbers, each assigned to an animal in the national herd. Then, 35-40 million new animals would need to be assigned these numbers on an annual basis at birth. In addition, another 35-40 million unique identification numbers would need to be tracked as they moved through the supply chain from producer to livestock auction to feeder to stocker and ultimately to the packer where they are slaughtered and processed. This task cannot be accomplished without the aid of computer technology.

There is certainly no lack of opportunity for the beef industry to adopt this technology. *Drovers* magazine currently lists 56 companies in their directory of service providers for animal identification products (Drovers, 2006). Most of these companies offer software and/or database services to support the NAIS program. As Bob Scheiler of

the *Wall Street Journal* reports, "The effort has sparked something of a stampede among makers of radio identification tags, retinal scanners, and other electronic gizmos with the potential to keep tabs on millions of animals from birth to slaughterhouse"(Scheiler, 2005, pg.1).

In addition, many of the top US retailers like McDonald's, Wal-Mart, and Tyson are actively encouraging the beef industry to adopt technology and a system that allows for animal traceability. Robert Cannell, McDonald's United States Supply Chain Director, has publicly stated his desire for animal identification on numerous occasions. In a recent issue of *Farm Week* he said that while McDonald's is sensitive to the fact that some beef producers need both time and money to implement NAIS, McDonald's is not waiting for the USDA to act. According to Cannell, McDonald's is actively seeking contracts with beef suppliers who can track all animals (McClelland, 2005, pg. 1). Because McDonald's traditionally buys over 1 billion pounds of domestic beef annually, their desire for traceable beef would seem a strong incentive for members of the beef supply chain to act in developing the technology needed to satisfy this request.

Although then-Secretary of Agriculture Ann M.Veneman asked the USDA's chief information officer to make creating a national animal ID system his top priority in 2003, we still have no system in place, despite spending nearly $100 million since that time to make NAIS a reality (Stecklow, 2006). In fact, as recently as 2005 the USDA's plan included mandatory participation (Clapp, 2006, pg. 12). Now, the date for the system's debut has been delayed until 2009 and does not include mandatory participation. The majority of the beef industry still opposes most facets of the current plan, and those who

favor a national plan differ sharply on how that plan should be designed and administered. Many within the industry believe that the system will never mature at all.

Still, the USDA pushes forward with its technical requirements. As recently as March 2006, the USDA released performance standards for animal identification tags that include lifespan, reading distance, and failure rate specifications (Clapp, New Approach, 2006, pg 12). At roughly the same time, the USDA announced plans to allow numerous private databases to comprise a national system of identification and traceability. And in August 2006, the USDA approved a Minnesota company as the first manufacturer of "approved" NAIS RFID (Radio Frequency Identification) tags.

However, private industry groups including many producers and politicians, like Rep. Ron Paul of Texas, are organizing to block the system entirely except in the case of international sales. They see NAIS as unnecessary government interference and an infringement upon personal liberties. Articles continually appear by authors like Jodie Gilmore who states that, "The USDA has targeted farms and livestock facilities and their livestock for intrusive, unnecessary, and eventually mandatory identification and tracking regulations" (pg. 27). There has been a massive miscommunication in addressing the needs of the industry from top to bottom according to Representative Paul and those who share his opinions. Or, if Representative Paul is incorrect, then at least the needs of the industry have been misunderstood by a significant portion of the supply chain, either at the end or the beginning. Why is this?

Many communication theorists are interested in what creates these rifts in communication. While we can undoubtedly place part of the blame for the lack of technological development within the beef industry upon cultural resistance to

technology and economic issues, we must blame at least some of the misunderstanding upon miscommunication and communication networks that promote misunderstanding. The beef industry is a very personal business, and communication circles are tight. There are defined networks of individuals who share information and opinions to reach a consensus. This process is not unlike what Rogers and Kincaid (1981) describe when they write that, "It seems that almost everyone depends heavily on interpersonal communication channels to obtain the information that he/she needs to make important decisions" (pg. 344). In other words, we turn to those we trust and know for information about difficult decisions.

While the basic message coming from the end of the supply chain and the USDA seems clear (that animal tracking must be implemented), the specifics of that message necessary to bring about compliance are not reaching the beginning of the supply chain. If they were, we can assume that there would be much more understanding of the logistics of the system and of the computer and technology upgrades required by the proposed NAIS than exist today. Those opposed to the NAIS might not accept it still, but they would know much more about what they are rejecting. Although there have been many articles written in recent years about the debate between those for and against the NAIS system, and even more opinion pieces written, there have been almost no attempts to analyze the lack of understanding that still exists between the two camps.

As my own personal interviews with members of the beef community have revealed, the plan itself is still largely misunderstood. The very persons that the USDA and large retailers like McDonald's will need to solidify support for the NAIS plan do not understand the technology that the plan requires. They do not know what it does, how it

works, what it would require of them, or where it will lead them. When we add their underlying cultural distrust of computer technology, we have what amounts to a near complete failure of communication between these two groups.

Thus, my research goal was to analyze the failure of presumably persuasive communications to alter the opinions of opponents to technology and the NAIS. To complete my analysis, I used information collected from personal interviews with active professionals within the beef industry. Livestock market owners were the primary focus of these interviews, because livestock sales are typically the point at which animals become "lost" (untraceable); and these markets are the location at which much of the new required technology would need to be placed. However, I also spoke with other members of the supply chain, including stockers, feeders, and packers in order to get a complete picture of the supply chain's resistance to technology.

To do this, I analyzed the information collected from those interviews on the basis of Rogers and Kincaid's definition of communication networks (1981) and Rogers' model of technology diffusion (1995). I also used methods described by Fetterman (1989) and Van Maanen (1988) to establish an ethnographic perspective of these interviews that should reveal some of the historical, demographic, and socioeconomic factors that may be affecting this debate.

Second, I analyzed documents from major beef retailers and government agencies, including the USDA. I focused on their efforts to promote technology and animal identification within the beef industry and communication failure along the supply chain. To analyze these documents, I conducted a discourse analysis of their content using Petty and Cacioppo's Elaboration Likelihood Model (1986). I used ELM to

10

discover current communication strategies, which strategies have or have not been effective, and what strategies are missing.

Next, I analyzed these documents using the linguistic concepts of implicature and pragmatics as defined by Grice, Zwaan, Blakemore, Schiffrin, and others. This analysis helped identify the gaps in the language of this debate, which led to a better understanding of some of the miscommunications that have occurred.

The beef industry is not adopting new technology or business models that would allow animal tracking to become a reality. There are strong opinions on the subject, but the proponents of technology and NAIS have been unable to create enough to momentum to sway the opinions of their detractors. There are longstanding traditions and attitudes within the beef community that explain some of the resistance, but there have been many communicative efforts to overcome those obstacles. Those efforts have not been successful. It is my hope to create a model that will incorporate communication theory and theories of technology diffusion and communication networks that will help to explain this persuasive communication failure.

In the remainder of this dissertation, I will share the results of those analyses, and hope to be able to shed new light on beef industry communications that will help to facilitate future technological diffusion within the beef industry and other industries that are having trouble with diffusing computer technologies into their businesses and lives. The remaining chapter of this dissertation will focus upon my methodology, the current state of the beef industry, results, and my discussion of my findings. First, however, a more complete description of my theoretical background is in order.

Chapter 2

Theoretical Background

Any examination of communications should be grounded in theoretical perspective. My theoretical approach in this investigation employed communication theories, linguistic principles, ethnographic principles, and theories of technological diffusion. In this chapter I explain these theoretical principles. My intention is to give the reader a background from which to view the chapters that follow, in which I discuss my methodology and results. I intentionally adhere almost exclusively to the original sources of these methodological ideologies, because I use them as tools of analysis. I deviate from this methodology only when referencing well-accepted summaries of communication theories or in referring to linguistic principles that are derived from numerous sources.

Individual Theories

First, I discuss Rogers and Kincaid's definition of communication networks and Rogers' model of technological diffusion. The two individual works go hand in hand in many ways, because I use them to analyze the flow of information concerning NAIS and technology. Although that information often originates with proponents of the technology or would-be designers of the NAIS system, technology diffusion and communication networks are critical to my analysis of how that information is received.

Second, I discuss methods described by Fetterman and Van Maanen to establish an ethnographic perspective of my interaction with members of the beef community.

Ethnographic methods are critical to the success of this analysis because of their ability to reveal some of the historical, demographic, and socioeconomic factors that are affecting the debate over technology and NAIS within the beef community.

Third, I discuss the communication theory and linguistic principles used to analyze documents from major beef retailers and government agencies, including the USDA. These theoretical perspectives are critical to my ability to conduct a discourse analysis of their content. I will outline Petty and Cacioppo's Elaboration Likelihood Theory, and the linguistic concepts of implicature and pragmatics as defined by Grice, Zwaan, Singer, and Schiffrin aid in this process.

The remainder of this chapter will focus on outlining these different communicative theories as I use them in my investigation. I hope to provide an overview of their individual perspectives and to outline my use of them in creating an analysis of technology diffusion and communication within the beef industry. Currently, there is no literature concerning theories of communication as they relate to communication within the beef supply chain. This state of affairs is unfortunate, because technical communication is built upon fundamentals of reader-centered design and usability. Therefore, it would be wise to employ principles of communication theory and communicative principles of technology diffusion in any analysis of communication within the beef supply chain.

Technology Diffusion

Everett Rogers developed one such theory (Rogers 1995) when he wrote his landmark book concerning diffusion of innovations. He continued his work with

Kincaid in their book about communication networks. Together, these two texts formed a major portion of my research. When considering innovations like those facing the beef industry, there is always more to the story than simply relating ideas and advantages to potential adopters of that technology. There are social and individual factors that affect not only communication about these innovations, but their portrayal to potential adopters of that technology.

Rogers illustrated those factors in his description of the efforts given to convincing Korean villagers that boiling water before using it was a good idea. Although the advantages of doing so appear obvious to most Westerners, the effort was largely unsuccessful because of societal predispositions. The ethos of the change agent (the person trying to persuade another to adopt new technology), the characteristics of the social group affected, and preconceived notions of the change all affect the outcome of the technology's success. In essence, Rogers sees diffusion as a social change (5), and one that should not be confused with the advantages of the technology itself. Innovation is creation of new technology. However, diffusion of that technology into society and industry is much more complex and requires social communication.

Technology, in Rogers' description, is a means of reducing uncertainty about cause and effect (13). The potential benefits of the innovation motivate us to learn about the innovation, while the possible consequences of adoption limit our acceptance. The balance of these two considerations determines our willingness to accept new technology. In this sense, innovation is essentially a process of information seeking and experimentation (14). The innovation in question may be boiling water, as in the case of the Korean village, or may be much more technical, such as the development of new

software for animal tracking. Whatever the case, the innovation itself usually consists of both hardware and software, although when Rogers refers to "software" he means an idea or method. This "software" may be a political or religious idea as easily as computer software. But, nevertheless, the innovation is usually a mixture of both hardware and software in that there are usually both physical and mental components to innovations. When confronted with innovations, we typically begin by asking ourselves a series of basic questions designed to help us accept or reject technology (14):

1. What is it?
2. How does it work (and change the way I work)?
3. Why does it work?
4. What are the possible consequences of its use?
5. What are the possible advantages of its use?

To answer these questions, potential adopters go through the process of diffusion, which Rogers sees in four stages.

Innovation

The first stage is the innovation's development. Any innovation, by design, will have certain characteristics relative to current technology that will affect its acceptance. These include (16),

1. Relative advantage—to what degree is it better than what we have now?
2. Compatibility—is it consistent with the values, experiences, and needs of our current situation? How much do I have to change?
3. Complexity—how difficult is it to understand and to use the innovation?

4. Trialability—to what extent can it be tried and evaluated?

5. Observability—can we know what the current results of its use are? And are we able to observe trials?

However, knowledge of the innovation alone does not necessarily translate into acceptance. As we will see, in order to form an opinion about an innovation, the would-be adopter of that innovation usually requires more information, which brings us to how knowledge of the innovation's characteristics is transmitted. In other words, after the innovation develops, we must have a means for describing it to others if we are to seek its acceptance.

Communication Channels

Hence, the second element of diffusion is communication channels. Communication channels, in their most basic sense, are a means by which messages about the innovation get from one person to another. But the messages themselves are not the pure information we would often like them to be, because most people within social networks rely upon the subjective evaluations of others to form opinions about innovations (18). Although mass-media channels are often the most effective method for "getting the word out" about a particular innovation, our decisions to adopt or reject new ideas and technologies are often based more upon the opinions of our peers within social networks than upon scientific or objective evaluation from impartial sources. Thus, diffusion is a social process (19) that is affected by the social status, education, and influence within our social system enjoyed by the change agents that bring the innovation to our attention.

Time

But precisely *when* that innovation is brought to our attention is still independent of the innovation itself and to some degree from its communication channels. For example, Rogers shows that scurvy, which was responsible for the deaths of many sailors, was curable through the work of Lancaster by the early 17th century. However, Lancaster's lack of ethos within his own navy prevented him from convincing others of his innovation's importance. Thus, it was nearly 150 years later before his innovation (which was providing fruit juice to sailors) diffused throughout the British navy (9).

Therefore, time, as the third element of diffusion, is important in Rogers' model of diffusion because of its ability to show how quickly or slowly an innovation is adopted, because of its ability to shed light upon those considering the innovation, and because of what he calls the innovation-decision process. In other words, what is the interval from the time knowledge of the innovation becomes available to the time it is either accepted or rejected by members of the communication network (20)? Time, in terms of the innovation-decision process, can be measured through the completion of five steps (162):

1. Knowledge—awareness of an innovation and some knowledge of how it functions.
2. Persuasion—when an opinion is formed toward the innovation.
3. Decision—when an individual or entity actively moves to accept or reject the innovation.

4. Implementation--when the innovation is put to use (if it is put to use).

5. Confirmation—when a decision is reinforced or reversed because of experience or new information.

For our purposes, persuasion is the critical factor in the innovation-decision process. The need for persuasion as it applies to social networks, as it does in most cases according to Rogers, arises when (164) "one's desires outweigh one's actualities." It is at this stage that individuals become more involved in seeking information about the innovation that will help them form a positive or negative impression of that innovation. To form their opinion, most individuals seek the opinions of others whom they respect or trust or both, which is why the fourth element in Rogers' diffusion process is the social network of the would-be adopters.

Social Networks

Because of our reliance on others for information, the persuasion stage of innovation is a very subjective process, often relying more upon the opinions of others than upon the "facts" as they might be argued by others. Thinking at this point becomes affective and social reinforcement becomes critical as we seek to reduce our level of uncertainty. This strategy can cause selective message reception on the basis of previous knowledge, uncertainty, and our own perceived ability to control the future (168). Thus, the process of innovation-decision can affect our decisions about innovations and can be affected by personal and societal values.

The innovation decision, however, is also affected by the type of process that takes place. Although personal and communicative factors are the overriding

determinants of persuasion and diffusion in Rogers' model, there are some external factors that can affect the diffusion process regardless of personal variables. At the very least, these different innovation-decision types can limit or enhance individual and societal variables (207). Some diffusions are purely optional. They are individually decided upon and affect only the individual decider. Others are collective decisions, carried out by industries as collectives or by organizations. Some decisions are mandated, either by government entities or other decision-makers who have authority to decide upon implementation. The effects of these decision types depend in large part upon the nature of the individuals involved and the types of industries or organization they represent.

However, according to Rogers, we can also make certain general assumptions about early adopters of innovations versus late adopters. In general, early adopters (166),

1. Have more formal education

2. Have higher socioeconomic status

3. Are more exposed to mass media

4. Are more exposed to interpersonal channels of communication

5. Have more contact with change agents

6. Are more socially active

7. Are more cosmopolite than late adopters

Because the early adopters of an innovation are likely to have the characteristics listed above, they are more likely to be the change agents within a social structure. The social system is the fourth element of diffusion identified by Rogers. And although these early adopters are often change agents for new technology, they are also often seen as suspect within the social system because of their deviation from "normal" values shared by the

group (26). That deviation can make it difficult for them to be persuasive in social settings. One paradox of the early adopters defined by Rogers is that they often need the innovation the least, being generally at the higher end of the socioeconomic scale (275). Still, whether they need them or not, change agents usually deliver information about innovations to the rest of the social community, and are often heavily involved in an innovation's acceptance or rejection. As I will show, this is especially true within the beef industry, where communication networks are often more informal than formal.

Communication Networks and Diffusion

Although formal structures do exist for communication flow in most organizations or industries, there is also an informal element to these communication structures that often defines much of the communication that takes place (24). Certain networks form within organizations and industries that control the flow of information apart from formal structure. Eventually, certain patterns form. In a sense, they resemble the path water takes in a stream as the flow becomes normalized over time. A channel forms, and almost all water follows that path to its ultimate source. The same can be said of information. As individuals become comfortable with others as sources of information, they tend to follow the same path when they seek more information.

Different structures of information flow from different areas, much as different streams develop. They are influenced by their surroundings. Diffusion structures are also influenced by their surroundings because of social variables and the personality variables of the potential adopters such as ability to cope with uncertainty, attitude toward science and technology, skepticism, and aspirations. Diffusion is also influenced by the communication behaviors of potential adopters, such as social participation,

interconnectedness within social networks, exposure to change agents, and exposure to an overall network of communication. Eventually, communication networks develop that are a mix of formal and informal communication channels.

These communication networks are precisely what Rogers and Kincaid addressed (1981). Their work on communication networks is an attempt to explain communication in real-world contexts. In a break from traditional models of communication, they sought to examine communication apart from traditional linear models of communication. Instead, they studied communication on the basis of networks of participants. In their view, communication in social networks often involves two or more persons sharing information simultaneously in order to reach mutual understanding. They call this process *convergence* (31). This model places emphasis on the relationships between those exchanging information rather than on individuals themselves as units of analysis.

In this model, as opposed to linear models of communication, information is not a commodity to be transferred from one individual to another as one would hand them a glass of water, but an interpersonal act complicated by special relationships, psychological bias, and mutual causation (38). Communication, then, is not a linear act in their view. It is not a transfer between two isolated entities. It is a process that is affected by the individuals involved, their experiences, their predispositions, and their personal histories.

As Rogers and Kincaid see it, there have been two main obstacles to relationship-driven models of communication. One has been a lack of explanations capable of representing the interrelationships of members of a communication system. The other has

been a lack of suitable research methods for studying these relationships (47). As Rogers and Kincaid see communication,

> […] information is a consequence of action, and through various stages of human information processing, action may become the consequence of information" (55). Thus, when information is shared between individuals and groups of individuals, not just linearly transferred from one to another, a mutual understanding can be reached that results in collective, rather than individual action. This mutual understanding becomes the basis for communication rather than simple information transfer, and is dramatically affected by the "inherent uncertainty of information processing (57).

Thus, Rogers and Kincaid view communication as a quest for mutual understanding, and provide a paradigm for communication research separate from traditional linear models.

Because of its reliance on interpersonal relationships as opposed to information transfer, the convergence model of communication is much more closely aligned with cybernetic theory than with linear models of communication. However, cybernetics tends to focus on machine-like circuit loops that are "triggered" to provide feedback at certain times. In fact, many modern mechanical and technological devices work on this premise. Consider, for example, a fire alarm. Many fire alarms in present-day buildings react automatically to high temperature readings. The trigger level causes a series of communicative actions to take place. The fire department is notified, sprinklers turn on, and so forth. Meanwhile, the loop of information continues.

However, the convergence model does not rely upon triggers of response (although there are obviously certain triggers that call for a response within human communication) but upon feedback that diminishes mistakes over time, decreases

uncertainty, and promotes mutual understanding (62). Unlike humans, the fire alarm

system will never learn that the increase in temperature may not indicate a fire. It is only

designed to respond to a stimulus.

Humans, on the other hand, adapt to these stimuli by collecting and interpreting

information to create mutual understanding. Most of our time, in fact, is spent searching

for collective purposes and communicating about our search. Once our purpose has been

established, true convergence can take place. As Rogers and Kincaid put it,

> The process of convergence implies that a goal already exists at the time of a communication
>
> event. Which is the primary purpose that already exists when information is exchanged? The
>
> primary purpose of this human communication is to define and to understand reality so that other
>
> human purposes can be achieved. The primary purpose of communication as mutual
>
> understanding is crucial: the success of all other human endeavors depends upon it (63).

Mutual understanding of reality within communication networks is at the heart of the

convergence model. As interconnected individuals share information over time, a shared

reality begins to form. Not because they share the same physical reality, but because they

share the same information about physical reality. Indeed, perfect mutual understanding

is never achieved, but it is usually unnecessary for the purposes of mutual decision

making (63).

In essence, the convergence model of communication is a dynamic process that

takes place over time. Causation within the convergence model is not one way flow of

information, but is a mutual understanding that forms as information is shared among the

members of the communication network. Convergence is not assured by this model. In

fact, divergence is possible as well. Because mutual understanding does not guarantee agreement, individuals within a communication network may simply agree to disagree in the end. However, as information flows become patterned over time, a network of communication that is relatively stable emerges. Individuals that comprise the network become conduits for information flow, and over time this information flow develops patterns. Certain individuals within the network routinely communicate with other individuals within the network, and patterned flows of information are created (75). The most important step in determining how a communication network affects behaviors on the basis of information is determining which individuals are affecting other individuals within the system.

As routine patterns of information flow become stable, new information tends to follow the same path over time. So it is that, when innovation A is announced, person X learns of it from person G who learned of it from person Q and so on. It is this type of information flow, combined with the personal characteristics of those individuals and the social values of the communication network as a whole that determine how innovation A is received more than the attributes of innovation A itself. As information flows through this pattern of communication, it is shaped first by individual Q for individual G, who then shapes the information for individual X on the basis of the degree of convergence or divergence achieved by the communication between individuals Q and G. So, by the time information in a large communication network reaches the end of this information "food chain" it may no longer resemble what was transmitted by the original sender of the information.

On the basis of this model, Rogers and Kincaid's analysis of communication networks is not based solely upon the information being shared and by whom, but upon, "tracing specific message flows in a system and then comparing this communication structure to the social structure of the system in order to determine how such structure is interrelated with the communication network" (76). In their method of analysis, then, no distinction is made between the sender and receiver of a message, because they are mutually communicating. Rather, the unit of analysis is the relationship between the two (or more) parties involved on the basis of their social relationship and their positions within the flow of communication within the network. The result, or dependent variable of communication, then, becomes the behavior resulting from communication within the network, not the communication itself. In addition, the consequences of this communication can be correlated to that communication on the basis of consensus within the network.

These qualities of communication networks are why Rogers and Kincaid see former literature about communication networks as largely unusable. In general, according to them, they are abstract and over-mathematized. Instead, they propose a model of analysis that is based upon three factors:

1. Units of analysis   (individuals and their relationships)
2. Variables   (education, existing attitudes, previous behaviors)
3. Time

The aspect of time is critical because of its effect on the process of communication networks. Otherwise, as they put it, behavior can only be treated "cross-sectionally" (80). Instead, Rogers and Kincaid offer a method that is based upon wholeness of the communication system. Individuals within the system are differentiated on the basis of their membership in certain cliques or subgroups, their role as liaisons, bridges or isolates, or their connectedness within the communication network. They are not treated as individuals solely, however, but as conduits within the system. They are simultaneous receivers and transmitters of information, interconnected with other members of the system.

Within the network, not only do individuals affect information that is received by others, but groups of individuals or pairs of individuals etc. combine to collectively converge with or diverge from the originator of the information. Likewise, groups or cliques of individuals far removed from the originator of the information may converge with or diverge from other cliques and groups. This pattern holds especially true if they already hold different values, backgrounds, educational histories, and goals. So, although a message may be sent by an individual to another individual originally, the interpretation of that information as it travels through established paths of communication will be based upon qualities of individual network units.

Although there are several methods of observing these units, Rogers and Kincaid recommend a combination of link analysis (who is connected to whom), observation, and unobtrusive ethnographic methods (141). Networks consisting of individuals who are more heterogeneous and more interconnected offer the most opportunity for change in general, but factors such as proximity and other social value sets also greatly affect

communication and its effect upon individuals and groups. In fact, social variables often impact the outcome of communication more than proximity (309).

In the end, the convergence model of communication networks is important to studying communication because it interfaces so completely with technological diffusion and offers a method for analyzing diffusion within socially constructed communication networks. Because most individuals go to interpersonal connections for information about technological innovations, the question becomes not *how* they get that information, but from *whom* they get that information. Socially constructed communication networks play a vitally important role in shaping attitude and behavior through communication. As we will see in later chapters, this social networking is especially important within the beef industry, and has been an important factor in shaping technology diffusion within the industry.

Although the communication networks described by Rogers and Kincaid undoubtedly affect communication and the diffusion of information of technology, there the content of the message itself does influence its acceptance. After all, information deemed irrelevant to the communication network as a whole will likely be ignored. Similarly, irrelevant technology will be ignored, making principles of diffusion and network communication a negligible factor. However, information that *is* relevant to the members of a communication network will be advanced rapidly because of its relevance to the well being of the network's individual constituents. So what makes information relevant to the members of an industry or other communication network? To answer that question, I turn to another theory of communication.

Elaboration Likelihood Model

The Elaboration Likelihood Model (ELM), developed by Petty and Cacioppo (1986), provides a unique perspective on relevance and the likelihood of cognitive consideration from members of communication networks. According to ELM, the question is: What is it about the content of a message that gives that message the ability to persuade listeners to really listen, so that actual persuasion can take place? The Elaboration Likelihood Model was originally developed specifically for examining communication intended to be persuasive, and it can be applied to both oral and written communications as a measure of both persuasiveness and effectiveness.

Petty and Cacioppo's Elaboration Likelihood Model (1986) is built upon several basic assumptions about message recipients. The first is that users want to form correct attitudes. As the authors point out, we are motivated to hold correct opinions because of their influence on our "psychological or physical well-being" (6). While the correctness of an opinion is inherently subjective, our opinions and attitudes can always be judged against other standards that allow us to evaluate our attitudes and behavior.

The second basic assumption of the model is that, although we want to form and hold correct opinions and behaviors, the ability to do so varies by person and by situation. In other words, the amount of effort we are willing to expend toward forming correct attitudes varies on the basis of a person's ability to consider the facts of a message, the context in which the message is received, and the relevance of the subject matter for the message receiver.

Finally, they point out that we are simply unable to think critically about every persuasive communication we receive. Consider for a moment the number of

advertisements, political messages, written opinion pieces, newspaper articles, and television reports we see in an average day. It would be impossible to consider all of those messages critically and get anything else done! We would spend all of our time in a futile effort to form correct opinions on an endless variety of persuasive subject matter.

Although there are seven postulates of ELM, the three explained above are the most important to this investigation. However, the seven postulates of ELM are listed below (5):

1. People are motivated to hold correct attitudes.

2. Although people want to hold correct attitudes, the amount and nature of relevant elaboration in which they are able or willing to engage to evaluate messages vary with individual and situational factors.

3. Variables can affect the amount and direction of attitude change by (a) serving as persuasive arguments, (b) serving as peripheral cues, and/or (c) affecting the extent or direction of issue and argument elaboration.

4. Variables affecting motivation and/or ability to process a message in an objective manner can do so by either enhancing or reducing argument scrutiny.

5. Variables affecting message processing in a relatively biased manner produce either a positive (favorable) or negative (unfavorable) motivation to issue-relevant thoughts attempted.

6. As motivation and/or ability to process arguments are decreased, peripheral cues become more important determinants of persuasion. Conversely, when argument scrutiny is increased, peripheral cues become relatively less important determinants of persuasion.

7. Attitude changes that result mostly from processing issue-relevant arguments (central route) will show greater persistence, greater prediction of behavior, and greater resistance to counter persuasion than attitude change resulting from mostly peripheral cues.

On the basis of these seven postulates, Petty and Cacioppo have outlined "routes" through which persuasive communications are channeled. The central route is the route that is used when a message recipient is both motivated and able to think carefully and critically about the information being presented. The authors define this route as the route used by message recipients when they are both willing and able to "elaborate" upon the information presented. As they put it, "By elaboration, we mean the extent to which a person thinks about issue-relevant information" (7). Elaboration likelihood is high when the conditions surrounding the message are not distracting, the motivation of the recipient to correctly process the message is high, and the individual abilities of the message recipient are conducive to elaboration of the content matter of that message. For example, I may be motivated to understand a lecture about the most recent tax laws in use by the Internal Revenue Service but unable to comprehend the subject matter. On the other hand, if I have a background in accounting, I may be perfectly able to think critically about that information being presented but unmotivated to do so. In either case the central processing route will not be utilized. If I am both able to process the information and motivated to do so, I can then use the central processing route to elaborate on the information provided and will employ critical thinking skills to form what I believe to be a correct opinion of the material.

If the message recipient is unable or unwilling to use the central processing route, the recipient will be more likely to use the peripheral processing route. In this case, the recipient (user) is more inclined to use, "positive or negative cues in the persuasion context that either become directly associated with the message position or permit a simple inference as to the validity of the message" (11). In this case, the elaboration likelihood is said to be low. In other words, the message recipient either does not possess the ability to process the information presented, or is not motivated to do so, and will turn to peripheral cues to form an opinion.

If we return to the example above, I may be motivated to think critically about the information presented concerning the new IRS regulations, but unable to do so because of my lack of accounting knowledge. Or, the subject matter may be of interest to me but not of sufficient personal relevance to warrant the expenditure of the cognitive energy it would take for me to understand its message. In either case, I am more likely to form my opinion of the message on the basis of peripheral cues, such as my perceived ethos of the speaker/writer, the attractiveness of the speaker/writer, or my pre-existing attitudes toward the subject as a whole.

Petty and Cacioppo also address internal and external factors that affect the likelihood of elaboration given a specific persuasive message. They address these issues throughout their book, but summarize the situational and individual factors affecting elaboration nicely by saying,

> […] we have suggested that situational factors can play an important role in enabling and motivating individuals to think extensively versus superficially about the merits of and appeal. We reasoned that just as there are situational factors such as distraction, issue relevance, personal responsibility, and number of message sources that influence the likelihood that individuals will think about and elaborate upon the externally provided message arguments, so too must there be dispositional factors governing message processing and, indirectly, persuasion" (101).

31

One of those dispositional factors is the individual recipient's personal need for cognition. According to Petty and Cacioppo, some of us are simply more inclined to think critically about arguments, and in fact, enjoy thinking more than others. Those message recipients are more likely to distinguish between strong and weak arguments, and are more likely to be willing to exert the cognitive effort required to develop what they perceive to be a correct opinion on the basis of the information provided (109).

Another factor that Petty and Cacioppo identify is biased elaboration. If a person already has a schema in place concerning a particular subject, message source, or type of message, they tend to incorporate new information into their existing attitudes. For example, if I already have a negative attitude toward my subject or message source, my integration of new information is more likely than not to reinforce this attitude, especially if my central processing route is not utilized in my evaluation of the new information.

ELM sees attitudes as general evaluations of a particular subject or argument (pg. 4). Attitudes can be overcome, but the communicator facing a person with a negative attitude has farther to go than he would otherwise. In addition, changing a pre-existing attitude would almost certainly require using the central route to persuasion, whereas the peripheral route would almost certainly rely mostly upon the existing attitude. Conversely, a strong attitude might be used to persuade a listener using the peripheral route on the basis of that attitude. Still, the key to long-standing attitude change is not appeals to the peripheral route, but issue-specific cognition about the merits of an argument, which can only happen through the central route to persuasion.

Arguments are the basis of persuasion seen within ELM. Arguments in the context of ELM are, "[...] bits of information contained in a communication that are

relevant to a person's subjective determination of the true merits of an advocated position" (16). What constitutes a relevant argument may vary from person to person and from situation to situation, but the presenter of any given argument must still find the points in any given situation that will elicit issue-specific, central route processing, if he hopes to persuade his listener.

Interestingly, Petty and Cacioppo's own research shows that the most determinant factor influencing the tradeoff between biased processing and objective analysis of message content is the personal relevance of the message to the message recipient (83). In other words, the more directly relevant the message is to the listener/reader, the more likely that person is to attempt to think critically about the message despite the presence of an existing bias concerning the source of the content. Yet, a weak argument is still more likely to do more harm than good in a high involvement situation, and situational variables can still affect the outcome of argument processing. For example, in situations where large numbers of participants are involved, motivation typically decreases as personal responsibility for the outcome decreases (96).

Biased or not, ELM holds that message recipients will attempt to form correct opinions based on the information they do have. While their attempt may involve some existing attitudes, personal attributes, cognitive ability to process information, and motivation based on personal relevance of the message, the issue is not *whether* the recipient will attempt to form correct attitudes and behaviors, but *how* they will do this.

ELM holds that the central processing route, based on critical thought, will produce more affective and lasting changes in attitudes and behavior. The model also states that attitudes and behaviors formed through the peripheral route tend to be less

enduring and affective. It seems clear, then, at least on the basis of ELM, that our goal should be to find whether the central processing route has been used to evaluate the information contained in any given argument, and if not, why the central route has not been used. However, we must first examine the variables and strategies currently associated with the context of the argument.

The principles of ELM state that the central route to persuasion relies on a message recipient's ability to cognitively process the information within a message and their motivation to do so. Because the central route to persuasion is the most affective and enduring, it makes sense to seek the central route within technology users. Where Rogers and Kincaid focus upon the source of persuasive messages, ELM focuses upon the content of persuasive messages, allowing the two theoretical perspectives to compliment each other.

As to persuasion, we can assume that users are persuaded to the extent to which they find communication usable, understandable, and relevant to their personal context and goals. It makes sense then, that if these conditions are met, users will be more persuaded of the value of technology. Nevertheless, most discussions, either written or oral, are not isolated, one-time discussions. They are usually part of ongoing conversations that are held over time as the debate for and against innovation acceptance is waged. Those conversations are subject to the same conversational maxims that we rely upon in everyday conversation and written discussions. To examine those maxims as they relate to conversational analysis we turn to linguistics and the study of implicature and pragmatics.

Implicature and Pragmatics

To help answer some of the questions about documents surrounding the debate over technology and animal identification within the beef industry, we must first consider the meaning of the terms used in the documents themselves. Therefore, I will employ two linguistic principles, implicature and pragmatics. As noted earlier, Implicature, as described by Grice (1975), is that part of the meaning of a sentence or text that is left to be filled in by the reader. Implicature is a function of what Grice calls the Cooperative Principle (Jaworski & Copeland 78). The cooperative principle is based upon general assumptions about conversations stated as maxims.

1. Quantity—your communication should be as informative as necessary, but not more so.

2. Quality—your communication should not be deliberately false or one for which you lack sufficient evidence.

3. Relation—your communication should be relevant to the subject at hand.

4. Manner—your communication should be clear, orderly, unambiguous, and concise.

These maxims are what we expect in conversation, but as Grice points out, we often deviate from these maxims in any number of ways. For example, we rely upon violations, or *conversational implicatures*, on the basis of our context, to make conversation easier. In other words, our conversational situation often creates a need to violate the maxims (82).

For example, look at the following hypothetical conversation.

Conversation 1

Statement: "Let's go out to eat tonight."

Response: "We don't have any money".

From this conversation, we are able to deduce relatively quickly that the couple cannot *afford* to go out to eat, even though the response might have an entirely different meaning without the initial statement. In Gricean terms, this conversation represents a successful implicature based upon what the maxims of conversation, which in essence state that participants in a conversation operate cooperatively under the assumption of a set of rules. The two speakers are able to create this successful implicature because of their shared context, goals, and background. This cooperative principle (Grice 78) helps us to conduct communicative interactions within spoken and written contexts, and operate under the assumption that both parties have similar goals for the communication, that the amount of information is enough, but not too much, and that the information should be both factual and relevant to the conversation. In the conversation above, the initial speaker is able to make sense of the response because of shared background and contextual knowledge with the respondent. We understand that going out to eat requires money. Thus, even though on the surface the response seems to be irrelevant, we understand its implications.

It is in this respect that implicature becomes necessary in communication. For example, let us revisit the conversation above. Without the implicature it might look like this:

Conversation 2

"Let's go out to eat tonight."

"We don't have any money".

"So what?"

"So we can't go out to eat."

"Why?"

And so on…

Thus, the implicature that having no money means that the couple is unable to eat out is critical to the conversation. Without it we might be unable to complete this explanation before dinner! Traditional linguistic theory once considered implicatures required by text as more complicated than the example given in Example 2. Gibbs (1994) points this traditional view out:

> […] indirect and nonliteral language should always be more difficult to process than roughly equivalent literal speech. More generally, this traditional view assumes that understanding what speakers literally say requires accessing of semantic information, whereas understanding what speakers implicate in context demands pragmatic information that is more difficult to access than semantic knowledge (p. 94).

In other words, the traditional assumption was that the information contained in *Conversation 2* is easier to comprehend on the surface than the information contained in *Conversation 1*, even though *Conversation 2* could literally go on forever. Traditional views on linguistics saw the inclusion of outside context as more difficult for the reader, as he is forced to pull from contextual memory those parts of the situation that are relevant through implicature. More recent linguistic theory assumes that contextual implications are processed simultaneously with text, making the reader instantly aware of complex nuances that change the meaning of the text we read (Gibbs 1994). This is the

reason we understand the implicature required by Example 1, and is the reason we rely on implicature so completely in written texts.

Having said that, there is one major difference between the implicatures required in the example above and those required in many written documents. The implicatures required of readers of written documents are often not based upon the maxim of quantity, which states that the reader's background knowledge must be taken into account so as not to give too much information. Violation of this maxim is often necessitated by single words that function as lexical items for other concepts or terms. Lexical items can be briefly described as the mental image or abstract thoughts produced by words, and they are closely tied to context. For example, when we read the word *paste* in a situation involving computer software, we do not think of glue. More likely, we think of the concepts involved with cutting and pasting procedures in word processing applications. Thus, a whole range of concepts and activities that may be required of the reader are encapsulated by a single term. To understand that term, we must not only understand the definition of it in this context, but the actions that pertain to it in the current context.

Pragmatics, the study of language in context, is concerned with the difference between what a sentence of text says and what the reader takes as its meaning. The perceived meaning is usually based upon the situational context of the communication. Thus, pragmatic considerations play an important role in shaping our interpretation of written and spoken language, which brings us to the critical role pragmatics plays in communication. Pragmatics, as we have said, can best be briefly defined as the study of language use in context. Context can be best described as the situation in which the reader or listener will be using the information provided plus the relevant background

knowledge the user brings to the situation. This definition is perhaps narrower than most definitions of context within linguistics, but more closely aligned with the concept of context within technical communication. Returning to conversation 2:

Conversation 2

"Let's go out to eat tonight."

"We don't have any money".

"So what?"

"So we can't go out to eat."

"Why?"

If we know that both parties are very wealthy, it might look different.

Conversation 3

"Let's go out to eat tonight."

"We don't have any money".

"So we'll stop at the ATM."

Once again, the conversation makes sense, as long as we are aware that the statement "we don't have any money" only means that the couple do not have any money *with them.* This meaning can be inferred because of our background knowledge concerning their wealth, which is part of the context in which we use the information provided.

Pragmatics also considers the situation in which a conversation takes place. For example, if *Conversation 3* were held in a raft adrift off the coast of Cuba it would be humorous, even though the couple might be starving. Why? Because the context in which the conversation was held would signify that the remark was meant to be humorous. Therefore, we must consider both context and background in communication analysis.

Zwaan and Singer (2003) describe the combination of context and background knowledge in what they call a *situation model*. However, there is one key addition to their definition of a situation model that does not come from the examples above. The difference is that they define a situation model as "the mental representation of a state of affairs denoted by text" (113). The critical difference for technical communicators and for those interested in technology is the phrase "as denoted by text." In the conversations above we are assuming that the couple is wealthy or that they have been stranded on a raft. Why? Because we have been told by the text of this essay to make these assumptions. However, in the context of written communications, we often have no delineated starting point. The assumptions the text requires are neither defined nor articulated, leaving the reader to operate from what background knowledge he may possess, hoping that it will be enough.

Background knowledge then, as it relates to the readers of differing backgrounds, can best be viewed as the pre-existing knowledge that readers use to fill in the gaps left by text. Situational models are the contexts that readers use to process text from the vantage point of their own current state. In other words, even though the reader has a set of existing background knowledge used to fill voids left by implicature, there is still a set of current needs that vary according to the reader, based upon the state of the reader, the

physical environment of the reader, the state of their emotional environment, and their

history. A user needing an ATM on a raft is operating from a differing set of contextual

needs than one who is simply out of cash. The same can be said of the user who has never

used word processing software before, versus the needs of one who is upgrading to the

latest version. These differing needs form the context of the reader's situation while

reading any given page, and the gaps left for implicature and pragmatic interpretations

will be filled on that basis. This difference in user background knowledge and their

differing contextual circumstances may explain some of the distrust felt by readers of

complex documents. In the terms I have outlined above, discussions about technology

that appear in informational writings from government or even private sources are often

not designed to help *anyone* in particular. Instead, they write virtually for themselves,

offering a collection of undefined terms to describe processes the reader does not

understand, derived from a context and background he does not share. As Johnson (2002)

rightly points out, the complex nature of current technologies makes them difficult to

understand outside of the context in which the technology will be used. The effect upon

written communication dealing with topics of computer or other technology is that they

become designed for an undefined, "average" user, and written in language that is more

familiar to the expert user than the novice. It is written by professionals who do not

adequately understand user context for amateurs, and becomes a systematic departure

from anything contextualized or pragmatic.

How then should we approach such technology without being detached from the

everyday user of that technology? The most applicable tool in this case is ethnography.

Using methods described by ethnographers allows us to become involved in the

description of technology, and intertwined with technology users in their natural environment. Through the use of observations, casual conversations, and informal or formal interviews, a researcher can establish an emic position to use in analyzing collected information. In this case, those observations take place within the livestock markets that pervade the cattle industry, but in other situations, they might be done in a factory, on a playing field, or in a classroom. Only by immersing ourselves in the natural environment of the subject can we truly understand the ramifications of communications networks, diffusion, linguistic principles, and the communications themselves in the form of written and verbal exchanges. To accomplish this goal, I turn to methods described by Fetterman (1989) and Van Maanen (1988).

Ethnography

As Fetterman writes, "Ethnography is the art and science of describing a group or culture. The description may be of a small tribal group in some exotic land or of a classroom in middle-class suburbia" (11). Van Maanen agrees, stating, "In the most general sense, ethnography refers to the study of the culture(s) a given group of people more of less share (1995, p. 4). In our case, that description may be of a singular industry or segments of that industry, such as the beef industry. Fetterman points out that ethnography is in many ways like the task of an investigative reporter, except for the fact the investigative reporter seeks out the unusual, while the ethnographer seeks out the everyday, the usual (11).

Ethnographic Perspective

However, by seeking out the usual, the ethnographer places himself in what is termed an emic position, or an insider's position. As Van Maanen sees it, that position grants ethnographic research, "[…] a kind of documentary status on the basis that someone actually goes "out there," draws close to people and events, and then writes about what was learned insitu" (1995, p. 3). However, this proximity and the emic approach can also enhance the effect that any biases will have upon this type of research. Therefore, the researcher must make any biases explicit from the start. In addition, the wise researcher employs additional controls such as triangulation and contextualization (Fetterman p. 33). Ethnographic research must be approached with an open mind because the ethnographic study allows for multiple interpretations of reality throughout the study. As Van Maanen puts it,

> This is what makes the study of culture is so sticky. Human culture is not something to be caged off for display, put on a slide for inspection, read from an instrument, or hung on a wall for viewing. The field worker must display culture in a narrative, a written report of the field work experience in self-consciously selected words. Ethnography is the result of fieldwork, but it is the written report that must represent to the culture, not to the fieldwork itself. Ethnography as a written product, then, has a degree of independence (how culture is portrayed) from the field work on which it is based (how culture is known) (1988, p. 4).

My goal, therefore, was to use ethnographic tools to mediate my own interpretations of my experience within the beef industry. As Fetterman points out,

> Most researchers, explicitly or implicitly, use one of two types of theory: ideational or materialistic. Ideational theories suggest that fundamental change is a result of mental activity, of thoughts and ideas. Materialists believe that material conditions such as ecological resources, money, and modes of production are the prime movers (16).

In truth, both ideologies are applicable to my research. Therefore, I will not seek to differentiate between the two methodologies. However, there are aspects of each which are more applicable than others. For example, ideational theories rely heavily on cognitive theory, while the materialist theories are more concerned with observable behavior patterns (16). I will return to these concepts when I discuss my methodology in Chapter 4. For now, let us continue to explore ethnography.

Fetterman tells us that fieldwork is the most characteristic element of any ethnographic research design (18). Classic ethnography often requires extended periods of observation. However, as Fetterman also points out, in applied settings, long-term continuous fieldwork is neither possible nor desirable (19). The most important element of fieldwork is being there to observe, to ask questions, and to be in contact with your chosen culture.

Ethnographic Style

Results of ethnographic observations can be written in many different styles and in many different formats. But to write ethnographic research requires at least some understanding of the language, beliefs, practices, and social structures of the observed group (Tales 13). Typically, this description includes some history of the group in question and least some description of socialization systems and contact between members of the culture (Fetterman 22). But specialized ethnographies often focus on specific elements of the culture. In fact, ethnographic methodology will be applicable to my research as descriptions of specific relationships. As Van Maanen notes, the writing of ethnographic research has as much to do with creating the culture portrayed in

ethnography (through writing) as the observation itself (1995, p. 6). Fortunately, researchers are not limited to observation alone.

One advantage to ethnographic methods of research is that they allow the researcher to gather data from a variety of sources including observations, interviews, and general conversations. I will discuss some of these methods here and more specifically during my discussion of methodology.

The research of culture is the broadest goal of ethnography. Although there are various interpretations of culture, Fetterman returns to ideational and materialist views of culture as the primary divisions within cultural interpretation (27). Materialist theory sees culture as the sum of its actions, as the sum of its observable behaviors and customs. Ideational theory takes a more internal view of culture, focusing upon the cognitive aspects of a culture, upon the ideas, beliefs and knowledge background of a particular culture.

Of course, regardless of an individual researcher's view of culture, interpreting that culture within the framework of the social group's view of reality is still the primary function of any ethnographic research. Cultural interpretation is based upon careful observation, collection of data, and understanding of influences within the social group. Data must be contextualized within a framework of general knowledge about the culture under study. Fetterman provides an excellent example of this framework when he discusses the difference between a wink and a blink. While there may be no mechanical difference between the two actions, the cultural significance of each and the differences between the two are well-known (28). Understanding small differences such as these is pivotal to providing a non-judgmental view of reality. But, while no study can capture the

entirety of the group's history, politics, and environment, the field worker must attempt to see beyond his own bias and immediate situation. This contextualization, or placing observations into a larger perspective, is essential (Fetterman 29).

While the researcher must attempt to gain an insider's point of view about reality, he cannot entirely share that view of reality without skewing his own results. In fact, documenting multiple perspectives of reality is critical to understanding why members of a community act in different ways and why they communicate in different ways. This difference is why the etic, or outsider's perspective of research must be combined with an emic perspective to create a larger picture of reality. It makes sense to collect data from an emic perspective, but at some point that data must be analyzed from an etic perspective. To be successful, the researcher must be willing to be honest about biases, because we are all products of our environment. As Fetterman writes, " The point, simply, is that ethnographers must attempt to view other cultures without making value judgments about unfamiliar practices, but cannot be completely neutral" (30). Recognizing our own limitations is crucial to ethnographic success.

Once the researcher is beyond these limitations, at least from the perspective of his research, he can begin to focus upon the more concrete aspects of social organizations such as structure and function. In general, structure in ethnography refers to social and political configurations within a group, while function refers to the social relations among members of the group (Fetterman 35). Most groups, as shown by Rogers and Kincaid, have a set of formal and informal relationships that are well defined and help to regulate behavior. Ethnographic theory shares this perspective. Still, most group cultures rely as much upon informal structure as they do upon formal structure.

The beginnings of an ethnographic study may not be so clearly defined. Typically, the researcher begins wherever he can. Introductions are crucial, because research communities may be resistant to a researcher's presence or interference. Sometimes a researcher's interest is seen as meddling. However, when a researcher has gained access to the community, he must use his own judgment as to which members of the community are most worthy of study. As Fetterman shows us, this approach is quite natural and can be very useful based upon a very simple and direct questions about what people do in their daily lives. This method is valuable even from a statistical frame of reference, because most ethnographic samples are not truly random, and because most sample sizes are too small for parametric measurement (Fetterman 99). In essence, the best way to ask the right questions is to discover what people do on a daily basis (Fetterman 43).

However, once the researcher has made these decisions, he must be prepared to become more specific about his method. Structured interviews, semi-structured interviews, informal interviews, and retrospective interviews are all common within ethnographic research. There are pros and cons to each of these methods. Typically, formally structured interviews and semi-structured interviews have very specific research goals, and approximate written questionnaires. These interviews can be very useful in ascertaining the very specific informational once the researcher understands the realities of the social group. In the beginning of a study, they often present the researcher's view of reality as opposed to the insider's view of reality because of the researcher's lack of depth concerning the social community (Fetterman 48).

Informal interviews, on the other hand, are much more casual in nature. Their agenda is more implicit than explicit, as the researcher attempts to understand meaning

within a culture and how individual perceptions compare within that group. Informal interviews are easiest to conduct but not necessarily any less valuable than their structured counterparts. Their informal nature allows unscripted conversation to follow, which often elicits information that would not be obtained by a more structured interview. However, at times the informal nature of these interviews amounts to a lack of control, and ethical issues often arise as a result (Fetterman 49). Because informal interviews should be user friendly, they should be approached with a degree of give-and-take. As the interview continues the researcher should be able to interject more formalized questions. In this sense, the formal and informal interview can often be combined to yield maximum results.

However interviews are conducted, they should be used to classify individual perception of reality. While most interviews share certain common questions, questions per subject and general questions may vary in their form and function (Fetterman 50-54). For example, survey questions, often referred to as the "Grand Tour" questions are designed to give the interviewee a chance to provide broad generalizations of his world and view of reality. These questions can be used to define boundaries and to establish the interviewee's general activities. After these have been established, specific questions are useful in nailing down more detailed information. In addition, both open-ended and close-ended questions may be used to control response information. For example, a question such as, "How do you feel about technology in the beef industry?" may elicit a long and detailed response which can provide unexpected information that may lead to unexpected avenues of research. Conversely, the question, "Do you use RFID tags for purebred cattle?" is likely to elicit something closer to "yes" or "no" as a response.

Ethnographic Reporting

In the same way, as Van Maanen shows, there are different styles of reporting ethnographic results. The most common forms of these styles are realist, confessional, and impressionist tales. Realist tales are marked by third-person voice and more dispassionate reporting than confessionist tales or impressionist tales (Tales 45). Typically, in this form, the author is almost non-existent in the written report of findings. Also, realist tales usually focus on very minute details of everyday life. These details are typically reported in a no-nonsense fashion, and the author typically has the final word on how the culture is interpreted. Conversely, confessional accounts of research typically focus on *how* the research was conducted, as opposed to focusing upon the findings (Tales 75). Often, this approach is designed to minimize criticism by exposing personal bias, attitudes, and experience with the target audience. These confessionals tend to stand in conjunction with realist tales more often than they stand in place of them. They are designed in many cases to support the author's realist account of his findings (1988, p. 79). Finally, Van Maanen speaks of impressionist tales, which seek in some way to dramatize the events of the research itself. Unlike realist accounts, impressionist accounts tend to characterize events and to portray them in a more dramatic light than the other two methods listed here (Tales 104). Van Maanen's point concerning the reporting of "fact" is poignant in light of these different methodologies because of their impact upon the final result of any ethnographic research. But, as Van Maanen also notes, over time these styles have merged somewhat as characterizations of informants have become more accepted in realist accounts and confessional accounts are less likely than ever before to recount only the conditions under which field work was conducted (1988, p. 126).

Because the cattle industry is so affected by both ideological concerns and materialistic concerns, a combination of realist and confessional reporting suited this research best. My interactions with market owners, buyers and producers in the livestock market environment offered a unique emic position, but because this type of research is new, I was interest in presenting confessional ethnographic details as well. The combined style offers an insider's view while explaining the research process and preserving an etic perspective as well.

Regardless of the question of style, Fetterman stresses the importance of making contact with key players in the community. He uses the term "key actors" (58), for these people because typically they are able to provide important historical data, knowledge about interpersonal relationships, and about the important facets of everyday life within the social group. Although a researcher's questions for key actors may seem obvious, they are important in determining what should be asked of other members of the community.

Finally, Fetterman stresses the importance of written and electronic information in conducting ethnographic studies. While these sources are often more time-consuming, they often reveal facts that did not come up in most interviews. These can be important for the researcher as he attempts to triangulate information. Triangulation is vital to ethnographic researchers because of its ability to test one source of information against another (Fetterman 89). Typically, triangulation is accomplished by conducting similar interviews with more than one source. However, written documents often provide sources for triangulation as well. Triangulation improves the quality and accuracy of ethnographic data by testing sources for validity. Therefore, researchers analyze written

and electronic data in virtually the same way that they analyze their observations. By consulting more than one source about any one potential conclusion, the researcher is able to improve the overall validity of conclusions.

Conclusion

By combining methods of ethnographic research with communication theory and linguistic principles, I hoped to create a theoretical model that would help me to investigate technology diffusion and communication networks within the beef industry. Diffusion must be viewed as a social process, but a general method for analyzing communication must include tools for analyzing message content as well. In the next chapter I will provide a situational context in which these methods were applied. The beef industry is unique, in many ways, when it comes to technology and new business ideologies. Their history and the current state of affairs concerning NAIS and technology within the industry are important to understanding my results.

Chapter 3

The State of the Beef Industry

Technology within the beef industry has always been a hit and miss affair. Much as Rogers describes, some beef professionals are early adopters, while others refuse to adapt to new technologies even in the face of obvious benefits. As David Wieland (2001) of *Beef Magazine* reports, some sectors of the agriculture industry, especially the beef sector, have been slower to adopt new technology for various reasons including expense, low return on investment, and general lack of awareness within the beef industry as a whole concerning new technologies and their benefits. Even today, it is not uncommon at livestock auctions to find dot-matrix printers, Dos-based computer programs, and hardware that would be considered ancient by most standards.

However, recent technological and methodological changes have forced members of the beef community to reconsider many of their attitudes about technological diffusion within the beef industry. As computer technologies have made their way into mainstream agriculture, the beef industry has been least affected because of the industry's resistance to change, general technological ignorance, and a proud adherence to traditional methods of production. Now, however, even traditional beef producers and marketers are being forced to evaluate computer technology because of market pressures and technological advancements that are driving the beef industry as a whole to become more accountable for animal origin and identification, and thus to become more technologically savvy.

The most recent incarnation of this debate centers upon animal identification and RFID technology. National and world wide health concerns over disease outbreaks, most

notably *Bovine Spongiform Encephalitis* (BSE), or "mad-cow disease," and other diseases such as foot-and-mouth disease, have forced the industry to consider adopting computerized identification systems for animals. But in an industry where most professionals still prefer to conduct business "the old-fashioned way," new technology can be a difficult sell.

Current Plans and Background

As I have said, the general idea behind current technologies and proposals from the USDA is that animals could be given RFID tags at their place of birth. These tags, which are basically the same as the bar code tags found on food items in a grocery store that automatically transfer pricing and item data, could be encoded with data including a premises and a identification number, which would be a 15-digit number that would be unique to the individual animal. This tag could then be scanned each time the animal moved to a different location within the supply chain, uploaded into a database, and used to track the animal's movements in case of a disease outbreak. Thus, theoretically, an infected animal's origin could be traced within 48 hours and the outbreak quickly contained (Stecklow, 2006).

Although the USDA has been discussing the need for animal identification and tracking for nearly a decade, the debate over using technology to implement such a system began in earnest in 2003 when the first case of mad cow disease was discovered in the United States (Stecklow, 2006). Consumers had been concerned over the disease because of the deadly effects of infected beef upon humans. Furthermore, the most recent episode of BSE contamination, located in Alabama, had seen USDA and state officials investigate five auctions and 36 different farms with DNA testing equipment in an

unsuccessful effort to locate the source (Stecklow, 2006). Worldwide, more than 150 deaths have been linked to infected beef, and there may be other cases that have been misdiagnosed in underdeveloped countries. Cattle producers are also concerned. Similar incidents including outbreaks of foot-and-mouth disease have led to the slaughter of millions of cattle, sheep, and pigs because of inability to trace the disease to its source (Stecklow, 2006).

This fear is not limited to US consumers. After the 2003 BSE outbreak, Japan cut off shipments of US beef, as did many other countries. The Japanese market was significant, as was the Canadian market. Japan alone bought $1.3 billion worth of US beef in 2002, then promptly cutoff imports. South Korea, likewise, imported $815 million worth of US beef and also cut imports to zero. Although in 2006 both countries resumed imports after thorough inspections of US processing plants, they are still very wary of US ability to control and trace disease, and consumer confidence in those countries has yet to return to normal. Thailand, China, and Singapore, all significant importers as well, still have bans on US beef (ElAmin, 2006).

In the wake of the scandal in 2003, then-secretary of agriculture Ann M. Venneman sought to enhance and hasten US identification and tracking system development. In fact, at the time, she asked the USDA's chief technology officer to make it his top priority. Still, as of December 2006, no national tracking or identification system is in place (Stecklow, 2006). Why is this?

The answer to that question is multifaceted. As recently as 2005 the USDA's animal identification plan called for mandatory participation and included tagging animals at their place of birth with RFID ear tags that could be read by computerized

technology and tracked through the beef supply chain. But industry resistance to a mandatory plan, coupled with a disagreement among industry associations, alliances, and businesses, has crippled the proposed program and brought it to a stand-still over the past three years.

Industry Alliances and Debate

For example, the National Cattleman's Beef Association (NCBA), which represents members of the beef supply chain including producers, feeders, and processors, and the Livestock Marketing Association (LMA), which is the organization that represents livestock market owners, tend to agree on very little. Both have plans that they would like to see enacted within any national animal identification system, and those plans differ significantly. For example, the LMA would like the federal government to fund tagging services at auctions and manage the corresponding information database, while the NCBA favors entirely private tagging and database services. Then there are other producer organizations, such as the Ranchers-Cattleman Action Legal Fund (R-Calf), centered in more northern states that have their own agenda. Taken together, these differing points of view offer little consensus within the industry. When we add to this disagreement the wishes of the feedlots (where animals are typically "fattened up"), the packers (who process the meat) and the various large-scale national retailers (Wal-Mart, McDonald's etc.), each of whom have their own wishes, we have what amounts to a mess concerning technology implementation in the beef industry.

For example, the LMA has major reservations about the ability of individual livestock markets to establish and pay for tagging stations that would allow small producers to tag and register animals at the sale barn (Perrin, 2004). Because the federal

government has offered no financial support in this area, the LMA has been against the plan from the start. The LMA is also concerned about losing customers if they are forced to pass tagging expenses on to producers. The NCBA has recognized the need for a mandatory system in the past. However, many producers see any form of animal identification as government intrusion, and have staunchly resisted any such measure.

In effect, the NCBA and the LMA cannot agree among themselves about what should be done. And neither of these organizations can agree with R-Calf, who support Country of Origin Labeling (COOL). COOL was perhaps the initial effort to establish some sort of tracking and identification system. Although not nearly as far reaching as current plans, it was designed, in short, to require all beef products to have a label stating what country any beef product came from. COOL was originally part of the 2002 Farm Bill, and required mandatory country of origin labeling for beef products. Yet, on January 27, 2004 President Bush signed into law a measure that delayed that requirement until September 2006. Then, on November 10, 2005 President Bush again signed into law a measure that delayed COOL until 2008 (http://www.ams.usda.gov/cool/). Many industry insiders now believe that COOL will never become a reality.

Still, R-Calf believes in COOL because of its ability to designate meat products by country. They believe country of origin labeling to be most beneficial to US beef producers because it would differentiate US beef on supermarket shelves from beef produced in Latin America or other underdeveloped parts of the world. Furthermore, R-Calf still supports the position that any mandatory identification system should be overseen and administered by federal, state, and tribal governments (R-Calf, 2006). This viewpoint, of course, does not sit well with those in the LMA and the NCBA who favor

more private control over any such system. This concern is especially true of the NCBA, who believe that any data system that could be accessed by the federal government might lead to unnecessary oversight and invasion of privacy of its members or that such data might be used by animal rights activists or others to harm the beef industry.

Then, of course, there are the packers and retailers, who enjoy taking advantage of international beef prices when they are favorable, and therefore more profitable. For obvious reasons, they are not in a hurry to expose country of origin to consumers because of the possible perception among consumers that beef from Mexico, Central American countries, or even Australia is inferior to US beef. This reluctance does not mean that all large retailers are opposed to a tracking system. McDonald's has already offered increased profits to producers for traceable animals, but has been generally disappointed with the number of producers willing to take advantage of their offer (Stecklow, 2006).

In fact, McDonald's Vice President of Procurement Robert Cannell has spent the past two years telling convention audiences and industry insiders that a national identification system is critical to the future of the beef industry. He has, however, been alone for the most part in his vocal support for such a system among large retailers.

But other countries are listening. Canadian industry officials have recently adopted identification system controls that include tagging animals, identifying those animals within a computerized database, and age-verifying animals born after 1990 (www.candaid.ca/producer/cow_calf). Similarly, Australia has aggressively marketed its own national identification and tracking system to international markets. The result has been a substantial increase in Australian beef exports.

Then there is the USDA. After the 2003 BSE outbreak, the National Institute for Animal Agriculture (NIAA), a non-profit organization, organized a task force comprised of USDA and industry officials to come up with a tentative plan for a national animal identification system. Later that year, there was a tentative agreement between those involved. According to this agreement, the USDA would oversee and control all cattle data (Stecklow, 2006).

But the NCBA was not a part of the NIAA's strategic meetings and immediately opposed the plan. They then offered another plan that would be voluntary and overseen by an industry-run system. Their plan called for private oversight of data, which the NCBA considers proprietary to its members. There were some fears among NCBA members that data stored in government databases might be accessed and used to provide advantages to their competitors.

Shortly after the NCBA unveiled its plan in 2004, R-Calf representatives made it known that they did not trust the NCBA because of its ties to meat packers, who might be able to gain access to privately held data, such as animal pricing and producer data that would dramatically increase their buying power within the marketplace. The LMA, also concerned that packers would be able to access private data, became concerned that packers might be able to go directly to producers if they were able to gain access to producer addresses, phone numbers, cattle type, and pricing, thereby significantly reducing the number of animals sold at auction. The LMA promptly rejected the NCBA's plan.

Meanwhile, the USDA, seemingly paralyzed by this lack of consensus, struggled to come up with a plan that would suit all parties. A general uproar ensued, as all parties

involved vied for control of both the proposed system and the data stored within that system. There was certainly no shortage of private companies willing to become involved in either a government-controlled or privately-controlled system. As Bob Sechler reported in August of 2005, technology firms were "stampeding" to livestock (p. 1). Even now, drovers.com lists over 50 companies specializing in some technological facet of the proposed National Animal Identification System (NAIS) (http://www.drovers.com/directories.asp?pgID=712). Still, there is no clear plan, and as Joe Roybal (2006) of *Beef Magazine* reports, one of the major concerns for the near future of the beef industry will be the, "USDA's seeming decline in credibility among various audiences and what it portends for the advancement of important industry issues and infrastructure such as the development of the National Animal Identification System" (p. 1). Roybal's statement is true, because of the credibility that the USDA lends to any identification system and because without USDA involvement many overseas markets will be unwilling to accept an industry-led plan.

But the USDA plan has been fraught with technical difficulties from the start. Questions about the USDA's ability to securely store data, the USDA's constitutional right to such data, the hardware and software requirements of the USDA plan, and perhaps most importantly the USDA's ability to fund the initiative have caused confusion and misunderstanding within the beef supply chain. Nevertheless, some matters are agreed upon by most industry organizations, including the LMA, NCBA and the USDA. Namely, the three organizations agree that any NAIS system must,

- Provide biosecurity for the national herd

- Identify vaccinated and/or tested livestock

- Identify animals in national and international commerce

- Protect animal data

- Provide added value

- Allow for efficient tracking of animals and disease outbreaks

Even the NCBA acknowledges the need for a national animal identification system. But they cite many problems in their review of the USDA's efforts, including a lack of funding, an unrealistic timetable, lack of confidentiality, and a lack of a commercial information exchange structure.

The issues facing the USDA are much more complex. For instance, market research at livestock markets began with establishing source identification for animals. This initial step was roughly equivalent to what is termed premises identification in the current plan, but the earlier version did not require premises registration. For a time this practice produced significant premiums at livestock markets for source-verified animals. But the market was unable to sustain those premiums, largely because tagging animals was difficult at auctions and because international pressures for age verification made source-verifying animals less valuable. There have never been any provisions within the USDA's plans for tagging animals at livestock markets. Dennis Davis, a long-time provider of tagging services and livestock market employee laments this fact. He believes that the USDA made a huge error in not incorporating livestock markets into their proposed NAIS from the start. He believes that since almost 40 million cattle went through livestock markets last year, it would be impossible to implement a national

animal identification plan without including livestock markets. Furthermore, he believes that it would be impossible at this time or in the near future to tag all animals at their place of birth.

Davis also has concerns about the international market and how the lack of US consensus on animal identification is affecting exports, saying that even now, surveys indicate that many Japanese consumers are literally afraid to eat US beef (personal interview Oct. 12, 2006). As part of any export verification to Japan, Korea, and other countries, an animal must not only be source-verified but age-verified as less than 20 months of age. This age requirement, as mandated by the USDA's Beef Export Verification (BEV) program, created a whole new set of problems for the National Animal Identification System. They have yet to be resolved.

USDA Reactions to International Pressure

Part of the confusion surrounding the issue of tagging animals came from the USDA's response to the problem of export verification. Trying to "stop the bleeding" caused by international bans on US beef sales, the USDA came up with two separate programs designed to provide some sort of quality assurance to external markets. One was the Quality System Assessment (QSA) program. The other was the Process Verified Program (PVP). Both programs are similar in nature, but have different requirements and were targeted toward different segments of the supply chain. However, this difference is not necessarily evident in reading the program descriptions. For example, the Process Verified Program is typically used by service agencies (such as software suppliers or RFID tag suppliers) while the QSA is primarily reserved for animal or meat suppliers to

international markets. Consider the description for the Process Verified Program

retrieved from the USDA's web site (http://processverified.usda.gov/).

> The USDA Process Verified Program provides suppliers of agricultural products or services the opportunity to assure customers of their ability to provide consistent quality products or services. It is limited to programs or portions of programs where specified process verified points are supported by a documented quality management system. The specified process verified points are identified by the supplier.
>
> The USDA Process Verified Program uses the International Organization for Standardization's ISO 9000 series standards for documented quality management systems as a format for evaluating program documentation to ensure consistent auditing practices and promote international recognition of audit results.
>
> Suppliers with approved USDA Process Verified Programs are able to make marketing claims associated with their process verified points -- such as age, source, feeding practices, or other raising and processing claims -- and market themselves as "USDA Process Verified." The USDA Process Verified Program does not relieve the supplier of meeting regulatory requirements issued by other Federal Departments or USDA Agencies.

We can compare that synopsis to the description of the Quality System Assessment

Program (http://www.ams.usda.gov/lsg/arc/qsap.htm) which reads,

> The USDA Quality System Assessment (QSA) Program provides suppliers of agricultural products and services the opportunity to assure customers of their ability to provide consistent quality products or services. It is limited to programs or portions of programs where specified product requirements are supported by a documented quality management system. The specified product requirements may be identified by the supplier or in a USDA Export Verification (EV) Program. Approved QSA Programs that meet specified product requirements as outlined in the EV Programs are listed on the EV Program websites.

For packing companies who wish to sell beef to the lucrative export market, there is still

another requirement, known as the Beef Export Verification Program. That program

requires a separate application and review process, and can only be attainted after either

the QSA or PVP certification have been attained. Despite their resistance to these

programs, most large agribusiness players in the US have signed up for one or both of

these certifications. One look at the list of approved companies on the USDA's process verified home page will prove this fact (http://processverified.usda.gov).

We will return to these documents during discussion of research and results. Still, we can see that there are similarities that might be confusing for the average calf producer or livestock market owner. In addition, both certifications require lengthy and time-consuming application processes including an on-site visit from either USDA or contracted inspectors at the expense of the applying company. Many small business owners have complained to me that the application process discriminates against smaller businesses owners who do not have the resources to handle the "red tape."

Again, neither of these programs was designed to accommodate livestock markets. And this omission is a problem for producers and markets alike who wish to sell to packing companies who ship to internationals markets. But, even if they are willing and able to apply for and receive these certifications, there are still many data security issues associated with managing such a situation. The requirements for either the QSA or PVP certification, which must be acquired prior to age or source verifying animals, are stringent and lengthy. Expensive hardware and software requirements make complying with either program an expensive and time-consuming endeavor.

Still, many advocates of the system point to the long-term effects of not adopting such a system. Will US consumers be willing to continue buying US-produced beef in the wake of another disease outbreak? Will international markets be willing to tolerate another outbreak, or will they cut off US beef exports permanently? Will imported beef begin to dominate the US market as consumers look to more verified sources of food production? And finally, why, in the wake of such damaging events for the beef industry,

are members of the supply chain unwilling to come to an agreement upon some type of identification, tracking, and source and age-verification system?

Communication Issues and Alternate Plans

It is perhaps partially because of the lengthy requirements involved with current options and the lack of understanding within the beef industry about those options that so many within the beef industry oppose national identification and tracking. It is more likely, however, that the process is misunderstood and has been poorly communicated to members of the supply chain. Whatever the case, there is both support for and opposition to the USDA's plans.

For example, Representative Ron Paul (2006) of Texas issued a statement through the US Federal News Service in which he called the National Animal Identification System nothing more than a tax on livestock owners that would allow the government access to detailed information about their private property. He continued to say that the NAIS is supported by Agribusiness giants because they want the federal government to create a livestock database and provide them with free industry data. Paul sees the USDA's proposed plan as a costly mandate for small and independent livestock owners.

Not to be outdone, the *Countryside and Small Stock Journal* (and other small journals as well) routinely prints critical articles concerning the NAIS. Many of these attacks consist of ill-conceived rants from individuals of questionable background and motive. However, some, like Mary Zanoni, have degrees from both Cornell and Yale. Zanoni (2006) says that the NAIS will, "[...] drive small producers out of the market, will prevent people from raising animals for their own food, will invade Americans' personal privacy, and will violate the religious freedom of Americans whose beliefs make it

impossible for them to comply" (p. 68). Her assertions are debatable, but my investigations show that many producers agree with her.

Taking things a step further, Senator Jim Talent of Missouri who is also a member of the Senate Agriculture Committee, co-authored a bill in 2006 that would prohibit the USDA from implementing a mandatory National Animal Identification System. Talent (2006) said, "The development and implementation of an animal identification system must be voluntary and done with the cooperation of producers rather than by coercing them to participate. I have made this point repeatedly to the USDA" (p. 1). There are many journals, magazines, and privately developed web sites with similar viewpoints. All one needs to do is search for "animal identification" on the internet to find a wide variety of dissenting viewpoints on the subject. Groups such as the Farm and Ranch Freedom Alliance (www. farmandranchfreedom.org) supply a steady flow of information designed to undermine NAIS.

Nonetheless, some business alliances continue along the path to animal identification on their own. Seemingly, they do not agree with the sentiments of the naysayers. For instance, the American Hereford Association has developed its own source and age verification program. Seeking not only to provide source and age verification, the American Hereford Association and other similar organizations have actively engaged producers and buyers in an alliance that rewards superior genetic stock and source and age verification. The idea is that not only can these animals be source and age-verified, but that they can be proven as performers when it comes time to take the animals to carcass. They are not alone. Other industry breed associations are buying in as well.

Some packing companies are buying into the idea. The National Beef Packing Company, which is among the four largest packers in the US, has agreed to participate with the American Hereford Association and to offer premiums to proven producers. In addition, they have agreed to purchase all animals coming through the program, which is an incredible incentive for producers to participate in the program with a guaranteed profit. According to Art Wagner, National Beef Packing Company Vice President for Cattle Procurement, "Hereford Verified will help us ensure a core predictable supply of cattle that meet Certified Hereford specifications. Our goal is to develop supply and at the same time be able to get information back to the cow-calf producers that will help them further improve Hereford-based animal performance and efficiency" (http://www.hereford.org/AHA/tabID__3856/tailored.aspx). Mr. Wagner and the American Hereford Association have a coherent plan that will likely succeed. Their plan is well thought-out and has the financial backing of a large packing company to bolster member participation. Still, the American Hereford Association plan is limited in scope, and far from a national system. It is another reminder of how many different views of the NAIS exist within the beef industry.

So where have these very different views on animal identification come from? From a distance it would appear that there are currently many different plans for implementing animal identification and perhaps more plans for derailing it. Some major industry alliances and members of the federal government insist that any national system must be mandatory, while other alliances and individuals within the federal government insist that any system must be voluntary to succeed. While the debate rages, the US continues to search for a system that will alleviate the fears of consumers both within the

US and among international consumers. At the same time, the USDA seems to be losing its ability to make any decisions about National Animal ID, which only adds to the confusion.

Moreover, the problem is exacerbated by the exclusion of a major player. As a professional communicator for a technology firm serving the beef industry, I was continually frustrated by the lack of consensus among the major industry alliances, organizations, and companies within the beef industry. But I was most frustrated by the inability of the livestock market owners, whom I dealt with most, to become part of the overall plan envisioned by the USDA. Livestock market owners were excluded, for the most part, from programs like the Process Verified Program and the Quality System Assessment Program because those programs were not designed to included livestock markets. As noted earlier, some 40 million cattle are sold through these markets annually. As I spoke with livestock market owners, I began to ask myself how a national system of any kind could be implemented without these markets. I also began to notice that for many of the small producers that depend upon these markets to sell their cattle, the market owners and staffs are a primary source of information about any new technology, including animal identification and traceability, and that other information sources and communication networks were affecting the livestock market owners. In fact, these relationships began to sound eerily close to those described by Rogers and Kincaid. Networks of communication and diffusion factors seemed to be influencing this technological debate.

I began to wonder why these markets had been excluded from the NAIS system, or at least why communication about the system, such as the many informational web

pages and written communications from the USDA and industry proponents of NAIS, had been ineffective in convincing market owners and producers alike that the system was both necessary and potentially profitable. As I spoke with the owners and staff of livestock markets around the country, I began to see that those communications and their arguments had not been effective. I began to see that, in effect, the USDA's efforts to implement a national animal identification system on a grass-roots level had largely failed to convince the grass-roots producers, buyers, and sellers of those animals that such a system was necessary. I wanted to know more. Although many producers, buyers, sellers, and the rest of the beef supply chain believe that a national identification system is inevitable, most producers, buyers, sellers, and livestock market owners that I have encountered do not understand the many different plans that have been suggested, and have, for the most part, no real interest in exerting further effort on the subject. It seems that an opportunity has been lost through poor communication. In the chapters that follow, I will attempt to explain the reasons behind this failure.

USDA Strategies for Communication

When the real push came to educate producers, consumers, and members of the beef supply chain from the USDA, their primary challenge was to communicate USDA plans and criteria for a national animal identification system to those constituents. Because the beef supply chain is so fragmented, this was not an easy task. Small producers often have limited contact with other producers, even less contact with livestock markets, and almost no contact whatsoever with large feedlots, stockers, or packers. This fragmentation is a problem for the USDA and other NAIS proponents

because of the number of small producers that still comprise a major segment of the beef supply chain.

For example, roughly one-third of the cattle sold in livestock markets annually come from small producers. According to the NCBA, over 80 percent of those small producer operations have fewer than 50 cows and approximately one-third of the nation's cows are in these herds (http://www.beef.org/NEWSEconomicImportanceOfTheUnitedStatesCattleIndustry2704. aspx). One-third of the national herd equates to approximately 33 million animals, currently raised on approximately 1.23 million farms and ranches. So, in effect, the USDA needed to communicate with more than one million farmers and ranchers who have little or no contact with the majority of the beef supply chain.

Communicating with that number of small producers is a difficult task to say the least. In my experience, I have learned that a small producer in a rural area might only communicate with other ranchers on an occasional basis, and would most likely only sell animals at a livestock market a few times per year. Although the USDA did produce literature and brochures designed to explain the proposed NAIS and did attempt to distribute that information, many small producers and even livestock market owners did not have direct access to that information, and those that did, as I will show later, tended to ignore it. The USDA also sent representatives to regional meetings hosted by state organizations to promote NAIS, but those meetings have only been attended by a small fraction of the 1.23 million small producers currently raising cattle in the United States.

Furthermore, many small producers and livestock market owners still scarcely understand what the Internet is, and certainly don't know how to use it, which renders the

USDA's large collection of online documentation concerning the NAIS useless to market segment of the supply chain. So, aside from regional meetings, scattered brochures, and publications distributed by extension agents and other USDA personnel, magazine and newspaper articles have been only regular sources of information for producers and market owners.

Of course, industry alliances are able to disseminate information and opinions through word-of-mouth and through newsletter mailings to their membership. The LMA, NCBA, and R-Calf, just to name a few, are able to communicate with producers, buyers, and market owners through direct methods not available to the USDA. This lack of direct communication is part of the reason that so many small producers form the majority of their opinions concerning national animal policy in what might best be described as "coffee shop diplomacy sessions" on the basis of partial or biased information. Buyers, market owners, and sellers tend to communicate at local livestock auctions and at whatever meetings there may be in their area. But the patriarchical nature of that communication always leads to the larger supply chain entities' representatives (who tend to travel more) passing on company or organizational interpretations of the NAIS to the smaller, more geographically limited producers and market owners.

As a result, there is confusion within the beef supply chain about what the proponents of NAIS are saying, and the confusion has prompted the beef supply chain to voice their concerns to their congressional representatives and senators. In May of 2006, a congressional subcommittee voted to withhold almost all funding for the NAIS until the USDA is able to better define the system's objectives. (Stecklow, 2006). So what was it

about the communications of NAIS supporters that did not resonate with livestock market

owners and producers? My research methodology was designed to answer that question.

Chapter 4
Methodology

Technology and the NAIS have not been accepted by the beef industry. In spite of the efforts of supporters of both, livestock market owners and producers in particular have been slow to accept changes to their business practices that would accompany new technology and NAIS. As stated in Chapter 1 of this dissertation, my research goal was to analyze whether communication had failed to persuade members of the beef industry to adopt new technology and the National Animal Identification System (NAIS). I sought to evaluate the roles of both interpersonal and mass communications in formulating the industry's view of new ideologies through analysis of interpersonal communication networks and through a discourse analysis of written materials that would focus on their content, linguistic features, and consideration of reader background knowledge. I define interpersonal communications as face-to-face or telephone conversations between members of the beef community, while I define written communications as textual or web-based materials designed to influence industry opinions of technology and the NAIS. In this chapter I will discuss my personal, ethnographic observations and conversations first, followed by a discourse analysis of written materials.

The first phase of my analysis was to conduct ethnographic research with participants from the beef supply chain so that I could analyze my findings on the basis of Rogers' and Kincaid's theories. In this way, I sought to show that communication networks and barriers to technology diffusion had a direct impact upon the success of new technology within the beef industry.

I collected information from personal, informal interviews, observations, and anecdotal conversations with members of the beef industry. I had done a pilot study before beginning this investigation that showed variation among members of the livestock market staff about technology and NAIS. Livestock market owners were the primary focus of my interviews, because livestock sales are typically the point at which animals become "lost" (untraceable) and because these markets mark the point at which much of the resistance to technology is born. However, I also spoke with other members of the supply chain, including stockers and packers. Because of my professional experience with members of the beef industry, both as a casual participant and as an employee of a software firm, my study was best accomplished through ethnographic methods. I had already developed contacts within the industry, and because ethnographic methods allow for personal contact and on-site study, I was able to gain direct access to my subjects and their businesses.

I was able to collect information through casual observation, conversations, and informal interviews both in person and over the telephone. My experience with the beef industry gave me the opportunity to visit many of the auctions throughout the Midwest and the responsibility for contacting them as part of my employment. In time, I was able to develop a personal relationship with many of the livestock market owners and was able to engage in very frank discussions with them.

After collecting data through informal interviews and casual conversations with various beef professionals, I was able to analyze that data on the basis of Rogers and Kincaid's definition of communication networks, Rogers' model of technology diffusion, and Fetterman and Van Maanen's ethnographic approach as described in Chapter 2, to

establish an ethnographic perspective of these interviews and to reveal some of the historical, demographic, and socioeconomic factors that may be affecting this debate. Those ethnographic methods formed the basis of my investigation into the individuals directly involved with livestock markets, animal production, and technology.

Ethnographic Methodology

As Fetterman points out, most researchers, either knowingly or unknowingly, use either ideational or materialistic theory as the basis for their research. Ideational materials stress change as a result of thoughts and ideas, while materialistic theories focus more upon materials, modes of production, and financial resources as primary agents of change.

Both ideologies are applicable to my research, because both are influential in the daily lives of market owners. I did not seek to differentiate between these two methodologies. In fact, both ideologies are so intertwined within the beef industry that one would be hard-pressed to separate the two. Market owners and producers are inherently resistant to change, and are influenced on a daily basis by external pressures. While sale owners and others within the beef industry realize that they are in the midst of industry-wide technological change, they are, in a very real sense, constrained by environmental and financial factors that affect their everyday livelihood. Hence, both ideational and materialistic concerns affect them.

For example, ideational theories rely heavily on cognitive theory, upon the notion that change comes from ideas and thought being transferred from one individual or group to another, much as Rogers and Kincaid describe when they discuss communication

networks and as Petty and Cacioppo describe with the Elaboration Likelihood Theory. On the contrary, materialistic theory rests on the principle of environmental dominance, which is ever-present within the beef industry in the form of market pressures, international demands, industry alliances, and government regulations. So, both ideational and materialistic ideologies are critical to any change within the beef industry, especially when changes rely upon new modes of thought and new modes of production.

New ideologies are not typically openly embraced within the beef industry, although they are not usually rejected out-of-hand. However, new technologies within the beef industry require both ideological persuasion and materialistic reality involving money and modes of production to gain widespread acceptance. Therefore, my ethnographic approach to conducting field research involved both of these perspectives.

One advantage to ethnographic methods of research is that they allow the researcher to gather data from a variety of sources including observations, interviews, and general conversations. My method of interaction with participants used all these tools. Because one goal of my research was to analyze the beef industry's strategies for incorporating and reacting to new ideologies and technologies, specifically the NAIS ideology and the hardware and software technology that would accompany it, the best way to accomplish my goals was to use a combination of observations, informal interviews, and casual conversations to reach conclusions based upon the framework of the social group's view of reality. Combining these methods also allowed for greater triangulation of results.

There was also the question of conducting a micro ethnographic study focusing upon small groups and individuals versus a macro study designed to view the beef

industry as a whole. Again, the best answer to this question was a combination of the two. Because many individuals, small groups, and factions exist within the beef industry, and because these individuals and small groups can be very influential within beef industry communication networks, I needed to analyze them at the micro level. In addition, I needed to take these group and individual views and relate them to national technology diffusion within the beef industry. Therefore, I needed a macro perspective as well.

My ethnographic goals, then, were to combine micro and macro research using conversations, interviews and observations. In doing so, I wanted to complete a picture of industry views from an insider's perspective concerning NAIS ideology and technology, while adding the perspective of an outsider's view to my results. I sought to reveal lines and methods of communication, pre-existing attitudes and beliefs, networked communication, and the industry's willingness to allow diffusion of new technologies. Finally, I hoped to report my findings in the form of a realist account that would portray a no-nonsense view of my findings, while offering confessional details that would allow the reader some insight into the process and explain relationships within the industry, important networks, key-actors, and the reasoning behind my methodology.

Researcher Background

I had no genuine biases at the outset of this process, except for the fact that I knew that the USDA had been frustrated in its efforts to convince the industry as a whole of the value of its proposed NAIS system and the technology that would accompany it. I grew up around the beef industry as the son of a cattle buyer. I have been in livestock markets for as long as I can remember, although I would not say that I am a beef expert by any

stretch of the imagination. I was, however, accustomed to dealing with members of the beef community and to their social interactions. By the time this research became something I was interested in, I already knew many beef industry professionals and was comfortable in talking with them.

However, my research was influenced at least to some degree by my employment with a technology firm. That firm, as a direct provider of technological services that would support the NAIS, had a decided interest in seeing the NAIS succeed. In fact, the company was originally founded on the belief that NAIS would be mandatory by 2006. Therefore, most of my initial contacts with interviewees were made with this agenda openly stated. However, most of my initial contacts were also of a simple fact-finding, casual nature. I was mostly concerned with current knowledge and opinions of the NAIS and new technology. Furthermore, as my own research progressed, I made it clear that I was no longer a proponent of the NAIS or an employee of the technology firm, but a researcher, interested only in gathering data about current ideologies and trends. I made all participants aware of my status as a researcher and made no attempt to sway their opinions on any subject. Because my informal interviews were conducted after my employment had ended, much of the potential bias that my have existed previously was eliminated.

Conversations and Observations

It is important to distinguish my formal methods of research from my more informal methods. Although I conducted informal interviews with members of the beef community, my initial interactions with them were much less research-oriented. As I have said, when I initially began to interact with members of the beef community on a

professional basis, it was as an employee of a technology firm specializing in providing computerized data banking services that would help to integrate data transfer within the beef supply chain.

While the details of the NAIS plan are quite complicated, the idea was relatively simple. Once animals had been tagged with Radio Frequency Identification (RFID) ear tags, those tags and their corresponding numbers could be scanned into a local database, much like a loaf of bread is scanned at a grocery store. This initial scanning would presumably take place either at the animal's birthplace or at its initial point of sale (such as a livestock auction). The scanned data could then be uploaded into a centralized data bank, where it would be stored and updated as the animal moved through the supply chain. Data could be added as the animal moved from farm to auction, to stocker, and so on that would form a complete picture of the animal's history and of its physical movements. The data could then be shared multi-directionally to any other individual or entity with access to the data bank. Of course, accomplishing this goal would require the addition of computerized technology, laptop computers, new internet functions, staff training, and acceptance of an entirely new method of data collection, storage, and transfer.

The company I worked for at the time and its technology offered two distinct advantages for my research. First, the company itself was in its infancy and venturing into an entirely new field. There were no established companies in this arena, so competition was wide-open and there were no firmly established rules for processes or systems of delivery. Second, the target users of the system were inexperienced with technology on the whole. This inexperience was not true of all users, but many of them

had little technological experience, and those who did were entirely unfamiliar with this type of application.

When animal identification was added to the mix, these factors combined to form the perfect opportunity to study a group of relatively inexperienced technology users dealing with completely new proposed software applications, and a new production ideology driving that new technology. This situation provided a clean slate for the beginning of my research.

My initial conversations concerning the company's technology were primarily with livestock market owners. The conversations were very casual in nature, and were designed to gather general information about personal attitudes and beliefs about technology and animal identification. I spoke directly with forty-eight livestock market owners in eight different states including,

- Texas
- Oklahoma
- Kansas
- Nebraska
- South Dakota
- North Dakota
- Minnesota
- Arkansas
- Missouri
- California

My conversations, while casual in nature, were always designed to elicit some particular information. Specifically, I was interested in determining,

- The owner's attitude toward National Animal Identification
- The owner's general comfort level with technology
- The auction's current technological status
- The auction's current physical structure
- The auction's major customers and their potential demand for source and age-verified animals
- The auction's current accounting system

I was always careful during these initial conversations, which were conducted both in person and over the phone, to ask open-ended, general questions. At the time, I did not want to scare away potential clients by seeming too pushy or by referring to technological details that might be intimidating to auction owners. I wanted the agenda of these conversations to be more implicit than explicit, as I attempted to understand meaning within the beef culture and how individual perceptions compared within that group. This method allowed for my initial contacts to be very informal rather than structured, which often elicits information that would not be obtained by a more structured interview. As Fetterman pointed out, because informal interviews should be user friendly, they should be approached with a degree of give-and-take. As my relationship with my clients/subjects continued, I was able to interject more formalized questions. Furthermore, I did not want our initial conversations to present my view of reality, as opposed to the insider's view of reality, because of my own lack of knowledge

concerning the social community. In this way I was able to combine the formal and informal interview to yield maximum results.

My research was also enhanced by a series of personal visits to livestock auctions. Between September of 2005 and August of 2006 I visited 35 of the 48 auctions that I had previously contacted by phone. All states listed above were included, with the exception of Missouri, Minnesota, and California. My personal visits to the livestock auctions allowed me to move beyond the owners' perspectives to include other livestock market staff, buyers and producers.

As I visited with owners, staff, buyers, and producers, I aimed my questions at gaining relevant data in three main areas.

1. The level of willingness among participants to use new technology and animal identification

2. Their experience, if any, using online technology, RFID technology, various software applications, and databases

3. Their level of overall knowledge concerning animal identification or new technologies and where they gained that knowledge

I chose these three areas because I knew that my conversations would need to be brief, and because I wanted to limit my questions to open-ended responses as I had done with the livestock market owners. I was looking specifically for any information that might reveal,

1. Any experience with software applications required by animal identification.

2. Positive or negative impressions of technology in general.

3. Any conception of how a new production paradigm might benefit the beef industry.

4. How new technologies and ideologies would affect specific job duties per individual.

5. Any opinions as to what others in the beef industry with similar job duties believe about the proposed changes to the industry.

6. Any opinion of how much help and guidance had been offered to them concerning new technology and animal identification.

Most of my conversations at the livestock auctions, aside from those with the owners, took place with the following types of individuals,

- The auction employee in charge of intaking animals at the unloading chute
- The office manager of the livestock auction
- Producers selling animals at the auction
- Large order buyers who regularly purchase many of the animals sold at the auctions

I chose these participants because, with the exception of the auctioneer, they represent each stage of the process of intaking and moving an animal from seller to buyer within the livestock auction and because they are the most likely users of any new technology that would accompany an animal identification system. I was interested in determining

how these participants would differ in their experience with technology and in their willingness to accept a new ideology in the beef industry.

Personal Interviews

My goal in conducting interviews with livestock market owners and other members of the beef industry was to analyze individual perceptions of technological reality and to establish patterns of communication flow and networking among the owners. To accomplish those goals, I regularly took notes during my discussions with livestock market owners and other members of the beef community. Later, I transcribed those notes into more coherent thematic descriptions of those conversations. My intent was to focus on the primary concerns of the participants and to determine what they understood about NAIS and its accompanying technology and what they did not understand.

While most of my interviews within the community shared certain common questions, questions per subject sometimes varied in their form and function. For example, I usually started with survey questions, often referred to by Van Maanen as "Grand Tour" questions, designed to give the interviewee a chance to provide broad generalizations of his world view of reality. Those questions often varied on the basis of location, experience, and the size of the market. They also varied at times on the basis of my relationship with the owner. I used those questions to define boundaries and to establish the interviewee's general activities. Afterward, I was able to ask more specific questions to gather more detailed information. In addition, I used both open-ended and close-ended questions to control response information. As I showed earlier, a question

such as, "How do you feel about technology in the beef industry?" might be used to elicit a long and detailed response that might provide unexpected information and lead to other areas of discussion. Conversely, the question, "Have you ever used RFID tags?" would be more likely to elicit something closer to "yes" or "no" as a response.

My personal interviews included 23 livestock market owners, procurement officers from major packing companies, two faculty members from Oklahoma State University, two order buying firm managers, seven order buyers, USDA Animal and Plant Health Inspection Service staff, national and state legislators, CEO's of companies within the supply chain and parallel to the supply chain, and many cattle producers. My goals in speaking to these individuals about the beef industry were sevenfold.

1. To determine the industry's comfort level with the National Animal Identification System (NAIS).
2. To assess their level of technological sophistication.
3. To gain an understanding of the values and business needs shaping their opinions about both technology and the NAIS.
4. To determine what information sources were shaping their attitudes concerning new technology and the NAIS and how influential those sources had been.
5. To ascertain how new technology and the NAIS impacts their personal and professional responsibilities.
6. To gain an understanding of the communication networks that have been most influential in their understanding of new technology and the NAIS.

7. To determine what impact information concerning new technology and the NAIS has had upon their personal opinion of new technology and the NAIS, and which sources were most influential in shaping their current opinions.

My conversations with these individuals was designed to establish an emic position from which I could determine the everyday values surrounding livestock market owners and other beef industry professionals. My goal was not to seek out the strange, but the everyday values and beliefs of the participants as they pertained to the NAIS and technology.

Technology Diffusion and Communication Networks

When considering innovations like those facing the beef industry, there is always more to the story than relating ideas and advantages to potential adopters of that technology. There are social and individual factors that affect not only the communication about these innovations, but the manner in which they are portrayed to potential adopters of that technology by others. The ethos of the change agent (the person trying to persuade another to adopt new technology), the characteristics of the social group in which the change was being sought, and preconceived notions of the change all affect the outcome of the technology's success. In essence, technology diffusion is a social change, and one that should not be confused with the advantages of the technology itself.

As explained in Chapter 2, according to Rogers, the potential benefits of the innovation motivate us to learn about the innovation, while the possible consequences of

adoption limit our acceptance. The balance between these two considerations determines our willingness to accept new technology. In this sense, innovation acceptance is essentially a process of information seeking and experimentation. The innovation in question may be the ability to boil water, or may be much more advanced, such as the development of new software for animal tracking. Whatever the case, the innovation itself usually consists of both hardware and software, although when Rogers refers to "software" he means an idea or method. This "software" may be a political or religious idea as easily as computer software. But, nevertheless, the innovation is usually a mixture of both hardware and software in that there are usually both physical and mental components to innovations. However, knowledge of the innovation alone does not necessarily translate into acceptance. After the innovation has been developed, its proponents must have a means for describing it to others if they are to seek its acceptance.

Hence, identifying the communication networks responsible for disseminating information about new technology and the NAIS was one of my top priorities in conducting my interviews. Communication channels, in their most basic sense, are a means by which messages about the innovation get from one person to another. But the messages themselves are not the pure information we would often like them to be. Most people within social networks rely upon the subjective evaluations of others to form opinions about innovations. Our decisions to adopt or reject new ideas and technologies are often based more upon the opinions of our peers within social networks than upon scientific or objective evaluation from impartial sources. Therefore, I wanted to understand the social networks shaping the debate over NAIS and technology within the

beef industry. I was also interested in judging how social status, information flow, and influence within the beef industry social system had affected opinions and how particular change agents had been able to use those assets.

To get that information, I spent hours talking with the market owners, producers, and buyers that regularly attend livestock auctions. Because I was able to travel to livestock markets ranging from Texas to North Dakota over a 9 month period, I was able to speak with hundreds of individual beef industry insiders and to ask them about their knowledge of technology and NAIS. I was also able to speak with them about where their personal information was coming from and whose opinions mattered to them. All of these conversations helped to define my perspective of the beef industry and to define the industry's reaction to the innovations accompanying NAIS. I became aware of the communication channels that were influencing the industry and the change agents within those channels. I wanted to know how and at what point livestock market owners became aware of the NAIS and at what point they formed an opinion, if they had done so, as to its worthiness to the industry.

Finally, although personal and communicative factors are the overriding determinants of persuasion and diffusion in Rogers and Kincaid's model, there are some external factors that can affect diffusion regardless of personal variables. For example, some diffusions are purely optional; they are individually decided upon and affect only the individual decider. Others are collective decisions, carried out by industries as collective wholes or by organizations. And some decisions are mandated, either by government entities or other decision-makers. The effects of these decision types depend in large part upon the nature of the individuals involved and the types of industries or

organization they represent. So it was critical for me to gain perspective, through conversation and observation, of the societal and sociological factors that were biasing the debate and to see if as Rogers had surmised, early adopters and supporters would differ personally from the resistors, and which category members of the beef industry fall into.

Although formal structures do exist for communication flow in most organizations or industries, there is also an informal element to these communication structures that often defines much of the communication that takes place. It was this informal network that I was most concerned with discovering, and the ways in which information flow was being affected by certain cliques and organizations within the industry. In the end, I was looking for evidence of what Rogers and Kincaid call *convergence*. Communication as convergence is not a linear act, but a process that is affected by the individuals involved, their experiences, their predispositions, and their personal histories. I wanted to know what those individual factors were and how they had affected convergence within the industry's formal and informal communication networks. I wanted to know how mutual understanding was being achieved and how informal communication networks were affecting that understanding, and if the understanding that had been reached is convergent, divergent, or both. Finally, I wanted to know who was turning to whom for information about impending changes to the industry.

To accomplish these goals, I asked the following questions of all informal interviewees. (Other questions followed in most cases for clarification, but these questions were universal.)

1. How would you rate your understanding of the National Animal Identification System (NAIS)?

2. What is your experience with technology including computer technology, ear tag scanning technology, and internet/database technology?

3. How have traditional beef industry values and current business pressures shaped your opinions about both technology and the NAIS?

4. Do you believe that proposed new technologies will work within the beef industry?

5. Does the new business model of the NAIS fit the needs of the beef industry?

6. Where have you gotten most of your information about the NAIS and its accompanying technology?

7. How would the implementation of the NAIS and the accompanying technology affect your daily business activities and your personal responsibilities?

8. Who do you talk to about things like the NAIS, technology, and business concerns?

9. How has the information you have received concerning new technology and the NAIS affected your personal opinion of new technology and the NAIS?

10. Which information sources were most influential in shaping your current opinion of the NAIS?

I collected information from my informal interviews in the form of written notes, which I later summarized. My notes used to extrapolate both the technological and social reality my participants, and to understand their own personal communication networks.

Textual Analysis

The second stage of my research was to analyze written communications concerning NAIS and technology. I gathered a cross-industry selection of written materials (see appendices) concerning NAIS and new technology. I selected the documents based upon author status in the beef community and upon the basis of their level of availability to members of the beef community. My focus in analyzing written documents was upon the USDA and several NAIS proponents and detractors. Specifically, I was interested in efforts to promote technology and animal identification within the beef industry, in analyzing the ways in which those ideologies were transmitted, and in comparing NAIS documentation with responses from industry alliances.

Texts for Analysis

I chose seven primary texts for analysis on the basis of two considerations. First, I wanted the texts to be from sources directly and influentially involved in the NAIS technological debate. Second, I wanted the texts to be representative of the written materials that have been most widely circulated and read by industry insiders on the basis of my conversations with members of the beef community. The primary texts for analysis were,

1. Audit, Review, and Compliance (ARC) Branch Policies for USDA Process Verified Program.

- This document is designed to give readers an overview of general policies concerning the USDA Process Verified Program.

2. ARC 1001 USDA Process Verified Program.

   - This document is provided by the USDA Audit, Review and Compliance (ARC) Branch as a guideline for applying for Process Verified Program (PVP) status. The PVP is designed to assure customers and consumers that animal products have been raised and processed according to a prescribed set of standards designed to ensure safety and quality.

3. The National Animal Identification System (NAIS). Why Animal Identification? Why Now? What First?

   - A brochure designed by the USDA as a persuasive device for beef industry professionals. It was intended to offer insight into the merits and advantages of the National Animal Identification System.

4. The United States Animal Identification Plan.

   - The initial report issued by the National Institute for Animal Agriculture (NIAA), which was the nonprofit organization that organized a task force of USDA and industry professionals in 2003 to draft a plan for the National Animal Identification system. The draft was issued in January, 2004.

5. Livestock Marketing Association Comments on the US Animal Identification Plan.

   - The Livestock Marketing Association's response to the NIAA's report, issued in January, 2004.

6. National Cattlemen's Beef Association NAIS Industry Proposal White Paper.

- The National Cattlemen's Beef Association Response to the NIAA report, issued in February, 2005.

7. R-Calf USA 2006 Position Paper: National Animal Identification System.

- R-Calf's response to the National Animal Identification System.

Together, these documents provide an overview of both the USDA's plans for the NAIS and the responses to that plan from the largest industry alliances. Using theories of communication and linguistics to analyze these documents was critical to identifying misunderstanding as opposed to simple disagreements. Also, because communications formed the foundation of the debate surrounding the NAIS and accompanying technology within the beef industry, they were critical to establishing a frame of reference for producers and livestock market owners. In essence, these are the primary users of this information. Producers and livestock market owners are the constituents of industry alliances, the suppliers of a large portion of beef in this country, and the customers of the larger organizations within the supply chain. Any attempt to persuade the beef industry as a whole to accept the NAIS, and the technology that accompanies it, would need to be accepted by these constituents.

To analyze my chosen documents, I conducted a discourse analysis of the content, using two theories of communication and two linguistic principles, including Petty and Cacioppo's Elaboration Likelihood Theory and the linguistic concepts of implicature and pragmatics. My goal was to use communication theories to discover what strategies were used, which strategies were or were not effective, and what strategies were missing.

The linguistic principles of implicature and pragmatics were necessary to identify gaps in the language of the debate surrounding NAIS technology and reader understanding. My belief was that these gaps in language commonality may have led to some of the miscommunications that have occurred during the debate over the NAIS and technology within the beef industry. I was also looking for discrepancies in terms of pragmatic assumption and implicatures required of readers that might cause miscommunication or misunderstanding.

Elaboration Likelihood Theory

As noted in Chapter 2, my goal in using Elaboration Likelihood Theory was to determine,

1. Whether an individual message was more likely to be considered using the peripheral or central route

2. The motivation of the reader to consider information presented by the source of the message

3. The ability of the reader to understand the information being presented by the message

4. The positive or negative cues most likely to be adopted by the reader in the absence of central route processing

5. Message source and bias that may have affected cognition

ELM holds that message recipients will attempt to form correct opinions based on the information they do have. While this attempt may involve some existing attitudes, personal attributes, cognitive ability to process information, and motivation based on personal relevance of the message, the issue is not *whether* the recipient will attempt to form correct attitudes and behaviors, but *how* they will do this. One goal of this dissertation was to use personal interviews to establish what passed for relevant information in the eyes of the beef industry, how much of this information was contained in the written sources I had chosen, and what percentage of livestock market owners were able to understand the information, as presented, from different sources. To accomplish these tasks, I relied heavily upon what I had learned through my observations and conversations with my subjects. Through those conversations and interviews, I was able to establish the prevalent concerns of livestock market owners and relate those concerns to ELM's descriptions of central and peripheral route processing.

Implicature and Pragmatics

As I described in Chapter 2, implicature and pragmatics are also concepts that help us to define the success of communicative actions. We need both implicature and pragmatic assumption to ensure successful communication without the endless procession of speech or text that would follow spelling out every thought or statement. My goal in using implicature and pragmatic theory as part of my discourse analysis was two-fold. I was looking for instances of both implicature and pragmatic assumption that

would hinder communication between the USDA, industry alliances, and the average beef industry professional. I defined these as follows:

- Implicatures required of the reader---defined as the number of times the reader is required to "fill in" information in accordance with the Gricean maxims and as how much background knowledge would be required of the reader to understand the text in, and complete the tasks outlined in a given section.

- Pragmatic acknowledgement---defined as the amount of context given to the reader about situational aspects of the text (i.e. in what situation you would be expected to perform certain operations or understand certain ideological concepts). Specifically, I was interested in what the texts assumed the user's context to be, the number of implicatures required by the texts, and their use of lexical items as either abstract or definite concepts.

I determined the number of implicatures present in each of the seven publications selected for analysis by using the following criteria and by assuming the abilities of an average market owner or producer on the basis of my ethnographic investigation:

1. How many times is the reader required to "fill-in" information as a result of implicature that would be beyond the ability of the average beef industry reader (as determined by my conversations with them)?

2. Does the text give indications as to the expected background knowledge of the reader?

3. Does the text offer specific contexts to use in interpreting the text?

The difficulty in doing an analysis of this type is in defining how the criteria will be counted. One the whole, my criteria were largely qualitative in this investigation. I was forced to create my own picture of the average reader and to count implicatures required of those readers on the basis of my interviews and conversations with them. However, by the time I began to analyze written documents I had already spent a great deal of time working with members of the beef community in addition to my own personal experiences with them. For the purposes of investigation, I defined the questions listed above according to the examples listed below. Phrasing that a reader who was familiar with technology and animal identification to some extent (as in how to identify a unique identification number) would be familiar with was NOT counted as implicature. However, phrasing that would be familiar to an animal identification specialist or technology specialist but not necessarily to a livestock market owner or cattle producer WAS counted as implicature.

I assumed the context of an average member of these two groups based upon my conversations and interviews with members of those groups. Some (particularly younger members) of the sample were more advanced than others, but this was not the norm. The average reader might be familiar with animal identification concepts and basic operations, but would not be familiar with specialized terms and methods of operation associated with animal identification. Results were tabulated by examining the text, one paragraph at a time, for required implicatures and pragmatic consideration.

To define implicatures I first needed to distinguish them from lexical items. Lexical items are the abstract concepts we connect with terms. For example, the term *dog* produces a certain mental image when we hear the word. There is a certain abstract

thought that accompanies this word. That abstract thought or image is what we call a lexical item. Different readers, of course, will apply different connotations to a term and hence form different, although possibly very similar lexical items. The term *dog,* being a familiar term to most, is likely to produce reasonably similar mental images among average adults. However, a more unfamiliar term, such as Radio Frequency Identification, might produce very different mental images. An implicature, on the other hand, is not what is said, but what is *not* said. It is that portion of a statement or story that a reader is required to fill in as he reads. Therefore, a lexical item does not necessarily require an implicature, but often does. For example, in dealing with common software such as Microsoft Word, if we are told to "Go to Track Changes on the Tools Menu," we have the lexical items "Track Changes" and "Tools Menu" that may or may not hold meaning for the user depending on his background knowledge. The implicature required by this statement is for the reader to determine that this entails,

1. Clicking on the word *Tools*, which is located at the top of the screen.
2. That clicking *Tools* will produce a menu below the word *Tools*.
3. That by scrolling down this menu they will find the phrase "Track Changes."
4. That clicking on this phrase will produce further options.

All of these functions are left unsaid in this example, and similar omissions are found in most texts. The implicature required, then, is that of filling in this unspoken information. In the case of a single lexical item like "Database" the reader must also create an implicature as to what this phrase means and what its use offers. So, in effect, an

97

implicature can be required by either a segment of text as a whole or by a singular lexical item.

For example, the following passage from the USDA NAIS Brochure creates implicatures on the basis of a lexical item and on the basis of assumptions made about the background of the reader.

Example 1

> Database systems must be developed and maintained, equipment must be purchased, animals must be identified and tracked, programs must be monitored, and labor is needed for all of these activities (p.8).

The language used in Example 1 requires the reader to identify the term "Database" through implicature or background knowledge. This term is not explained within this brochure, at least not to the extent that a novice technology user would be familiar with. In effect, this segment rests upon assumptions about user background knowledge concerning database technology that are probably unfounded. This assumption means that the reader will either have to stop at this point to find what the term means, or continue without the knowledge that the correct implicature would provide. In a sense, the reader is then making a decision to continue with only partial knowledge and therefore will be unable to grasp the entire meaning of the messages contained within the text.

I was also looking for provision of user context and goals within this type of passage. For example, does the text tell us *why* we might want to use a database? In this case it does not. Example 2 offers another implicature from the USDA Process Verified

Program (PVP) Policies. In speaking to what is required of PVP endorsed companies, the

USDA writes,

Example 2

> All evaluations and re-evaluations of suppliers must be in accordance with the *Principles of Auditing* as defined in ISO 19011:2002 Guidelines for quality and/or environmental management systems auditing. (p. 2)

Again, Example 2 requires the reader to possess knowledge about several terms,

including "Principles of Auditing" and "ISO." More advanced readers will understand

that auditing is related to accounting and accountability and that ISO refers to the

International Organization for Standardization. However, on the basis of my interviews,

most beef industry professionals are unfamiliar with these terms, and certainly have no

idea what the International Organization for Standardization is about. When we look at

the actual implicature drawn by this reference we see that it involves an entire series of

actions that beginning readers might be incapable of performing. If it were written out it

might look like this,

1. Discover what ISO documents are and what they mean.

2. Read document ISO 19011:2002 and determine how it relates to your

   particular business.

3. Develop a set of standards for your business on the basis of ISO

   19011:2002.

4. Apply those standards to your own business and to any suppliers who

   work with you.

As we can see, this one, simple command implicates a whole range of activities which are situated in background knowledge and dependent to some extent on the context of the operation being performed. Thus, the selection would require an implicature and depend upon background knowledge that is not present in this text. Furthermore, the text does not indicate where this knowledge could be found or the context in which the action might be performed. A true pragmatic description of context would be situated in an example that would provide the reader with a context from which to visualize the purpose of the text.

On the basis of these principles, my goal was to count the number of implicatures required of the reader of each document on the basis of language and pragmatic assumptions. I then compared each of the documents on that basis in hopes of reaching conclusions about the language used in each and how that language affected the acceptance of the promises and directives contained therein and how that language affected the use of the central or peripheral processing routes by the documents' intended audience.

Conclusion

Any investigation into an industry like to beef industry is built upon personal relationships. I spent a great deal of time establishing those relationships and developing trust during my conversations and interviews with market owners and other members of the beef supply chain. My methods used to gain information about attitudes toward NAIS and technology had to be multi-faceted to encompass the various forms of communication and the various communication channels that form the beef industry communication network. My results show that there are indeed various avenues of

communication at work within the beef industry and that communication networks are

alive and well, socially influenced, highly influenced by the attributes of members.

Chapter 5

Results

My conversations and observations of market staff revealed a wide range of attitudes concerning both technology and the NAIS. While the results were predictable to someone who has been involved in the process, they may offer some surprises to those with little experience in dealing with agricultural audiences and for those with little experience in dealing with inexperienced technology users. My initial results from these conversations and observations with market owners, staff members, producers, and buyers can be summarized by individual category.

Casual Conversation and Observation

To review the methodology, my casual conversations and observations were conducted mostly on the phone with livestock market owners and in person as I visited those markets and spoke directly with owners, market staff, animal buyers, and animal sellers. Although my casual conversations and observations varied some degree from auction to auction, they typically included the following,

- The owner of the livestock auction
- The auction employees in charge of intaking animals as they are unloaded and processed
- The office manager of the livestock auction

- Producers selling animals at the auction

- Order Buyers who purchase large quantities of animals at the auctions

I chose these participants because they represent the entire process of moving an animal from seller to buyer within the livestock auction and because these individuals are the most likely participants within any NAIS at a typical livestock auction. I was interested in determining how these participants would differ in their experience with technology and in their knowledge of the NAIS plan.

Livestock Auction Owners

My initial conversations showed that livestock auction owners already knew more than they would like to about the system. Although they are interested in the potential benefits of the system, they are concerned with the economic implications of any NAIS plan. In addition, aside from this general attitude, most owners expressed no real desire to become familiar with operating NAIS technology and no desire to become technologically proficient in the details of the system. Most of the owners I spoke with in 2006 indicated that they did not use computers on a regular basis and did not want to.

I did not get the impression that they were completely against technology. Indeed, owners described technology such as automatic scales and veterinary technology as indispensable to the cattle industry. Yet, as a group, they showed no ability to be involved in operating the technology that would accompany the NAIS---especially computers. In fact, 75% of the owners I originally contacted by telephone told me that they did not understand NAIS technology and did not feel they had been given much information

about what would be required to implement the system. One owner told me that a certain

number of market owners would need to die before advanced computer technology would

ever become commonplace in markets. In general, they believe that any NAIS plan

would result in more work for themselves and their staff and probably in additional

expenses.

As we will see later, this opinion may be correct. Moreover, it was clear from my

initial conversations with owners that they did not understand what was being proposed

and were extremely reluctant to commit themselves to any ideology or course of action

until they knew more. Furthermore, they were reluctant to commit to any course of action

until market owners had established a consensus and until the physical and technological

parameters of any such plan had been firmly established. They were also genuinely

concerned with the demands that new technology and the NAIS would place upon their

staff.

Auction Office Managers

Fortunately for the NAIS, the auction's office managers, on the whole, have had

more direct experience with technology than the owners. My conversations with them

revealed that most have had experience with a string of data collection systems over time.

However, most of these data collection systems were nothing like the advanced

technology that would be required by the NAIS. In truth, the data collection systems used

by most auctions I visited were either still based on a DOS platform, or were built to

work on outdated Novell networking systems. Of the 48 auctions I visited, 15 were in the

process of updating their systems, or were running current Microsoft operating systems, but these were not the norm.

On the whole the office managers I spoke with were by far the most accepting of the idea of new technology and business methods. They seemed to be the most willing of the participants to explore the potential benefits of the NAIS and the accompanying technology. The many tasks they perform during animal sales are often hampered by the general technological inefficiency that accompanies them. For example, my observations showed that market staff typically enter data manually for each animal as it is sold and later fax these data to the buyers, which is an inefficient and time consuming process. Many would be happy to eliminate this process if technology could help. One office manager told me that she would be able to die happy if she could just eliminate entering sale data manually. In effect, the office managers run the auctions. The owners are rarely involved in the accounting and transfer of data that accompanies a fast-moving auction. Instead, they are busy dealing with customer concerns. But, most office managers are also responsible for training their sale day staff, and my conversations with them revealed a lack of confidence among office managers concerning training themselves and others. Also, if this training were to go poorly after the technology had been implemented, the auction could be severely hampered.

Intake Employees

Before the animals could be sold at an auction in accordance with the NAIS, they would be fitted with an electronic ear tag containing unique identifying data. Tagging done at the sale barn would need to be done in the pens behind the sale barn in a specialized chute designed to keep animals stationary for their protection. Even if the

animals were tagged at the ranch before arriving at the market, the tags would need to be read with specialized wands to collect the data stored on the tag. Therefore, the employees working in the back of the livestock auction would be responsible for first tagging the animal's ear, and then reading that tag into the data collection system on a laptop computer, at a minimum. Not surprisingly, these individuals, have, for the most part, extensive cattle knowledge and almost zero exposure to the type of technology required by the NAIS. In other words, many have never used any type of computer. My impression of the intake workers in general was that they have no real fear of the technology, but do not trust it either. Most have received limited, if any help with the technology at their markets now, and would prefer direct instruction with new technology, as they have no patience for manuals or help systems that come with software applications.

In addition, they are extremely concerned with the additional animal processing time that would be required during the sale. Auctions often have hundreds, if not thousands of animals to sell on a sale day, which means that speed is critical to their tasks. Their personnel must move quickly to keep up with the demands of the auctions. An addition of one extra minute per animal, for example, could extend an already lengthy sale by hours, causing added stress for all involved.

Nonetheless, as with the auction manager, they are in favor of a system that could automate tasks and save time. However, also like the office managers, the intake workers have almost no exposure to the type of technology that would be required, and even less understanding of the NAIS as proposed by the USDA.

Order Buyers

Order buyers typically move from auction to auction on different days of the week purchasing large numbers of cattle that are then shipped to centralized locations. Their firms operate by taking "orders" for cattle from many places and then sending buyers to auctions to fill those orders, which often range in the hundreds or thousands of head. Most of their clients are either packers, stockers who intend to let the calves graze on grass or wheat as they grow, or feed yards, which hold thousands of cattle at a time while they are fed on grain.

Because the buyer and/or the staff of the buying company are responsible for quickly and accurately transferring data that usually comes by fax into a spreadsheet (which has to be done manually) they can usually see clear benefits to new technology. I spoke with several large order buyers who have experimented with some type of electronic data transfer and have experienced setbacks because of their lack of experience and lack of information. One story I heard concerned these initial attempts to streamline data transfer. The company's office was initially convinced that all of the unique identification numbers transferred with the animals were identical. This confusion resulted from their staff failing to realize that after exporting the data to Microsoft Excel, the numbers (being very long) would be automatically expressed in scientific notation by Excel. The results caused a great deal of confusion typical of the many small problems that I heard of while discussing technology and the NAIS with order buyers.

Producers

My initial conversations with producers were unenlightening. Those I initially contacted saw any form of a National Animal Identification System as an intrusion by the government into their private affairs and nothing more. Like the animal intake workers, the producers I observed and spoke with had almost no ties to technology. Most producers I spoke with would have no use for any type of NAIS system unless it had proven economic benefits or was mandated by the federal government. They are, for the most part, people who have been raising cattle for most of their lives in exactly the same way. They are not interested in changing now unless they are forced to change or they are drawn in by profits. In fact, the only example of sustained producer interest that I witnessed during my observations was at an auction in Texas where a major order buyer began offering premiums for source and age-verified calves. When the premiums were consistent, producers consistently provided the information that was needed to source and age-verify their calves. But when the premiums stopped, the producers selling animals at the auction became unwilling to provide animal data or to go out of their way to comply with NAIS goals because they had more profitable things to do with their time. Several times, I observed producers asking about premiums, only to change their minds about participating when an auction worker attempted to explain the process to them. One producer in particular told me that, "Raising cattle is a 24-7 job already. If I can't make money with this thing then I can't use it." He meant, of course, that if there were no profits to be had from animal identification, he had better things to do with his time.

Interviews

Predictably, my interviews with livestock market owners echoed my original conversations with and observations of them. However, they did provide information about the communication barriers and communication networks that have affected the debate surrounding the NAIS and the interpersonal and written discourse that have shaped opinions of the NAIS within the beef community. In addition, my interviews with university faculty members and other members of the beef supply chain provided an external perspective that also proved insightful. My interviews made several things clear. First, the beef community still has no idea what to expect from the USDA concerning the NAIS; next, livestock market owners do not fully understand either the ideology or the technology that accompany NAIS, and, finally, communication networks are influencing market owners much more than the official communications from the USDA and other proponents of a National Animal Identification System.

Interview with Dr. Christopher J. Richards

Dr. Christopher J. Richards of the Oklahoma State University Department of Agriculture reinforced my original contacts with cattle producers and offered a socioeconomic perspective of the trouble with the NAIS and related technology. He does not believe that NAIS will ever be mandatory without a disease outbreak of major proportions and that even a mandatory system would not get 100% participation. He pointed out that even though market forces such as international pressures and consumer demand are driving the push for animal identification, the specifications put forth by the USDA that govern export programs for traceable beef have several loopholes.

He also maintains that the agriculture business is generally slow to educate about innovations. As an example, he cited the fact that cattlemen often feed hay in a drought even though there are cheaper options available. Only when the hay runs out do they generally seek advice from university extension services about other options. His description of the beef industry's reticence to readily adapt to new technologies is reminiscent of Rogers' description of late adopters of technology.

Dr. Richards believes that there is now no incentive to get involved in the NAIS because early premiums have dissipated. Finally, he cites producer independence as a major barrier to the NAIS. Although some countries like Australia have been able to aggressively market their beef on the grounds of traceability and source and age verification, Dr. Richards believes that the overriding independent spirit of American producers would largely prohibit the large scale cooperation seen in Australia and other smaller countries where the national herds are more centralized and there are fewer mid-level producers. My own conversation echoed this sentiment. One market owner and two producers told me without reservation that the entire NAIS initiative was designed by the IRS to spy on their profits and animal movement. Their sentiment is an echo of the bias against the USDA that pervades the beef community and inhibits true ELM central route processing.

Interview with Dr. Bob Kropp

Dr. Bob Kropp, also of the Oklahoma State University Agriculture Department, echoes many of these sentiments. During our conversation, he made a point of telling me that many of the livestock market owners and animal producers in leadership positions

have no experience with technology because, if they went to college (and many of the older generation did not), there were no computers at that time in education. The idea of databases and electronic information is, therefore, foreign to them at a basic level. Because many of them are approaching retirement age, most feel like the best thing to do is to avoid technological progress for as long as possible, even though it may be in the best interests of the industry as a whole. They have adopted the attitude that they would rather get out of the business at this point than radically restructure their ideological business model and retool to such a large degree. In short, they are more comfortable letting the next generation of owners and leaders adapt to new technology that they neither understand nor want. There is a next generation, but it will be some time before their percentage of ownership among the markets is sufficient to make an impact.

Interview with Ken Bull

One of the most illuminating interviews I conducted outside of the livestock markets was with Ken Bull, Vice President of Procurement for Cargill Meat Solutions, one of, if not the, largest beef packing companies in the world. Mr. Bull spoke with me at length about the problems facing the NAIS. As an executive in a major meat packing company, Mr. Bull has far more understanding of the plan than most of the other professionals I interviewed.

Mr. Bull's attitude can best be summarized as cautiously optimistic although disdainful of the current USDA plan. He reiterated to me that the beef industry still has no clue about how two of the US mad cow disease cases actually started. He sees this as a definite problem. However, he was adamant that the current plan for the NAIS offers

little profit return on investments that would have to be made to implement the NAIS plan.

He believes that the USDA will never be able to justify a national system solely on the basis of risk, and that they must provide incentives other than a "feel good attitude" for participants to justify a national system. Otherwise, Mr. Bull believes that the only way to gain widespread acceptance would be to mandate participation, which would require political action. In his opinion, political action will be hard to gain because of the USDA's long history of ignoring the business needs of the beef industry and industry alliance ties to state and national legislators. Finally, Mr. Bull said that although some companies like McDonald's have actively pushed NAIS and have even offered to pay premiums for source and age-verified animals, they have stood alone for the most part among large retailers, because others have been unwilling to commit to a plan backed by the USDA that is so ill-defined. Mr. Bull claims that the plan changes from month to month, continually being swayed by different special interests, which leads to a continually changing story from the USDA about what will be expected of participants.

Other Conversations and Interviews

I also conducted interviews and had conversations with personnel from other companies and backgrounds. Some of those included Smithfield Foods, Tyson Foods, several order buying firm managers, several order buyers, USDA Animal and Plant Health Inspection Service staff, national and state legislators, CEO's of companies within the supply chain and parallel to the supply chain, and many cattle producers. I will return to some of those conversations in my discussion chapter, but several themes emerged which echoed my interviews with livestock owners; namely, that the USDA's plan had

been ill-defined from the start, that it had been communicated poorly, and that there is

still no general consensus as to what the plan will be or if it *ever will* be.

Interviews with Livestock Market Owners

All of my personal informal interviews were conducted with livestock market

owners. Of the 48 owners I had originally spoken with and/or visited, 25 were willing to

participate in casual, informal interviews concerning the NAIS and technology. I knew

some of those who refused to participate well enough to ask, "Why?" The most common

answer was that the owner believed that he would have nothing to say on the subject.

Further investigation revealed that many of those who did not participate felt that they

had not spent enough time personally investigating the facts to offer insightful comments.

I attributed their reluctance to apathy at first, but as my study progressed, I began to see

their reluctance as confusion, more than apathy. My interviews provided direct insight

into the reasons behind this surface-level apathy. Again, here are the primary questions

asked, and summaries of their responses to those questions. The responses on the whole

were surprisingly similar.

1. How would you rate your understanding of the National Animal

   Identification System (NAIS)?

All owners I spoke with had some understanding of the plan, but only 20% rated

their understanding as "good." They were all also quick to add that the USDA does

not know what it wants to do either. Naturally, I spoke with some owners who had

spent more time investigating proposed regulations than others, but the general

consensus was that owners do not believe anyone understands the plan at this point,

most of all themselves.

2. What is your experience with technology including computer technology,

ear tag scanning technology, and internet/database technology?

Most owners I spoke with (72%) have had at least some experience with tagging

animals at this point. The required animal pregnancy scan has also given them some

insight into the process of reading a scan. In addition, some of the younger market

owners have had experience with computer technology, but only 4 of the 25 owners I

spoke with are under the age of 40. Two of those have veterinary medicine degrees,

while the others have degrees in animal science or a related field. Still, members of

the older generation of market owners have almost no computer experience, and those

that do have not used that experience to influence the industry as a whole.

3. How have traditional beef industry values and current business pressures

shaped your opinions about both technology and the NAIS?

In general, when asked this question, owners respond that the resistance to

technological change comes from their customers more than from themselves. Most

owners (92%) report that their local producers do not want to deal with the NAIS, do

not understand it, and are under no immediate pressure to get involved. Because there

are still so many small producers whose animals make up such a large percentage of the national herd, it is difficult to get a high degree of participation in any program at this point.

Also, three market owners mentioned that a large portion of small producers are not directly involved in raising animals for large profits, but are interested in the lifestyle that comes with raising cattle. In my experience, many small producers are attracted to raising cattle for the independence it provides and for the outdoor, hands-on work that it provides. Computers and databases are not a part of that vision. In short, their customers are resistant to change and to computer technology.

4. Do you feel that proposed new technologies will work within the beef industry?

Somewhat surprisingly, 76% of market owners answered yes to this question, although they do believe that the process will be a lengthy one. Market owners believe that the USDA has done a poor job of defining exactly what those technologies would be and how they would be used. Instead, they have tried to let private industry complete this part of the picture, even though they have, as yet, not made clear what their own goals are. Market owners also state unanimously that any technology diffusion would require additional training for their staff. Yet no funds or opportunities for that training have been provided or even discussed. Finally, they are clear in their belief that any move to technological means of animal tracking will have to be mandated or demanded by the market before most market owners are willing to

get involved, and even then, they would need much more information about the plan and its regulations.

5. Does the new business model of the NAIS fit the needs of the beef industry?

My sources responded in the negative by 80% to this question. Although they tend to believe that some form of NAIS is inevitable, they also tend to be more than willing to wait for its arrival. Information is a critical commodity in the beef trade. Yet 76% of market owners see no guarantee in their ability to control their information or to receive data back from higher levels of the supply chain if NAIS is implemented. Packers and feedyards are notorious for their unwillingness to share pricing and purchasing data according to my subjects. Their reluctance has led many small producers to see the NAIS plan as a plan to create one big database that could be used by the "big boys" to manipulate the market to their own advantage.

Because the USDA has been unable to explain to them exactly *how* data will be controlled and kept private, and because producers and market owners have limited trust in the USDA to begin with, there is little chance that they will be convinced of their data security without specific procedures being laid out and explained to them in detail.

6. Where have you gotten most of your information about the NAIS and its accompanying technology?

Market owners overwhelmingly (96%) responded to this question by citing the

Livestock Marketing Association (LMA) or another industry alliance regardless of

their background with computer technology or their reported understanding of NAIS.

These alliances are clearly thought of as unions, not just organizations. Market

owners say that they do not believe that the USDA has their best interest in mind like

the LMA does, although 100% of them report having read at least some of the

information distributed by the USDA and other proponents like McDonald's.

Market owners I interviewed told me that information from the USDA is largely

unreadable and not written in a familiar context. One owner called USDA materials

boring and uninformative. Furthermore, though his customers know that the USDA

materials are available, nobody wants them because they are not written in a language

that they understand. As a result, they just collect dust.

Producer opinions are a major determinant of market owner opinion. According to

market owners, producer opinions are not being formed by the USDA or other NAIS

proponents. During my conversations and interviews with market owners, I heard

over and over that most cattle producers with no opinion of the NAIS will go to a

friend first, a competitor second, and an enemy third before seeking official USDA

information on the subject of the NAIS. The result of this avoidance is that most

opinion concerning the NAIS is formed "in the coffee shop" as one producer explains

his understanding of the program to another. That understanding is almost always

based upon an interpretation of the NAIS that has been received from an industry

alliance such as the NCBA or a trade journal targeted specifically to the producer's niche within the beef industry.

7. How would the implementation of the NAIS and the accompanying technology affect your daily business activities and your personal responsibilities?

The first response to this question was *always* to cite increased costs and increased demands upon staff and producers. There is genuine resentment among market owners and producers alike toward the USDA for proposing a system that will cost them money while the USDA is unwilling to provide funding for training and expenses. Because market owners sell animals on a commission basis, they rely upon their customers' animals to create revenue. And because the producers have little desire to participate in NAIS, no market owner wants to be first to adopt the system, thereby increasing costs to his customers and potentially driving them to a competitor.

Second, there is a genuine fear among market owners that any technology that would necessarily accompany NAIS would be cumbersome and difficult for their staff to operate. Every owner I spoke with (100%) expressed worry that NAIS might slow the pace of auctions and drive away buyers as they became tired of spending more hours at the auction.

8. Who do you talk to about things like the NAIS, technology, and business concerns?

According to market owners, there are more meetings on this subject than one might think. But again, the information that most owners (88%) trust comes from meetings of industry alliances and special interest groups. Owners are much more likely to speak with another market owner or an officer from the LMA or a similar alliance than they are to seek information directly from the USDA or other proponents of the system. It is interesting to note that although they are in direct competition with other market owners in many cases, they still prefer their competitor's opinions to more "official" NAIS information sources.

9. How has the information you have received concerning new technology and the NAIS affected your personal opinion of new technology and the NAIS?

Not surprisingly, 92% of market owners say that their opinion has changed little from three years ago. Most (82%) say that their initial interest in NAIS was met with indecision and poor planning from the USDA. After that, interest quickly faded. While they say that they have been paying attention since then, owners have not been persuaded by additional information from the USDA or by attempts to explain the good of the NAIS for the beef industry as a whole. If anything, the information flow from industry alliances and other beef industry professionals has reduced the

willingness of market owners to get involved. Owners typically report that they trust

the LMA much more than the USDA and that they are unwilling to go against their

"union" solely on the basis of USDA propaganda (which they do not trust anyway).

10. Which information sources were most influential in shaping your current

opinion of the NAIS?

Once again, the clear winners were the industry alliances and peers within the

industry. Not one owner told me that his primary source of information concerning

NAIS had been the USDA. Instead, they revealed that information from the USDA

strikes them as hard to understand, removed from their personal situation, mired in

bureaucratic conventions, and in some cases decidedly against the best interests of

owners. For example, as one owner said, "They've (USDA) messed this thing up

from the start. They can't even tell me what they're going to do. Then, when

everybody got down on them for not having a plan, they tried to tell us that this was

insurance for our industry. I'm not paying for that policy."

Communication Networks and Technology Diffusion

Rogers describes diffusion in terms of benefits that enhance acceptance of new

technologies and ideologies, and possible consequences that limit that acceptance. He

also defines innovations in terms of hardware, such as new equipment, practices, and

technology, and software, the abstract ideologies whose acceptance requires a deviation

from current thought and acceptance of a new paradigm.

As shown by my conversations with livestock market owners, the hardware that accompanies the proposed NAIS is still largely a mystery, even to those who study NAIS developments. I had conversations with market owners that supported this interpretation. For example, one market owner told me, while I was visiting him in South Dakota, that he had recently purchased a software system that would perform all functions of the proposed NAIS with no additional hardware required. At his invitation, I was able to examine his new software. It was certainly a capable accounting system and capable of automating certain communication functions, but was in no way capable of creating and tracking the type of data sought by the USDA and the NAIS.

I had many such experiences, but even in the most remote locations I did not find a single market owner who had not at least heard of the NAIS and spent at least some time gathering information about it. Still, two facts are clear. One is that the hardware that would accompany the NAIS is either misunderstood or not understood by most market owners and producers. Market owners believe that the USDA does not understand what will be required in terms of hardware either. Their record of continually changing the plan for a NAIS does nothing to change this assumption. In effect, then, with no clear description of hardware and its functions to evaluate, market owners and their customers are unable to see the potential advantages of such hardware. Even if the requirements were clearly drawn, they probably would not understand the potential benefits on the basis of the information they have received.

The other clear fact is that, the top-down communication network that would maximize the USDA's ability to control the discussion of the NAIS (whereby information would flow from the USDA and other architects of the system to large and

small businesses and producers along the beef supply chain), does not exist. Industry alliances such as the LMA, the NCBA, and R-Calf are much more likely to be primary sources of information than is the USDA or other proponents of the NAIS. Secondary information sources are most often peers within the industry or others that might be found at local meetings or at the coffee shop. The USDA and other proponents such as McDonald's and other retailers are a distant third in this communication network.

According to Rogers (1995), an innovation must have both clear advantages and a means of communication to explain those advantages to would-be adopters in order to gain acceptance. Because the advantages and possible drawbacks of the system are unclear to market owners and their customers, and because communication of its advantages has been hampered by unclear and often diverted (through industry alliances) communications, successful diffusion is nearly impossible according to Rogers' model. The fact that officers within the LMA have the highest change agent status within the livestock market social group, as was routinely reported to me by the owners, does not help the USDA's agenda. As I mentioned in Chapter 3, the USDA's announcement of the NAIS plan set off a power struggle between industry alliances who sought to control the process of shaping the plan. The ensuing struggle, and the USDA's inability to mediate that struggle according to market owners, have permanently damaged the USDA's efforts to become change agents on the topic of NAIS.

Rogers speaks to this facet of diffusion when he presents timing as a crucial element in the diffusion process. Market owners that I spoke with usually told me that the USDA had botched the NAIS rollout from the start. However, the timing of that rollout, combined with poor communications, and failure to recognize the prevalent

communication networks within the beef industry, were at least as responsible for the ensuing backlash as poor planning, in the eyes of market owners.

Another factor directly affecting the debate over the NAIS is that the plan is in no way mandated at this time, despite the best efforts of the USDA. The program's voluntary status means, within Rogers' model of diffusion, that diffusion is a social one. One thing that is clear from my discussions with market owners is that the communication networks described by Rogers and Kincaid do exist, and that they are in fact one and the same with the social networks that exist within the industry. Every market owner I spoke with would turn to a peer or friend first for information concerning the NAIS or, for that matter, any business decision. When the industry alliances are added to this equation (they elect officers from their own ranks) the communication networks become even more closed and self-reliant.

The nature of the beef industry's sociological makeup also contributes to the communication network's influence. Market owners and producers generally fall into the category that Rogers calls "late adopters." In general, my interviews show that when compared to what Rogers describes as "early adopters," they have less formal education, are exposed to less mass media, have fewer channels of interpersonal communication, have less contact with industry change agents, are less socially active, and are not cosmopolite. People within the beef industry tend to stick to their own kind. They tend to be heavily involved in their work, do not seek influence from external sources, and are highly independent, not overly social, slow to trust and to change, and uninterested in societal fads. This generalization does not apply to all market owners and producers, but none of the owners I spoke with could be described as early adopters based upon Rogers'

definition. In fact, most of the people I spoke with that could be described as early adopters were either involved in "higher" levels of the beef supply chain, such as packing or retail distribution, or were involved with a business that produced some sort of technology support for the proposed NAIS.

Market owners and producers also tend to be close-knit, both in their social groups and their communication networks. Their convergence, as described by Rogers and Kincaid, happens only within established patterns of communication, between themselves, others like them, and alliances they trust implicitly. They converge only by agreeing to general opinion within their own established communication networks, and are inherently *divergent* from external communication networks or even those that are perceived as outsiders. These attributes make them, in Rogers' definition, late-adopters of new technology and ideologies, and in the Rogers and Kincaid view of communication networks, isolates within the larger beef supply chain. Therefore, any attempt to persuade them must first conquer the natural defensiveness of the livestock market/producer communication network, and then be extremely persuasive in order to convince a naturally distrustful audience being asked to move out of its comfort zone.

Textual Analysis with Communication Theory

My next course of action was to determine what messages were being given to the market owners and their customers, and to analyze those messages on the basis of both my personal communications and observations and from a theoretical perspective using the Elaboration Likelihood Model and the linguistic concepts of implicature and pragmatics.

I began with the Elaboration Likelihood Model. My goals in using Elaboration Likelihood Theory were to determine,

1. Whether an individual message was more likely to be considered using the peripheral or central route.

2. The motivation of the reader to consider information presented by the source of the message.

3. The ability of the reader to understand the information being presented by the message.

4. The positive or negative cues most likely to be adopted by the reader in the absence of central route processing.

5. Message source and bias that may have affected cognition.

The results of my analysis, by document, were as follows,

1. **<u>Audit, Review, and Compliance (ARC) Branch Policies for USDA Process Verified Program.</u>**

This document (see Appendix A) was designed to give readers an overview of general policies concerning the USDA Process Verified Program (PVP) and also contains specific procedures for applying for PVP status. The PVP was designed as an accountability tool to allow private enterprise to advertise their adherence to certain quality standards that would ensure product safety. In many ways, the PVP was a marketing tool, designed to recover lost export markets. However, it was the first written product encountered by many American beef industry professionals, which had specific

guidelines for quality management. While the PVP is separate from the NAIS, it was a

"first-look" for the frontline market owners and beef producers at the type of bureaucratic

requirements that might be required of such a system.

In short, the requirements of the PVP confused market owners and producers.

They were not intended to be participants in this program, but because they knew of the

impending NAIS initiative, many were interested in the requirements of the PVP. Their

fears were quickly confirmed by the most influential sources within their communication

networks. The PVP requirements were designed by the Agricultural Marketing Service

(AMS), while the NAIS is directed by the Animal Plant and Health Inspection Service

(APHIS). In theory, the two divisions of the USDA have separate missions. This

distinction, however, was not clear to many within the market owner/producer

communication network.

The communication network members were undoubtedly already biased by the

fact that the PVP was a USDA creation. However, many were also intrigued. Yet the

details of the PVP do not lend themselves well to central route processing as defined by

ELM. First, the language is intensely bureaucratic. For example, this section gives an

overview of the requirements for agricultural product data services,

> Data services may or may not validate the data that is entered into an approved   USDA Process
> verified Program data system. However, the company must clearly distinguish between the
> validated and non-validated data. Data that is not validated may not be used to meet the
> requirements of other AMS marketing programs. Data must be validated through on-site
> evaluations and data evaluations. Data validation must be addressed within the receiving process
> under the Programs.

Using the principles of ELM, it would be almost impossible to conclude that any

livestock market owner or producer would be able to use the central processing route to

think critically about this passage. The references to data and data services within this section, and throughout the document and its accompanying instructions only serve to confuse and provide negative cues to the reader. My interactions with market owners and their clients prove that they consider the document vague and ill-defined, requiring the business entity only to "have a defined process" for procedures. The resulting ambiguity served only to prevent them from understanding despite their initial motivation, and thus limit central route processing.

2. **ARC 1001 USDA Process Verified Program.**

This document was provided by the USDA Audit, Review and Compliance (ARC) Branch as a guideline for applying for PVP status. These are the step by step guidelines for applying for the program outlined in the document above. Unfortunately, the specific requirements are often as vague and confusing as the overview. The program requirements cover 19 pages and still fail to identify specific tasks or procedures to be performed. The document lists these requirements.

The company must

a) Identify the processes needed for the QMS and their application throughout the company;
b) Determine the sequence and interaction of these processes;
c) Determine criteria and methods needed to ensure that both the operation and control of these processes are effective;
d) Ensure the availability of resources and information necessary to support the operation and monitoring of these processes;
e) Monitor, measure, and analyze these processes; and
f) Implement actions necessary to achieve planned results and continual improvement of these processes.

The individual business is responsible for developing quality standards that will adhere to these vague standards. The problem with this approach is that it requires those who are

already confused about the standards of the PVP to develop their own procedures that

will adhere to those standards. The program requirements continue by demanding the

business produce a quality manual that will meet the following stipulations for a quality

management system,

a) An organizational chart or similar document listing all personnel assigned to managerial positions within the program;
b) A description of the scope of the QMS, including details of and justification for exclusions;
c) The specified process verified points;
d) Documented procedures established for the QMS;
e) Reference to all forms, tags, and labels used to track or demonstrate product conformance;
f) A master document list that shows the most current issue of all QMS procedures, forms, tags, and labels used to track or demonstrate conformance;
g) A description of the interaction between the processes of the QMS; and
h) All other documentation as required in this Procedure.

Again, as with the general overview of the PVP, it would be nearly impossible for a

livestock market owner to adhere to these guidelines even if he understood them. It is

important to note, once again, that these requirements were not written for livestock

markets, yet they were widely distributed among all segments of the beef industry. As

with the general overview of the PVP, there is nothing in this document that would allow

readers to use the central processing route even if they were motivated and unbiased.

Based upon my experience with livestock market owners and their customers, bias did

exist, and the document's language is too far removed from anything feasible or

recognizable to small business owners or cattle producers to counteract that bias through

central route processing.

For example, section 1.2.3 deals with document control and reads as follows.

1.2.3   Control of Documents
The company must control all documents required by this Procedure.

a) A documented procedure must be established to define the controls needed
b) To control all documents required by this Procedure;
c) To ensure that changes and the current revision status of documents are identified;

While these directives might be usable by someone accustomed to designing audit-based processes on the basis of government directives and the bureaucratic vocabulary, they constitute a foreign language for most members of the livestock industry. The language of the document is far too removed from the daily operation of a livestock market owner or producer to reasonably employ central route processing, which is just another way of saying that there is no pragmatically-based interpretation of the requirements of the PVP for market owners or producers. I intentionally disqualified this document from implicature counting. The document *is* an implicature, having almost no applicable text that can be applied to any daily operations of an average beef industry professional.

3. The National Animal Identification System (NAIS). Why Animal Identification? Why Now? What First?

Unlike the previous two documents, this pamphlet *was* designed specifically for producers and others within the beef industry who might have limited knowledge of the NAIS. It was intended to be persuasive by providing insight into the merits and advantages of the National Animal Identification System. Unlike the PVP documents, this pamphlet was published by APHIS, which is directly in charge of the NAIS. Interestingly, the message from the start is that the NAIS is about controlling disease, and the language is much better suited to a livestock industry insider than that used in the PVP documents.

However, on the basis on my interviews and conversations, market owners and producers find more questions unanswered than answered by this document. For example, technology is not mentioned until the final page of the document. When technology is addressed, it is as follows (p. 8),

> Rather than focus on specific technology, USDA will focus on the design of the identification data system—what information should be collected and when it should be collected and reported. Once the identification system is designed, the market will determine which technologies will be the most appropriate to meet the needs of the system.

Although this is interesting, necessary information, it lacks the type of specifics that would allow livestock market owners and others within the beef industry to think critically about the NAIS using the central processing route. Unlike the PVP literature, this text is readable and understandable because it is not overly reliant on bureaucratic, vague terminology and not overly dependent upon technical terminology. However, much like the PVP requirements, it is so devoid of specifics that there is nothing to consider critically. Livestock market owners have told me that when they look at this type of document they are further convinced that the USDA has no plan. Nothing in this document details how supply chain complexities would be handled by the proposed system. Also, there is no plan outlined to pay for the system or to train personnel to operate whatever technology would be required by NAIS, both of which are clearly central concerns of livestock market owners. When the pamphlet does finally refer to these questions (in the final paragraph) they are addressed as follows,

> Both public and private funding will be required for the NAIS to become fully operational. Database systems must be created and maintained, equipment must be purchased, animals must be identified and tracked, programs must be monitored, and labor is needed for all of these activities.

Again, while this information is undoubtedly true, there is nothing to critically evaluate here, and nothing that would be persuasive based upon my interviews with livestock market owners.

4. **The United States Animal Identification Plan.**

This document is a summary of the initial document issued by the National Institute for Animal Agriculture (NIAA), which was the nonprofit organization that organized a task force of USDA and industry professionals in 2003 to draft a plan for the National Animal Identification system. The plan can be viewed as the document that started the outcry surrounding the NAIS to this day. As I described in chapter 3, the NIAA's inclusion of some groups in drafting the plan at the expense of others created a highly politicized atmosphere from which the industry has never fully recovered. As with the USDA's materials, when viewed through the lens of the Elaboration Likelihood Model, the document falls short in its ability to engage members of the beef community in persuasive, critical thought.

For example, consider the following passages,

- The infrastructure for individual animal identification will be made available as premises become enrolled to provide for the timely introduction of official ID with the new national numbering system (p. 2).

- The plan contains no mandatory requirements at this point in its development. Eventually, as the plan is finalized and tested, all livestock and food animals will be able to be tracked through the system (p. 2).

- While preliminary projections for financial requirements have been made, the
  plan is still being developed so no specific amounts are yet available (p. 2).

The NIAA's plan never gets more specific than these general, sweeping statements. Like the USDA's brochure, the plan makes grand claims for what will be accomplished by the NAIS without offering any specifics about *how* those goals will be accomplished, what will be required, or who will pay for meeting those requirements. So, while the plan may sound like a good idea in theory, the biased, skeptical readers of the plan that are the producers and livestock market owners in the US are again given nothing concrete to consider, no reason to alter their perception, and are again unable to use central route processing for lack of information. Even if market owners had been desperate to understand the NAIS, the NIAA's document gave them nothing specific to judge, and no reason to be persuaded that the plan is a necessity.

At the same time, the document makes several promises as to what the plan will do and when its goals will be attained. Among those promises is a call for a national premises registration system to be established in 2004. Also, the plan calls for mandatory participation in the NAIS by 2006. However, over time, both of these target dates and many others have come and gone. The USDA continues to set new deadlines for premises registration and other facets of the program that cannot be met. The result has been a decrease in the perceived power of the USDA to be sincere about its own policies and to implement those policies. My conversations with owners and producers made that point clear.

5. **Livestock Marketing Association Comments on the US Animal Identification Plan.**

This document is the Livestock Marketing Association's response to the NIAA's report. Despite the fact that the LMA was involved in the drafting of the NIAA's proposal, their objections are evident from the start of their comments. They do not directly attack the NIAA, but immediately turn to commenting on the long history of livestock markets as focal points for disease control and the long history of livestock market owners in bearing the burdensome costs of those initiatives. From the perspective of ELM, one difference between this document and those produced by the USDA and the NIAA is that the LMA's comments are directly related to the day-to-day operations of the livestock markets themselves. For example, consider the following passage from page 2 of the LMA's response,

> It is important that the cost projections of the ID program as they relate to markets consider much more than just the cost of the "Data Collection Infrastructure" or market readers, if indeed that is what the current United States Animal Identification Plan cost projections cover. For instance, the cost of refitting markets to accommodate the movement of animals through the market and past the readers will likely be much greater than the cost of the readers themselves. Also, we anticipate that the cost of setting up and maintaining a computer infrastructure and hiring technical staff to run and maintain these systems in the markets will be equally enormous.

As previously discussed, the owners' central processing concerns are based upon financial and training needs, lack of support from and mistrust of the USDA, and lack of specifics from proponents of the NAIS about how the plan will be executed. In the space of one paragraph, the LMA's document does more to address the specific concerns of the livestock market owners than any of the documents I have seen from proponents of the

system. At the same time, the LMA's response confirms those fears and implicitly invites the membership to oppose the plan by alluding to the plan's financial cost as enormous.

Furthermore, after examining the lack of funding and underestimated costs projected by the NIAA, the LMA's document goes into an in-depth analysis of the many potential problems they expect livestock markets to encounter on the basis of the vague specifications set forth by the NIAA. The LMA is persuasive in both their ability to speak directly to the concerns of the market owners and in their ability to provide a day-to day operations perspective of the many potential problems with the NIAA plan, largely because the LMA leadership is comprised of livestock market owners. They understand the context of other market owners and write directly to their concerns, unlike the USDA. Their commentary is understandable, and motivates readers to consider their information carefully, as it relates directly to their daily concerns.

The NIAA plan, they say, claims to offer the ability to track livestock. Yet, as the LMA points out, there are innumerable variables and animal co-mingling variations that must be addressed before any such plan could even begin to become reality. The USDA describes no plan for those eventualities in its documents. Their plans have no procedures for moving animals through tagging at livestock markets, what information would be required at the markets, or who would oversee the proper coordination and compliance of those activities.

6. **National Cattlemen's Beef Association NAIS Industry Proposal White Paper.**

This white paper was the National Cattlemen's Beef Association response to the NIAA report. Like the LMA's response, the NCBA's paper immediately focuses upon

the financial concerns of its membership, saying that the USDA has yet to receive the necessary level of funding to make the NIAS fully implemented, and thus, like the LMA's document, speaks directly to one of the primary concerns of their membership.

However, unlike the LMA's document, the NCBA goes on to provide a rationale for a completely private system, also by speaking directly to constituent concerns over data privacy. Because many producers are greatly concerned over the federal government or large businesses gaining access to their personal data, the NCBA's proposal calls for data service providers and data trustees, both of which would be private industry sources, to control the data and to provide services only in accordance with mandates approved by the NCBA's constituents and the technology firms serving as contractors to the privatized national system.

Interestingly, the NCBA does not discount the need for NAIS, but their document is persuasive to their membership on the basis of ELM because of its ability to speak directly to member concerns over price fixing by large companies, unfair competition, and the USDA's inability to describe how confidential data will be protected. As ELM postulates, potential bias can have a strong influence upon persuasion. In this case, it seems that the NCBA chose to start from the basis of that bias and move toward a quieting of their members' fears through proposing a privately held plan that would be more in tune with the desires of their membership.

However, unlike the LMA's plan, rather than pointing directly to the day-to-day operations that would be required of their members, the NCBA's document makes certain promises that are designed to largely remove members from the process. On the whole, it must be said that the NCBA's response to the NIAA plan is not as readily understandable

as the language employed by the LMA. It is more technical, and speaks more to the

technological requirements of any NAIS than the other industry alliance documents.

Yet it is highly persuasive in its promises to privatize the system, remove "Big

Brother" from the equation, and to fanatically protect system data from outsiders. The

NCBA's promises read more like, "we know you don't understand but we do" than the

LMA's direct interpretation of the effects of any NAIS. Still, the promises provide their

own comfort to the NCBA audience by removing the responsibility of compliance from

the average producer, which correlates with one of the postulates of ELM. By removing

personal responsibility from their audience, the NCBA document, in many ways,

encourages members to use the peripheral ELM route when considering NAIS and to

defer to their NCBA "union" on the matter.

7. **R-Calf USA 2006 Position Paper: National Animal Identification System.**

R-Calf's response to the proposals that came from the NIAA's meetings is

straight forward. Unlike the LMA and the NCBA, the concerns of the R-Calf

organization, which consists mostly of cow-calf producers, center upon whether a need

for a national animal identification system truly exists. R-Calf initially proposed Country

of Origin Labeling (COOL). In their view, the need for a national animal identification

system has never been truly demonstrated. They believe that labeling beef products by

country of origin would give consumers the information they need and require the US

beef supply chain to strictly regulate its own quality.

Yet, like the documents from the NCBA and the LMA, R-Calf's documents

consistently speak to their member concerns, and like the LMA document, to the specific

concerns of their members that are related to daily business operations. R-Calf's position is that any system must remain in public, rather than private hands, because of a private system's potential for abuse by large business interests.

This position is consistent with R-Calf's commitment to the "small operator" and traditional values. For example, R-Calf believes that any national system must include traditional methods of animal identification such as branding. Traditional identification methods would be difficult to incorporate into the digital system proposed by the USDA and other alliances. However, like the responses from the LMA and the NCBA, R-Calf's commitment to branding, public funding, and data protection is consistent with the values of their members, as I found in my discussion with many northern state producers and livestock market owners.

And once again, on the basis of those values, R-Calf's positions can be much more easily analyzed by their members than those of the USDA because of the language used, the paper's ability to link the issues to producer's daily concerns, and its ability to speak to the fears concerning the NAIS that hamper the USDA's efforts among producers. The paper is inherently more likely to be thought of using what ELM calls the central processing route without the bias that would accompany reading a USDA publication.

Also, like the NCBA and the LMA, this paper was produced by an organization whose sole mission is to safeguard the livelihood of its members. According to the postulates of ELM, the members of R-Calf will be more motivated to read this paper than one from the USDA on the basis of this fact alone. But when the content of that paper is consistent with the daily operations of its membership, and the content of the USDA

publications is not, the reader's motivation and ability to process the information are greatly enhanced, and their understanding of the complexities of the system are much more likely to be drawn from the R-Calf documents than they are from documents produced by the USDA.

The message of R-Calf to its members is more prohibitive than inclusive. Unlike the messages of the LMA and the NCBA to their membership, R-Calf's seems only to indicate their willingness to fight against a mandated system and to guard small producer's data against an incursion by the federal government. R-Calf has been direct in their questioning of the NAIS, and has generally refrained from giving their membership directives. Still, as with the other industry alliance documents, they are much closer to the concerns of the average reader than anything produced by the USDA.

Textual Analysis with Implicature and Pragmatics

As you might expect from the results shown by analysis with communication theory, the results of my investigation show large differences in the numbers of implicatures and in the extent and depth of pragmatic consideration given to readers in the definition of context and background knowledge. While none of the texts overtly describe the type of background knowledge required by the reader, it is easy to see that the texts are written for very different audiences in terms of their background, and the implicatures required of readers show a clear pattern.

In general, the USDA and NIAA documents show a consistent disregard for both reader vocabulary and reader background knowledge. Although there are a handful of beef supply chain professionals that would understand the USDA's documents, they are

far from the norm. As I have described, most members of the supply chain expressed to me in conversations and interviews that the type of terminology found in the USDA documents is largely foreign to them and to their customers. Furthermore, when implicature is required by the documents from the USDA and the NIAA, it is consistently reliant upon ideologies far removed from the daily activities of any market owner or producer. Finally, and this is perhaps the most pronounced difference, the texts from the LMA, NCBA, and R-Calf only introduce one concept at a time and tend to base their analysis of any given concept from the USDA and NIAA documents upon "real-world" concepts that can be pragmatically applied by most of their members. The difference in the number of counted implicatures required of readers is largely a result of this. Total implicature counts for the seven documents analyzed were as follows,

Table 1: Implicatures required by text.

Text	Implicatures Required
Audit, Review, and Compliance (ARC) Branch Policies for USDA Process Verified Program.	14
ARC 1001 USDA Process Verified Program.	Disqualified because of overwhelming implicature
The National Animal Identification System (NAIS). Why Animal Identification? Why Now? What First?	10
The United States Animal Identification Plan General Overview	8
Livestock Marketing Association Comments on the US Animal Identification Plan.	4
National Cattlemen's Beef Association NAIS Industry Proposal White Paper.	25

R-Calf USA 2006 Position Paper: National Animal Identification System.	0

Table 2: Terms requiring implicature.

Text	Implicatures
Audit, Review, and Compliance (ARC) Branch Policies for USDA Process Verified Program.	Verification Data services Validate Data Program Data System Non-validated data On-site evaluation Data Evaluation Data Validation USDA Process Verified Program Audit Principles of Auditing ISO 19011:2002 Independent and systematic Evidence-based approach
ARC 1001 USDA Process Verified Program.	Disqualified on basis of near complete implicature
The National Animal Identification System (NAIS). Why Animal Identification? Why Now? What First?	Identification data system National Data Standards System architecture Premises and animal identification State or tribal animal health authority Animal identification number distributor Database Zoonotic disease outbreak Identification system Design of the identification system
The United States Animal Identification Plan	Radio Frequency Technology Individual Animal Identification ISO 11784 ISO 11785

	Code structure
	Technical concepts
	Code of Federal Regulations
	Official Identification Devices
Livestock Marketing Association Comments on the US Animal Identification Plan.	Canadian ID experience
	Non-producer participant
	Market Participant
	RFID Tags Warrant
	Data file transmission
National Cattlemen's Beef Association NAIS Industry Proposal White Paper.	NAIS architecture
	Centralized database
	Service Provider
	Data Trustee
	Private database
	Information management company
	Animal health authority
	Robust technical solution
	NAIS network
	NAIS database
	Data collection
	ISO
	HDX
	FDXB
	Mobile applications
	Ramping available data
	Interfacing
	PDA
	Import identification numbers
	Hosting facility
	Redundant hardware
	Disaster recovery
	Off-site storage
	Middleware data-scrub software
	Merge and search application software
R-Calf USA 2006 Position Paper: National Animal Identification System.	None

The implicature count results per document are somewhat misleading because of their differences in referring expressions. As previously noted, each of the documents seemed to have a different persuasive purpose. It is tempting, looking at the implicature count results, to classify the NCBA's document as the most poorly written. But, as I

noted earlier, the NCBA document seemed from the start to be aimed at removing the NCBA constituents from the process of implementing the NAIS.

Overall, per page, the USDA and NIAA documents exhibit the most implicature requirements of the reader, especially given the complete lack of pragmatic consideration given to each. The documents prepared by the LMA, NCBA, and R-Calf are constructed for specific purposes with specific audience concerns in mind. They also show a direct correlation to the daily activities (with the exception of most of the NCBA document) to members' daily activities. They are documents constructed for a purpose and addressed to American beef professionals. This is more than can be said for the USDA and NIAA documents, which are far too vague and far too removed both linguistically and practically to be either communicative or persuasive for most of the beef industry audience.

Chapter 6

Discussion

Considering my results, there is clearly misunderstanding and disagreement between the proponents of NAIS and its technology and the livestock market owners and producers who would need to adapt to NAIS and its technology. I began to notice the gap between the two factions almost as soon as I started talking with cattle producers and livestock market owners. Even the coffee shop talk that was going on in livestock markets made it obvious that there was some level of disagreement and misunderstanding. Of course, that did not explain what was causing the rift. After further investigation, I believe that the misunderstandings can be traced to poor communication strategies employed by NAIS proponents, coupled with a lack of systematic planning and pragmatic consideration.

Written documents highlight the differences in the views espoused by the USDA and other proponents of NAIS and the views of NAIS opponents. In general, the materials from the USDA are much more technical, have a higher incidence of implicature, pay less attention to background knowledge and current industry trends, were not targeted to key stakeholders, and largely ignore communication networks in their presentation. They are also less likely to target themes that lead to central route processing as defined by the Elaboration Likelihood Model (ELM) In short, the USDA's persuasive strategies and methods of technical communication have been ineffective because of their lack of audience perspective, their avoidance of livestock market owner

and producer business concerns, and their inability to use communication networks to successfully diffuse NAIS technology. In hindsight, I believe that the USDA would have had a hard time selling NAIS to the beef community even if they *had* produced solid, pragmatically considered materials, because they alienated primary beef industry communication network change agents, such as the LMA and NCBA, from the start.

It seemed clear from my initial conversations and observations with market owners, producers, buyers, and others, that there are a wide variety of skill sets and expectations within the beef industry concerning NAIS and its technology. The technical skills of the participants in this investigation, by university standards, are not high. But to change technology resistance, it is imperative that proponents of NAIS begin to shift their perspective to the technological level of market owners and producers, and to speak to them about technology in language that makes sense to them within the context of their everyday concerns.

The Office Managers, who are, as a group, the most technologically advanced employees at livestock markets, seemed willing to entertain the idea of new technology and new ideologies, but are so unfamiliar with the types of advanced technology that would be required of them by NAIS that they would still require training, as would their staff. Also, they are, in general, unwilling to take on the role of tech-support person in addition to their already busy schedules. Their attitude does not bode well for NAIS, because they are the most likely candidates to be the lead implementers of NAIS technology at livestock markets. The market owners know less than the office managers, and do not want to know more. So, it would seem that if any group is in a position to truly adapt NAIS technology to livestock markets, it would be the office managers. Of

course, the office managers have not been targeted for persuasion or education on the facts of NAIS like the owners have. So, in effect, the most technologically knowledgeable personnel in the livestock market industry have been ignored by NAIS proponents. It is true, of course, that the level of technological sophistication among office managers is not generally sufficient to maintain NAIS systems at livestock markets on a national level, but they would probably be a more fertile starting ground for exploring technological possibilities than the market owners. They would be open to exploring ideologies that the industry alliances and owners would probably be unwilling to entertain, because of their everyday reliance upon outdated technology.

Also, there is a prevalent sense of disdain for technology among some producers. Younger producers are much more accepting, but there are fewer of them. Older producers are much more rigid in their ways. They do not understand it, do not want to, and certainly do not trust it. Many of them are of an older generation, which means that they did not grow up with computers or software. In fact, they have a proud sense of self-reliance that leads them to frown upon new ideologies and methodologies and to adhere to the old ways of doing things. Producers are individuals who are accustomed to working with their hands, and are not comfortable with processes that cannot be seen or understood. Their distrust of the federal government is strong, and that distrust is particularly true of the USDA.

Poor communication from NAIS proponents has done nothing to alleviate their concerns. If anything, it has caused more confusion. That confusion was in many ways the beginning of resistance to the NAIS among market owners and their customers. When confronted with a controversial innovation, they were forced to consider the innovation

and to attempt to understand the benefits and drawbacks of NAIS. Yet they were unable to gather the information they needed to make an informed, central route decision. Most market owners indicated that they had, at least at one time, been intrigued by the idea of NAIS. However, over time, most of the owners have soured on the idea, and many have quit paying much attention to the latest developments. In addition, most owners that I spoke with profess no love for technology in general. It's not that they do not respect technology's potential. But they see technology in terms of time and priorities. Most owners put in long work days, and learning new computer skills is definitely at the bottom of their priority list. Market owners believe that if the new technologies and business ideology of NAIS became a mandatory part of raising cattle, many small producers will get out of the business. That would serve to consolidate the cattle industry's production of new animals, and perhaps lend more support to NAIS, but would ultimately lead to fewer individuals participating in the cattle producer lifestyle.

However, many market owners believe that the number of small producers is decreasing continuously anyway, as fewer young men and women want to get involved in raising livestock because of shrinking profit margins and urbanization. Over time, many believe that consolidation will take place, resulting in fewer producers, more large production ranches, and increased opportunities for a program like NAIS to become feasible. But, despite the efforts of the USDA and companies like McDonald's, most market owners and producers have not been persuaded that there is a real need for NAIS at this time. While most will not say that there will never be a need, they also say that the time for the NAIS has not arrived, and they are clearly in no hurry to see its arrival. Many producers and market owners, who are of the pre-computer age, will candidly tell you

that they hope to retire before the industry takes on new digital ways of doing business and transferring information. They see it as dehumanizing to their business and as an affront to their traditions that hold a handshake as a firm commitment, regardless of contracts or database figures.

There are also practical matters that have not been fully thought through by NAIS proponents. At certain times of the year, a weekly auction can last 16 hours or more (sometimes more than one day). A small delay in processing each animal sold at auctions could greatly increase sale time, which *nobody* wants. For example, if NAIS added 30 seconds to the processing of each animal during heavy fall runs, when a large market might sell 4500 animals, the result would be an additional 37 hours of sale time! Therefore, any NAIS plan would need to be completely understood by market staff and operate efficiently and quickly. Because the USDA, in the opinion of market owners and producers alike, has failed to explain to *anyone* how that would happen, they are distrustful and resistant to the ideology and technology of NAIS.

Clearly, the USDA has made an effort to organize meetings and to be present at industry conferences and meetings. Most market owners can recall hearing a USDA representative speak on the topic at least once. But, at major conferences, such as the recent Beef Quality Summit, held in Oklahoma City, that featured presenters from most major packing companies, major retailers like McDonald's and Wal-Mart, major software suppliers, university professors, and large ranching operations, the USDA is often curiously absent, either because they did not choose to present or were not invited to attend.

The USDA's absence in such settings is only one of many examples of their dissociation from the primary communication networks within the beef industry, and their lack of status as social change agents. Proponents of NAIS, like the USDA, say that the advantages of adopting NAIS are obvious. But, their limited ethos as change agents has been unable to gain them access to the social communication networks that control opinion within the beef industry. As Rogers points out, change agent ethos, along with the characteristics of the social group affected and preconceived notions of the change directly affect diffusion success. Therefore, the advantages of new technologies and ideologies cannot be confused with the social process that leads to their acceptance.

That is exactly what has happened with NAIS. The USDA has relied upon the technological efficiency and safety afforded by NAIS to sell its ideology, while ignoring the societal values and technological abilities of their audience. My conversations, observations, and interviews show that members of the beef industry are classic late adopters, as defined by Rogers. Their societal values and culture are not conducive to the kind of rapid change sought by NAIS plans, and they certainly aren't going to pay for those changes without a fight. In effect, NAIS proponents have marketed NAIS as an insurance policy for the beef industry, but their customers are not worried enough about an accident to pay for the policy. You can't sell flood insurance in Kansas, and that is essentially how the beef industry views NAIS. If, on the other hand, the USDA had been willing to pay for NAIS from the start, or at least provide a realistic scenario through which market forces would reimburse producers and market owners, they might have avoided much of the resistance to its technology. But, the USDA has never produced a plan to pay for NAIS.

Within the highly competitive business environment of livestock market owners and their customers, this type of ambiguity is interpreted as a lack of planning and is distrusted. Financing is a central concern of the market owners and their customers. The statements made by USDA documents and communications do nothing to dissuade their fear of being required to pay for the program themselves and to pay for training their employees. Therefore, rather than engaging them in critical, central route thought processing, these partially considered communications lead to an emotional response based upon longstanding distrust of the USDA and fears of overwhelming changes to business models, technology, and costs.

Many members of the beef community never got past the initial price tag of NAIS. However, some did, and were genuinely interested in understanding the technology that would support such a bold initiative. On that account, my interviews and conversations with livestock market owners and other beef industry professionals reveal several consistent themes. First, livestock market owners and their customers are clearly more influenced by industry alliances than by the USDA when it comes to NAIS. Second, although most have made an effort to read and comprehend the plans laid out by the USDA, the industry as a whole found those materials to be detached, confusing, and incomplete. Third, the portions of those materials that were understood by market owners, their customers, and officers for the industry alliances were not persuasive, and fourth, that personal contacts and informal communication networks are still vital to communication within the beef industry.

As I have shown, one of the USDA's first actions, although unintentional, was to create a virtual "turf war" among the predominant industry alliances that removed the

USDA from the role of change agent and cast them in the role of "Big Brother." They accomplished this change by promoting a plan that was neither pragmatically considered nor understood by the alliances and their membership. Thus, fearing for their own livelihoods, and convinced that the USDA's "mystery plan" would either enslave them or bankrupt them (or both), the individual alliances, which are, as I have also shown, the overseers of beef industry communication networks, began a fierce anti-NAIS campaign designed to wrest control of NIAS from the USDA and protect their own interests. Had they understood the plan from the start, I do not believe that their reaction would have been so antagonistic.

Furthermore, the USDA foolishly responded to the initial industry backlash against NAIS by promoting a string of "deadlines" for the adoption of NAIS, all of which have been postponed to later dates. Together, these postponements now total years of continual delays, as the USDA tries to convince industry insiders of NAIS value. Over time, these unrealized deadlines are treated much the same as any empty promise—they are ignored. And the directives that accompany those promises are resented and/or mocked.

When added to the general confusion about surrounding COOL, NAIS, RFID, the various USDA programs designed to satisfy both national and international demands and other various initiatives that have come and gone during the past ten years, the USDA's lack of coherent communication strategies has been nearly fatal for NAIS. The resulting dysfunction has only increased the power of coffee shop diplomacy and increased the need for members of the beef supply chain to rely upon informal networks of communication concerning technology and animal identification. Therefore, say the

LMA's constituents (many of whom I have spoken with personally), the USDA has no credibility. They are seen as both insincere in their desire to implement NAIS promises (hoping that others will buy into the plan with no details), and incapable of forcing those promises into being.

Had the USDA gotten past pricing and politics before the debate over NAIS began, they still would have needed better communication strategies to sell NAIS. As my results show, the USDA's written communications suffered as dramatically as their informal communications through communication networks, as a result of their divergence from theoretical perspectives like ELM. As my conversations with market owners also show, motivation, as defined by ELM, was not originally a problem for NAIS customers. The owners saw themselves as responsible for performing specific tasks related to NAIS and for adhering to NAIS policy. They were, therefore, sufficiently motivated to form correct opinions and behaviors with respect to NAIS as designated by ELM. We can also assume that they were not initially distracted, because all information about NAIS was initially coming from the USDA. For the same reason, although ELM indicates that one of the reasons for the use of the peripheral route is that we cannot process all of the persuasive messages that confront us, there was no initial overabundance of information about NAIS. The overwhelming number of messages and message sources concerning NAIS presented themselves only after the industry had determined that the USDA plan was incoherent and industry alliances began to vie for control of the process. Afterward, old resentments and distrusts began to make NAIS diffusion both social and political.

ELM states that new information encountered by message recipients with an existing bias toward the source of the message or the subject will likely bolster the existing attitudes of the message recipient. However, as ELM also points out, the personal relevance of a message to the recipient can overcome this initial bias, leading the recipient to attempt to form objective opinions in spite of their original bias. NAIS, as a primary business concern for livestock market owners and producers, provided plenty of motivation for them to understand NAIS. For that reason, we cannot conclude that bias was an initial impediment to the central processing route for them, even though bias did exist. We can also conclude that there were no initial distractive communications that would have prevented them from understanding NAIS. And, we can conclude that the livestock market owners and producers, as non-originators of the plan, were shielded from personal responsibility for its success.

Thus, having eliminated distraction, motivation, bias, personal relevance, and personal responsibility as ELM factors that would prohibit the use of the central processing route by market owners and producers, we must place the blame for central processing absence on the communications themselves. The only other factor postulated by ELM as a block to using the central route to persuasion and information processing is a message recipient's inability to understand the content of the message. We have seen that market owners (most anyway) were at one time motivated to understand NAIS. The only missing link was their ability to understand the information presented. My results show that the information presented to market owners by the USDA has not been understood, and when it has, has been so removed from the daily operations of beef industry professionals that the information did not speak to their concerns. For this group

152

of readers, "we're working that out as we go" is not an acceptable plan. For them, that translates into *no* plan, and no concern for those impacted by the plan. Hence, the peripheral processing route takes over, emotional responses (such as longstanding distrust of the USDA) and communication network sources (such as the LMA) become dominant over critical thinking, and the principle determinants of technology diffusion success become external interpretations of NAIS policy from sources claiming to represent the message recipient's best interests.

Yet, there were also problems with USDA communications at a textual level. Even if the documents produced by the USDA and other NAIS proponents had been on topic and pragmatically centered, they were often so poorly written that they could not have been understood or persuasive. Pragmatically, the documents seem to be created for no one in particular, by no one in particular, and contain very few specifics about anything in context.

Written communication relies upon creating successful implicatures through phrasing and terminology. The USDA texts' consistent need for extensive implicature seriously hampers the ability of the text to ease beef industry readers into NAIS understanding. By consistently referring to concepts unavailable to the reader, they create confusing passages without explanation. As soon as the reader is making progress, he finds another term that requires implicature based upon unavailable references.

In contrast, the documents from the industry alliances (with the exception of the NCBA) and newspaper and magazine articles typically reference familiar situations and terminology. The bureaucratic terminology employed by the USDA to streamline their discussions is a victim of its own practices. The very terminology that they employ in

their writing style is misunderstood by their customers. It requires implicatures through references, obscure terms, and concepts that do not lend themselves well to everyday beef industry practices.

Implicature, as I use it here, is that portion of the meaning of text that is left unsaid. It is the link we are forced to draw between syntactical statement and action, between reading on the page and doing in life. Implicature is essential to both the reader and the writer, because it decreases our need to explain everything little thing. But, it is also essential that implicatures be built upon common background knowledge shared by both the reader and the writer. In the case of the USDA and the beef industry, this shared knowledge has not been properly incorporated into communication. When we speak of specialized concepts such as NAIS and technology, implicature becomes more of a burden than it does in regular text. Because of its consistent reference to specialized concepts, as opposed to everyday concepts, implicatures are more frequently required and are much more difficult for the reader to create. This is especially true if the writer and the reader do not share common background knowledge, and in the case of USDA author and beef industry professional, they clearly do not. It's a long way from a desk at the USDA to a sale barn in Texas. If the writer does not share background knowledge with the reader, then the writer and reader cannot share pragmatic meaning of language. The situational context of USDA directives, written from a system-centered point of view by USDA employees, is too far removed from the context of the everyday market owner or producer to be integrated into everyday business.

In other words, when a USDA writer sends information to a livestock market owner about NAIS, he is already far beyond the everyday terms and concepts

encountered at a livestock markets, and also well-removed from everyday concepts like baseball and apple pie. Therefore, if the writer expects his information to be understood by the reader, it must be explained in terms that are relevant and pragmatically affixed to the reader's everyday activities. NIAS is not being explained that way.

If we return to my initial examples of implicature concerning the couple going out to eat (see pp. 39-42), we see that they are built on everyday concepts such as money, restaurants, and the link between the two. This correlation does not appear within NAIS discussions from the USDA, where a reference to something like a *database* may have no inherent connotations whatsoever for the average reader, unless, of course, we know the context from which the reference come, such as the setting of the couple being stranded in a raft, or in the case of NAIS, the context of the livestock market. Again, market owners and producers are not being given that context.

The USDA, and others trying to explain the merits and everyday workings of NAIS to market owners and producers, would be better served by creating hypothetical situations, such as that of a market owner who wants to implement NAIS and has concerns. The most common scenarios could be identified and used in a way that would provide, at least, some type of contextual backdrop and less confusion. Pragmatic consideration should also be given to what a reader might be doing, even if there are limited details that can be assumed. Regardless of the specific communication, the need to include implicature, pragmatics, communication theory, and core industry values into future explanations of NAIS is real. As long as the needs of NAIS are addressed first, as opposed to the everyday needs of the beef professional, market owners and producers will always come second to the needs of a national system seen as a burdensome and

unnecessary intrusion. This does not lend itself well to the development of pragmatic understanding between proponents and detractors of NAIS.

In other research, (see Wright, 2007) I have shown that explanations of complex topics such as computer software can be successful when they are couched in pragmatically-based explanations similar to those employed by the popular "for Dummies" texts, in which authors assume the most common context of the common reader and base explanations on their context. Perhaps the USDA should be focusing its efforts on producing texts that are more in line with those principles. Of course, rather than producing *NAIS for Dummies*, they might produce *NAIS for Livestock Market Owners*. They could assume that the reader is a typical livestock market owner interested in learning about NAIS as it relates to their business, and start from there. While this strategy would not account for the context of *all* beef industry professionals, it would account for the context of *some* beef industry professionals (unlike current communications), and other titles could be added appropriately.

In the beginning of this dissertation, I stated that the beef industry has been struggling to keep up with technology in recent years. Unfortunately, current technologies seem to change before our understanding of them is complete. This trend holds true for society in general, not just the beef industry. But, in the beef industry, where so many are starting from such a technological disadvantage already, there is even farther to go, both ideologically and technologically. Nevertheless, technology will continue to change, and there are still industries, like this one, that will need extensive guidance and education concerning that technology.

Some beef professionals believe that a generational change in ownership of primary businesses, such as livestock markets, will have to occur before the industry will be ready to commit to NAIS. They may be correct, unless there is a national disaster, at which point NAIS will likely be mandated by the US Congress. Until that disaster occurs, we are not likely to see a massive shift in opinion concerning NAIS. The overseers of the beef industry communication networks, such as the LMA and NCBA, have considerable political clout. They are seen as "grass roots" organizations in their home states, and politicians are reluctant to offend them, especially in highly agricultural states.

Politics aside, there will need to be changes made to current USDA communication strategies if NAIS is to survive. Large retailers like McDonald's and Wal-Mart will need to find better incentives for producers and market owners if they are sincere in their desire for traceable beef. Saying that NAIS is "the right thing to do" is clearly not enough, unless those retailers intend to financially back NAIS and to advertise their commitment. So far, they are unwilling to do so.

Still, several comments made during my investigation seem likely to resurface during future investigations and should be considered more thoroughly. The first of these is that beef industry professionals are not completely disinterested in NAIS and its potential to work for them as a marketing tool. They do see what is going on in the world, through trade journals and magazines, from reports from the industry alliances, and even reports from the USDA. They understand that global marketing is important for their future, and that other countries are making concerted efforts to promote their beef as safe and traceable. They also understand that the beef market may quickly become reliant upon traceability. But, they are unwilling to commit their current financial standing to a

program that has been poorly communicated, is ill-defined, has no political backing, and may only serve to drive their customers away as they chafe at the requirements of NAIS.

As I have said in every presentation I have given on this topic, market owners and producers are not stupid. Cattlemen and women know cattle. The convergence of cattle and computer technology is just starting, and will be difficult. If we took computer programmers and placed them in the back of a cattle auction, asking them only to move cattle from the pen to the sale arena, there would be pandemonium! But, NAIS, as a plan, currently exists only as a construct to be argued over by industry alliances, communication networks, and the USDA, which is seen as a federal entity far removed from everyday beef life. Until that situation changes, there will probably be no convergence, as defined by Rogers and Kincaid, that will produce a mutual understanding between NAIS proponents and detractors.

Second, as a group, the beef community *is* willing to use new technology, although they insist that it be understandable, beneficial, and profitable. In an industry like the beef industry that is still so dominated by paperwork and fax machines, it stands to reason that digitizing some or all of the process could save both time and labor. This concept is something that all participants seem to support. To them, the only reason to use technology is if it makes things easier and more profitable. Confusion among this technologically inexperienced group of users is met with immediate frustration and must be countered by effective explanation and pragmatically centered design to convince industry professionals that NAIS ideology and technology is both profitable and usable, which is a combination they have not seen as of yet.

Finally, the skill set likely to be encountered within this industry, and others like it that are new to technology is prone to be widely varied. While not common anymore, it is still possible to operate a livestock auction without a computer at all. As we have seen, there are some who have no intention of having anything to do with hardware, or software, or anything else computer-related. In turn, there are those who we would not expect to be savvy, who are. This must lead us to consider the needs of the beef industry user from an all-encompassing perspective, while realizing that each individual user expects a certain amount of tailoring to his needs.

One thing that all participants seem to realize is that the industry is changing. Whether they want to be involved or not, they all seem to realize that eventually *someone* will *have* to be involved. The only questions are when? And who? While this industry is more technologically unsophisticated than most, the newness of NAIS technology and emerging online databases leaves everyone a bit behind at this point. The exact methods for administering a national animal database have yet to be determined, which is, somewhat ironically, a big part of the problem. The other part is finding a means to communicate that advanced technology and its benefits to a novice group of users.

Whatever the case, it is my hope that the findings of this investigation will prove to be beneficial in the pursuit of a better NAIS or other forms of beef industry technology. For that matter, I hope that the model I have created here will be beneficial to other industries as well. I believe that the combined analysis of technology diffusion, communication networks, theories of communication and principles written communication can be adapted to other industries in addition to the beef industry. Technology diffusion is not limited to the beef industry. It happens every day in

industries al over the world. Technology is advancing at such a rate that we cannot hope to keep up, save for our own limited areas of expertise. That means that entire industries will need communicative strategies for explaining what needs to be known to others—especially those who are technologically behind. That category of technology user is in no way limited to the beef industry.

As for the beef industry, much more research into the communication channels that form opinion and shape convergence is needed. Perhaps communications can be refined pragmatically, written with more communicative purpose, delivered to change agents within communication networks, and worded to be accessible to a new audience. Maybe then our animal disease surveillance system, and our beef industry's ability to use advanced technology for informational enhancement can be realized. After all, it's not a bad idea, at least in theory.

References

American Hereford Association. *Hereford Verified*. Retrieved December 4, 2006 from
    http://www.hereford.org/AHA/tabID__3856/tailored.aspx.

Blakemore, Diane (1992). <u>Understanding Utterances: An introduction to pragmatics</u>.
    Oxford: Blackwell Publishers.

Canadian Cattle Identification Agency. *Guidelines for Cow-Calf Producers*. Retrieved
    November 27, 2006 from http://www.canadaid.ca/Producer/cow_calf.shtml.

Clapp, Stephen (2006, January 16). USDA Considers New Animal ID Approach. *Food
    Chemical News*. Retrieved October 19, 2006, from global.factiva.com.

Clapp, Stephen (2006, March 13). USDA Releases Guidance on Animal ID Devices.
    Food Chemical News. Retrieved October 19, 2006, from global.factiva.com.

Davis, D. (25 September 2006). Personal Communication.

Drovers Magazine (n.d.). *Directory of Service Providers*. Retrieved October 10, 2006,
    from http://www.drovers.com/directories.asp?pgID=712.

ElAmin, Ahmed (2006, Jan. 24). BSE in Canadian Cow Sets Back Efforts to Regain Lost
    markets. *Food USA*. Retrieved August 24, 2006 from
    www.foodpructiondaily.com/

Fetterman, D.M. (1989). <u>Ethnography: Step by step</u>. Thousand Oaks, CA: Sage.

Gibbs, Raymond W. "Nonliteral Speech Acts in Text and Discourse." In A.C. Grassear et
    al. (Eds.) <u>Handbook of Discourse Processes</u>, (pp. 35-73), Mahwah,
    New Jersey: Lawrence Earlbaum Associates, Inc., 2003.

Gilmore, Jodie (2006, May 15). Need-to-Know Info on Animal ID. *The New American*,
    27.

Grice, Paul (1975). Logic and Conversation. In Cole, P. & Morgan, J. (eds.) <u>Syntax and
    Semantics, 3: Speech Acts</u>. New York: Academic Press.

Johnson, Robert R. (1998). <u>User-centered technology: a rhetorical
    theory for computers and other mundane artifacts</u>. Albany, N.Y.:
    State University of New York Press.

Kropp. P. (25 October 2006). Personal communication.

Lawrence, John & Otto, Daniel (2005). *Importance of the United States Cattle Industry*. National Cattleman's Beef Association. Retrieved October 10, 2006, from http://www.beef.org/NEWSEconomicImportanceOfTheUnitedStatesCattleIndustry2704.aspx

Livestock Marketing Association. *Comments on the US Animal Identification Plan*. Retrieved August 7, 2006 from www.lmaweb.com.

McClelland, David (2005). McDonald's Exec: BSE Testing Adequate, ID Needed. *Farm Week*. Retrieved October 22, 2006 from http://farmweek.ilfb.org/viewdocument.asp?did=8034&r=0.7326624&r=6.260318E-02&r=0.3093531&r=0.1569788&r=0.8363153

Paul, Ron (2006, May 29). Stop the National Animal Identification System. *US Federal News Service*, Including US State News, p. 1.

Petty, Richard E. & Cacioppo, John T. (1986). Communication and Persuasion: Central and peripheral routes to attitude change. New York: Springr-Verlag.

Petty, Richard E. et al. (1993). Conceptual and Methodological Issues in the Elaboration Likelihood Model of Persuasion: A reply to the Michigan State critics. Communication Theory 3, 336-362.

R-Calf USA. *United States Animal Identification System*. Retrieved November 21, 2006 from http://www.rcalfusa.com/Animal%20ID/2006%20Position%20Paper%20Animal%20ID.pdf.

Richards, C. (25 October 2006). Personal communication.

Rogers, Everett M. (1995). Diffusion of Innovations. New York: Free Press.

Rogers, Everett M. (1988). Social Change in Rural Societies: An introduction to rural sociology. New York: Prentice Hall.

Rogers, Everett M. & Kincaid, D. Lawrence (1981). Communication Networks: Toward a new paradigm for research. New York: Free Press.

Roybal, Joe (2006, Oct. 1). *Our Crystal Ball*. Beef. Retrieved October 2, 2006 from http://beef-mag.com/ar/beef_crystal_ball/index.htm.

Scheiler, Bob (2005, August 24). Tech Firms Stampede to Livestock. Wall Street Journal, pg. 1.

Searle, John. (1967). "Human Communication Theory and the Philosophy of Language." In F.E.X. Dance (ed.) Human Communication Theory. New York: Holt, Rinehart, & Winston.

Sechler, Bob (2005, Aug. 25). Tech Firms Stampede to Livestock. Wall Street Journal, Pg. A1.

Senator Talent Introduces Measure to Prohibit Mandatory Animal Identification (2006, Sept. 7) *US Fed News Service, Including US State News*, p. 1.

United States Department of Agriculture. *Country of Origin Labeling*. Retrieved June, 12, 2006 from http://www.ams.usda.gov/cool/

United States Department of Agriculture. *USDA Process Verified Program*. Retrieved December 1, 2006 from http://processverified.usda.gov/

United States Department of Agriculture. *USDA Quality System Assessment*. Retrieved December 1, 2006 from http://www.ams.usda.gov/lsg/arc/qsap.htm.

Van Maanen, John (1988). Tales of the Field: On writing ethnography. Chicago: University of Chicago Press.

Van Maanen, John (1995). "An End to Innocence: The ethnography of ethnography." In John Van Maanen (ed.) Representation in Ethnography (pp. 1-35). Sage: Thousand Oaks, CA.

Zanoni, Mary (2006, Jan/Feb). The National Identification System: A new threat to rural freedom? Countryside and Small Stock Journal, p. 67-68.

Zwaan, Rolf A. & Singer, Murray. "Text Comprehension." In A.C. Grassear et al. (Eds.) Handbook of Discourse Processes, (pp. 129-145), Mahwah, New Jersey: Lawrence Earlbaum Associates, Inc.

Appendix A

Audit, Review, and Compliance (ARC) Branch
Policies for USDA Process Verified Program

1. Purpose
This document provides the policies for programs that are submitted to the ARC Branch for approval
under the USDA Process Verified Program.

2. Scope
This document applies to all programs submitted for approval under the USDA Process Verified Program
and includes all programs that are currently approved.

3. Policies
3.1. Breed Claims
Breed claims that are not supported by a recognized Breed Association are not eligible for verification
under the Programs.

The ARC Branch will allow verification of the following breed activities:
1. Verification that breed association requirements for the specific breed are met; and
2. Verification that offspring originate from breed stock that meet breed association requirements for the specific breed.
Companies requesting verification of breed activities must (1) identify the applicable breed association
and (2) submit the breed association's requirements for the specific breed.

3.2. Agricultural Products Data Services
Data services may or may not validate the data that is entered into an approved USDA Process Verified
Program data system. However, the company must clearly distinguish between the validated and nonvalidated
data. Data that is not validated may not be used to meet the requirements of other AMS marketing programs.
Data must be validated through on-site evaluations and data evaluations. Data validation must be
addressed within the receiving process under the Programs. See Section 3.3 of this document for further
information.
Companies do not need to re-validate data from another company which is already approved by the ARC
Branch.

3.3. Approved Supplier Evaluations Process

In accordance with the receiving process under the USDA Process Verified Program, a company must
have a documented procedure that describes the criteria and process for supplier selection, evaluation,
approval, and re-evaluation. A supplier is defined as an organization or person that provides a product,
service, or information to a company. A supplier may be internal or external to the organization; and in a
contractual situation, a supplier may be called "contractor".
Companies do not need to conduct onsite evaluations of suppliers who are already approved under a
USDA Process Verified Program. Companies must conduct onsite evaluations and re-evaluations for
suppliers which they approve. An "approved suppliers" listing must be maintained and made available for
review during the USDA Process Verified Program audit.
Accordingly, companies must conduct an initial on-site evaluation of each supplier prior to approving the
supplier under the program. Companies must conduct re-evaluations in accordance with one of the
following policies:

1. 100% of the suppliers receive yearly onsite re-evaluations;
2. 10% of the suppliers or 2 suppliers, which ever is greater, randomly selected to receive a yearly onsite re-evaluation; or
3. 100% of the suppliers receive yearly onsite re-evaluations. When no non-conformances
are identified, those suppliers receive an onsite re-evaluation once every 2 years.
All evaluations and re-evaluations must be in accordance with the *Principles of Auditing* as defined in *ISO
19011:2002 Guidelines for quality and/or environmental management systems auditing*. These principles
make the audit (evaluation or re-evaluation) an effective and reliable tool in support of management
policies and controls, providing information on which an organization can act to improve its performance.
Adherence to theses principles is a prerequisite for providing audit conclusions that are relevant and
sufficient and for enabling auditors working independently from one another to reach similar conclusions
in similar circumstances.
The following principles relate to the auditor (the person conducting the evaluation or re-evaluation).

a) Ethical conduct: the foundation of professionalism: Trust, integrity, confidentiality, and discretion
are essential to auditing.

b) Fair presentation: the obligation to report truthfully and accurately: Audit findings, audit
conclusions and audit reports reflect truthfully and accurately the audit activities. Significant obstacles
encountered during the audit and unresolved diverging opinions between the audit team and auditee are
reported.

c) Due professional care: the application of diligence and judgment in auditing: Auditors exercise
care in accordance with the importance of the task they perform and the confidence placed in them by
audit clients and other interested parties. Having the necessary competence is an important factor.
Further principles relate to audits, which is by definition independent and systematic.

d) Independence: the basis for the impartiality of the audit and objectivity of the audit conclusions:
Auditors are independent of the activity being audited and are free from bias and conflict of interest.
Auditors maintain an objective state of mind throughout the audit process to ensure that the audit findings
and conclusions will be based only on the audit evidence.

e) Evidence-based approach: the rational method for reaching reliable and reproducible audit
conclusions in a systematic audit process: Audit evidence is verifiable. It is based on samples of
information available, since an audit is conducted during a finite period of time and with finite resources.
The appropriate use of sampling is closely related to the confidence that can be placed on the audit
conclusions.

3.4. Ranch or Farm Profiles
When a ranch or farm profile is required in a USDA Process Verified Program, the profile must be
sufficient to allow verification of the desired claim. The profile must be available for review by the
company, and when necessary by the USDA auditor. The profile is considered confidential information
and should not be removed or copied during the audit process. The following are types of information

that should be included in the profile in order to meet claim verification requirements:

1. A description or name of the of the supplier;
2. Maps and/or descriptions of specific locations where animals are maintained;
3. Number of acres;
4. Feeding practices;
5. Number of breeding stock;
6. Purchase of outside stock;
7. Breeding methods and seasons;
8. Birthing seasons;
9. Name of veterinarian;
10. Identification of animals;

a. Group identification - Identification must be unique to the ranch and individual animals must be identified.
b. Individual identification - Identification must be unique to the individual animal.

11. Documented procedures specific to the ranch or farm that address all program requirements; and

12. Records to support the ranch or farm profile.

3.5. USDA Process Verified Shield and Term
Companies must have a defined process for ensuring that the shield or term is used appropriately. This
process can not be solely to rely on the ARC Branch for approval. Companies that use the USDA Process
Verified shield or the term "USDA Process Verified" in promotional material must ensure that the shield
or term is used in direct association with a clear description of the specified process verified points.
Companies must also ensure that the shield or term are not misrepresented and are not used in association
with any company claims.
The use of the USDA Process Verified shield on a label must meet one of the following conditions:

1. The specified process verified points are printed immediately adjacent to the USDA Process
Verified shield.

2. An asterisk referring the consumer to the information panel for further information about the
specified process verified points is printed with the USDA Process Verified shield

3. An asterisk referring the consumer to point of sale information is printed with the USDA Process
Verified shield. In this situation, the company must ensure that the point of sale information is
readily available and within close proximity of the display counter containing the product.
The ARC Branch provides a cursory review of proposed labels but does not provide an official approval.

Official approval of all labels must be received from the USDA Food Safety Inspection Service, Labeling
and Consumer Protection Staff. The label application form and its instructions are available at
http://www.fsis.usda.gov/fsisforms/7234-1.pdf.

Appendix B

USDA Process Verified Program

When implementing a quality management system based on the USDA Process Verified Program, the content of the quality manual must reflect the Process Verified Program requirements, although it does not need to match the format. A company must create a quality manual that describes its processes and procedures.

Some important points to remember:
1. A quality manual must describe the company's processes and procedures as they relate to the Process Verified Program. You can reference existing procedures, work instructions, forms, etc within the quality manual. (see #4)

2. Say "what" you do and "how" you do it. It is not sufficient to simply state that you do something.

3. Write in present tense (what are you doing) instead of future tense (what you will do).

4. Use what you already have in place as long as it meets the Process Verified Program requirements. You can reference existing procedures, work instructions, forms, etc within the quality manual. (see #4)

5. The Process Verified Program requires 10 documented procedures, at a minimum. It is easiest to reference the documented procedures within the quality manual and include them as attachments. When attached, the documented procedures can be revised as necessary without having to reissue the entire quality manual. If the documented procedures are included within the body of the quality manual, then the entire manual must be reissued when the procedures are revised.

6. It is best to include the plant's name, the document's name, and the document's revision status on every page.

7. Include the plant's physical location and the program contact's information either within the letter requesting service or in the quality manual.

8. Review the ARC 1001A Policy to determine if any of the policies apply to your program.

Companies must submit a documented program that addresses the program requirements as outlined in the following clauses (Clauses 1 to 6).

1   Quality Management System

1.1   General Requirements
A quality management system (QMS) must be established, documented, implemented, and maintained which ensures that products conform to the requirements of this Procedure and to specified process verified points.

The company must continually improve the effectiveness of the QMS in accordance with the requirements of this Procedure.

The company must
1. Identify the processes needed for the QMS and their application throughout the company;
2. Determine the sequence and interaction of these processes;
3. Determine criteria and methods needed to ensure that both the operation and control of these processes are effective;
4. Ensure the availability of resources and information necessary to support the operation and monitoring of these processes;
5. Monitor, measure, and analyze these processes; and
6. Implement actions necessary to achieve planned results and continual improvement of these processes.

The company must manage these processes in accordance with the requirements of this Procedure.

Where a company chooses to outsource any process that affects product conformity with requirements, the company shall ensure control over such processes. Control of such outsourced processes must be identified within the QMS.

1.2   Documentation Requirements

1.2.1   General
The company must prepare and maintain a QMS that includes
a)   Documented statements of a quality policy;
b)   Documented statements of a quality objective;
c)   A quality manual;
d)   Documented procedures required by this Procedure;
e)   Documents necessary to ensure the effective planning, operation, and control of its processes; and
f)   Records required by this Procedure.

1.2.2   Quality Manual
The company must establish and maintain a quality manual that includes at a minimum
i)   An organizational chart or similar document listing all personnel assigned to managerial positions within the program;
j)   A description of the scope of the QMS, including details of and justification for exclusions;
k)   The specified process verified points;
l)   Documented procedures established for the QMS;
m)   Reference to all forms, tags, and labels used to track or demonstrate product conformance,;
n)   A master document list that shows the most current issue of all QMS procedures, forms, tags, and labels used to track or demonstrate conformance;

o) A description of the interaction between the processes of the QMS; and

p) All other documentation as required in this Procedure.

The quality manual must be controlled and available for review at all associated sites where activities are conducted.

1.2.3 Control of Documents
The company must control all documents required by this Procedure.

A documented procedure must be established to define the controls needed
  a) To control all documents required by this Procedure;
  b) To ensure that changes and the current revision status of documents are identified;
  c) To ensure that relevant versions of applicable documents are available at points of use;
  d) To ensure that documents remain legible and readily identifiable;
  e) To prevent the use of obsolete or unapproved documents; and
  f) To retain all documents for at least 1 year after the year in which the audit was performed.

Significant changes to QMS documentation must be submitted to the ARC Branch for approval prior to implementation.

1.2.4 Control of Records
The company must establish and maintain records to provide evidence of conformity to program requirements, to specified process verified points, and of the effective operation of the QMS.

A documented procedure must be established to define the controls needed
  a) To control all records required by this Procedure;
  b) To store records in a manner so as to prevent loss, damage, or alteration;
  c) To ensure that records are legible, easily accessible, and readily available; and
  d) To retain all records for at least 1 year after the year in which the audit was performed.

2   Management Responsibility

2.1   Management Commitment
Top management must provide evidence of its commitment to the development and implementation of the QMS.

Top management must continually improve the effectiveness of the QMS.

Top management must communicate to program personnel the importance of meeting customer as well as statutory and regulatory requirements

Top management must establish the quality policy.

Top management must ensure that quality objectives are established.

Top management must conduct management reviews of the QMS.

Top management must ensure the availability of resources.

2.2   Customer Focus
Top management must ensure that customer requirements are determined and are met with the main focus of enhancing customer satisfaction.

2.3   Quality Policy
Top management must ensure that the quality policy
   a)   Is appropriate to the purpose of the company's program;
   b)   Includes a commitment to conform to the requirements of the QMS;
   c)   Includes a commitment to continually improve the effectiveness of the QMS;
   d)   Provides a framework for establishing and reviewing quality objectives;
   e)   Is communicated and understood within the company; and
   f)   Is reviewed for continuing suitability.

2.4   Planning

2.4.1   Quality Objectives
Top management must ensure that quality objectives, including those necessary to meet specified process verified points, are established at relevant functions and levels within the company.

The objectives must be measurable and consistent with the quality policy.

2.4.2   Quality Management System Planning
Top management must ensure that the planning of the QMS meets the requirements given in *Clause 1.1 General Requirements*, as well as the quality objectives.

Top management must ensure that the integrity of the QMS is maintained when changes to it are planned and implemented.

2.5   Responsibility, Authority and Communication

2.5.1   Responsibility and Authority
Top management must ensure that QMS responsibilities and authorities are defined and communicated within the company.

The company must have an organizational chart or similar document listing all personnel assigned to managerial positions within the program.

All personnel listed must have their responsibilities and authorities outlined in an auditable method.

2.5.2   Management Representative
Top management must designate a management representative who, irrespective of other responsibilities must have responsibility and authority that includes
   a)   Ensuring that processes needed for the QMS are established, implemented, and maintained;
   b)   Reporting to top management on the performance of the QMS and any need for improvement; and
   c)   Ensuring the promotion of awareness of customer requirements and specified process verified points throughout the company.

The management representative must have the authority to act on behalf of the company at all locations where program activities are conducted.

2.5.3 Internal Communication
Top management must ensure that appropriate communication processes are established within the company.

Top management must ensure that communication takes place regarding the effectiveness of the QMS.

2.6 Management Review

2.6.1 General
Top management must review the company's QMS, at planned intervals, to ensure its continuing suitability, adequacy, and effectiveness.

The review must include assessing opportunities for improvement and the need for changes to the QMS, including the quality policy and quality objectives.

The company must maintain records from the management reviews.

2.6.2 Review Input
The management review input must include information on
- a) Results of audits (internal and third party);
- b) Customer feedback;
- c) Process performance and product conformity;
- d) Status of preventative and corrective actions;
- e) Follow-up actions from previous management reviews;
- f) Changes that could affect the QMS; and
- g) Recommendations for improvement.

2.6.3 Review Output
The management review output must include any decisions and actions related to
- a) Improvement of the effectiveness of the QMS and its processes;
- b) Improvement of product related to customer requirements; and
- c) Resource needs.

3 Resource Management

3.1 Provisions of Resources
The company must determine and provide the resources needed to implement and maintain the QMS and to continually improve its effectiveness.

The company must determine and provide the resources needed to enhance customer satisfaction by meeting customer requirements.

3.2 Human Resources - Competence, Awareness, and Training
Personnel performing work affecting product quality must be competent on the basis of appropriate education, training, skills, and/or experience.

The company must provide training to all persons with QMS responsibilities.

The company must have a documented procedure to ensure all persons performing work affecting product quality are properly trained in relevant aspects of the QMS.

The documented procedure must include
- a) Determining the necessary competence for personnel performing work affecting product quality;
- b) Determining the criteria for training;
- c) Evaluating the effectiveness of the training; and
- d) Ensuring that the persons are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives.

The company must maintain appropriate records of education, training, skills, or experience, as applicable. These records must include the scope of the training received.

3.3 Infrastructure
The company must determine, provide, and maintain the infrastructure needed to achieve conformity to product requirements.

Infrastructure includes, as applicable
- a) Buildings, workspace, and associated utilities;
- b) Process equipment (both hardware and software); and
- c) Supporting services (such as transport or communication).

3.4 Work Environment
The company must determine and manage the work environment needed to achieve conformity to product requirements.

4 Product Realization

4.1 General
If any program requirements within Clause 4 Product Realization can not be applied due to the nature of a company and its product, then these requirements may be considered for exclusion. Exclusions must not affect the company's ability to provide a conforming product. Additionally, exclusions do not affect the company's responsibility to provide a conforming product.

4.2 Planning of Product Realization
The company must plan and develop the processes needed for product realization.

Planning of product realization must be consistent with the requirements of the other processes of the QMS.

In planning product realization, the company must determine the following, as appropriate:
- a) Quality objectives and requirements for the product;
- b) The need to establish processes, documents, and provide resources specific to the product;
- c) Required verification, validation, monitoring, inspection, and test activities specific to the product and the criteria for product acceptance;
- d) Records necessary to provide evidence that the realization processes and resulting product meet the requirements.

The output of this planning must be in a form suitable for the company's method of operations.

4.3 Customer-Related Processes

4.3.1 Determination of Requirements Related to the Product
The company must determine the specified process verified points.

The company must determine requirements specified by the customer, including the requirements for delivery and post-delivery activities.

The company must determine requirements not stated by the customer but necessary for specified or intended use, where known.

The company must determine statutory and regulatory requirements related to the product.

The company must determine any additional requirements determined by the company.

4.3.2 Review of Requirements Related to the Product
The company must review the requirements related to the product.

The review must be conducted prior to the company's commitment to supply a product to the customer.

The review must ensure that product requirements are defined.

The review must ensure that contract or order requirements differing from those previously expressed are resolved.

The review must ensure that the company has the ability to meet the defined requirement.

The company must maintain records of the results of the review and actions arising from the review.

The company must confirm the customer requirements before acceptance when the customer does not provide a documented statement of requirements.

The company must ensure that relevant documents are amended and that relevant personnel are made aware of the changed requirements when product requirements are changed.

4.3.3 Customer Communication
The company must determine and implement effective arrangements for communicating with customers in relation to
- a) Product information;
- b) Enquiries, contracts, or order handling, including amendments; and
- c) Customer feedback, including customer complaints.

4.4 Design and Development

4.4.1 Design and Development Planning
The company must plan and control the design and development of product.

During the design and development planning, the company must determine
- a) The design and development stages;
- b) The review, verification, and validation that are appropriate to each design and development stage; and
- c) The responsibilities and authorities for design and development.

The company must manage the interfaces between different groups involved in design and development to ensure effective communication and clear assignment of responsibility.

Planning output must be updated, as appropriate, as the design and development progresses.

4.4.2   Design and Development Inputs
Inputs relating to product requirements must be determined.

Inputs must include
- a) Functional and performance requirements;
- b) Applicable statutory and regulatory requirements;
- c) Where applicable, information derived from previous similar designs; and
- d) Other requirements essential for design and development.

Inputs must be reviewed for adequacy.

Requirements must be complete, unambiguous, and not in conflict with each other.

The company must maintain records relating to product requirements.

4.4.3   Design and Development Outputs
The outputs of design and development must be provided in a form that enables verification against the design and development input.

The outputs must be approved prior to release.

Design and development outputs must
- a) Meet the input requirements for design and development;
- b) Provide appropriate information for purchasing, production, and for service provision;
- c) Contain or reference product acceptance criteria; and
- d) Specify the characteristics of the product that are essential for its safe and proper use.

4.4.4   Design and Development Review
The company must perform systematic reviews of design and development at suitable stages.

The company must perform the systematic reviews in accordance with planned arrangements (1) to evaluate the ability of the results of design and development to meet requirements and (2) to identify any problems and propose necessary actions.

Participants in the reviews must include representatives of functions concerned with the design and development stage(s) being reviewed.

The company must maintain records of the results of the reviews and any necessary actions.

4.4.5 Design and Development Verification

The company must perform verification in accordance with planned arrangements to ensure that the design and development outputs have met the design and development input requirements.

The company must maintain records of the results of the verification and any necessary actions.

4.4.6 Design and Development Validation

The company must perform design and development validation in accordance with planned arrangements.

Validation must ensure that the resulting product is capable of meeting the requirements for the specified application or intended use, where known.

The company must complete validation prior to delivery or implementation of the product, wherever practicable.

The company must maintain records of results of validation and any necessary actions.

4.4.7 Control of Design and Development Changes

The company must identify design and development changes.

The company must review, verify, validate and approve changes before implementation.

The review of design and development changes must include evaluation of the effect of the changes on constituent parts and product already delivered.

The company must maintain records of the results of the review of design and development changes and any necessary actions.

4.5 Receiving

4.5.1 Receiving Process

The company must ensure that product purchased or received from outside establishments and used in the program conform to specified receiving requirements.

The company must ensure the adequacy of specified receiving requirements prior to their communication to the supplier.

The company must evaluate and select suppliers based on their ability to supply product that conforms to the specified receiving requirements.

The company must establish and implement the inspection or other activities necessary for ensuring that product purchased or received from outside establishments conform to specific receiving requirements.

Where the company or its customer intends to perform verification at the supplier's premises, the company must state the intended verification arrangements and method of product release in the purchasing information.

The company must have a documented procedure addressing products purchased or received from outside establishments.

The documented procedure must describe
- a) All products purchased and/or received from outside establishments;
- b) The specified receiving requirements for approval of products to be used in the program;
- c) The criteria and process for supplier selection, evaluation, and re-evaluation; and
- d) The process used to ensure that products purchased or received from outside establishments and used in the program conform to specific receiving requirements.

The company must maintain records of the results of supplier evaluations and any necessary actions arising from the evaluation.

The company must maintain records to provide evidence of conformity to the receiving process and of the effective operation of the receiving process.

4.6 Production and Service Provision

4.6.1 Control of Production and Services Provision
The company must plan and conduct production and service provision under controlled conditions.

Controlled conditions must include, as applicable
- a) The availability of information that describes the characteristics of the product;
- b) The availability of work instructions, as necessary;
- c) The use of suitable equipment;
- d) The availability and use of monitoring and measuring devices;
- e) The implementation of monitoring and measurement; and
- f) The implementation of release, delivery, and post-delivery activities.

4.6.2 Validation of Processes for Production and Service Provision
The company must validate any processes for production and service provision where the resulting output cannot be verified by subsequent monitoring or measurement. This includes any processes where deficiencies become apparent only after the product is in use or the service has been delivered.

Validation must demonstrate the ability of these processes to achieve planned results.

The company must establish arrangements for these processes including, as applicable
- a) Defined criteria for review and approval of the processes;
- b) Approval of equipment and qualification of personnel;
- c) Use of specific methods and procedures;
- d) Requirements for records; and
- e) Revalidation.

4.6.3 Identification and Traceability
The company must have a documented procedure to identify product (raw materials and/or finished product) by suitable means throughout product realization, where appropriate.

The documented procedure must describe the method for
- a) Identifying the product throughout product realization;

b) Controlling and recording the unique identification of the product, including the use of the "USDA Process Verified" shield or the term "USDA Process Verified", if applicable; and

c) Identifying the product status with respect to monitoring and measurement requirements.

The method for identifying the product must

a) Be unique to the Program. When applicable, animals must be identified with ear tags or other permanent identification; and

b) Be such that the identification will transfer through all phases of product realization, from receipt into the Program through production to delivery;

The company must maintain records of all products as identified and records of all changes of identities.

4.6.4 Customer Property

The company must exercise care with customer property while it is under the company's control or being used by the company.

The company must identify, verify, protect, and safeguard customer property provided for use or incorporation into the product.

The company must report to the customer and maintain records of any incidences where customer property is lost, damaged, or otherwise found to be unsuitable for use.

4.6.5   Preservation of Product

The company must preserve the conformity of product during internal processing and delivery to the intended destination.

The preservation must include identification, handling, packaging, storage, and protection. It must also apply to the constituent parts of a product.

4.7   Control of Monitoring and Measuring Devices

The company must determine the monitoring and measurement to be undertaken to provide evidence of conformity to product requirements.

The company must determine the monitoring and measurement devices needed to provide evidence of conformity to product requirements.

The company must establish processes to ensure that monitoring and measurement can be conducted and is conducted in a manner that is consistent with the monitoring and measurement requirements.

Where necessary to ensure valid results, measuring equipment must

a) Be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; where no such standards exist, the basis used for calibration or verification must be recorded;

b) Be adjusted or re-adjusted as necessary;

c) Be identified to enable the calibration status to be determined;

d) Be safeguarded from adjustment that would invalidate the measurement result; and

e)   Be protected from damage and deterioration during handling, maintenance, and storage.

The company must assess and record the validity of the previous measuring results when the equipment is found not to conform to the requirements. The company must take appropriate action on the equipment and any product affected.

The company must confirm the ability of computer software to satisfy the intended application when used in the monitoring and measurement of specified requirements. This must be performed prior to initial use and reconfirmed as necessary.

The company must maintain records of the results of calibration and verification.

5   Measurement, Analysis, and Improvement

5.1   General
The company must plan and implement the monitoring, measurement, analysis, and improvement processes needed
a)   To demonstrate conformity of the product;
b)   To ensure conformity of the QMS; and
c)   To continually improve the effectiveness of the QMS.

This must include determination of application methods, including statistical techniques, and the extent of their use.

When statistical methods are used to control product quality or integrity, the basis for those procedures must be clearly defined.

5.2   Monitoring and Measurement

5.2.1   Customer Satisfaction
The company must monitor information relating to customer perception as to whether the company has met customer requirements. This information must be reviewed as a performance measurement of the QMS.

The company must determine the methods for obtaining and using this information

The company must maintain records relating to customer perception.

5.2.2   Internal Audit
The company must conduct internal audits at planned intervals.

The internal audits must determine whether the QMS
a)   Conforms to the planned arrangements, to the requirements of this Procedure, and to the QMS requirements established by the company; and
b)   Is effectively implemented and maintained.

The company must have a documented procedure which defines
a)   The planning of an audit program, which must consider the status and importance of the processes and areas to be audited, as well as the results of the previous audit;
b)   The audit criteria, scope, frequency, and methods;

    c)   The selection of the auditors and conduct of auditors which must ensure objectivity and impartiality of the audit process (Auditors must not audit their own work.);

    d)   The responsibilities for planning and conducting audits;

    e)   The reporting of results;

    f)   The follow-up activities (Follow-up activities must include the verification of the actions taken and the reporting of the verification results.); and

    g)   The maintenance of records.

Within the area being audited, management must ensure that actions are taken without undue delay to eliminate detected non-conformances and their causes.

The company must review the results of internal audits during management reviews.

The company must maintain records of the internal audits.

NOTE: Prior to initial approval of a program, the company must conduct an internal audit and submit those results to the ARC Branch as part of the application for service.

5.2.3   Monitoring and Measurement of Processes

The company must apply suitable methods for monitoring and, where applicable, measurement of the QMS processes.

These methods must demonstrate the ability of the processes to achieve planned results.

When planned results are not achieved, correction and corrective action must be taken, as appropriate, to ensure conformity of the product.

5.2.4   Monitoring and Measurement of Product

The company must monitor and measure the characteristics of the product to verify that product requirements have been met. This must be conducted at appropriate stages of the product realization process in accordance with the planned arrangements.

The company must ensure that the planned arrangements have been satisfactorily completed prior to product release and service delivery, unless otherwise approved by a relevant authority and, where applicable, by the customer.

The company must maintain records to verify evidence of conformity with product requirements. Records must indicate the person(s) authorizing release of product.

5.3   Control of Non-conforming Product within the QMS

The company must ensure that non-conforming product (raw material and/or finished product) is identified and controlled to prevent its unintended use or delivery.

The company must have a documented procedure that defines
    a)   The identification of non-conforming product;
    b)   The controls used to ensure the segregation of non-conforming product; and
    c)   The related responsibilities and authorities for ensuring the segregation and disposition of non-conforming product.

The company must handle non-conforming product by one or more of the following methods:
    a)   By taking action to eliminate the detected non-conformity;

b)   By authorizing its use, release, or acceptance under concession by a relevant authority and, where applicable, by the customer;

c)   By taking action to preclude its original intended use or application.

When non-conforming product is corrected, it must be subject to re-verification to demonstrate conformity to the requirements.

The company must take appropriate actions when non-conforming product is detected after delivery or use has started.

The company must maintain records of all non-conforming product and any subsequent actions taken, including concessions obtained.

5.4   Analysis of Data

The company must determine, collect, and analyze appropriate data to demonstrate the suitability and effectiveness of the QMS.

The company must evaluate where continual improvement of the effectiveness of the QMS can be made. This must include data generated as a result of monitoring and measurement and from other relevant sources.

The analysis of data must provide information relating to (1) customer satisfaction; (2) conformity to product requirements; (3) characteristics and trends of processes and products including opportunities for preventative action; and (4) suppliers.

5.5   Improvement

5.5.1   Continual Improvement

The company must continually improve the effectiveness of the QMS through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventative actions, and management review.

5.5.2   Corrective Action

The company must take action to eliminate the cause of non-conformance in order to prevent recurrence.

Corrective actions must be appropriate to the effects of the non-conformances encountered.

The company must establish a documented procedure which defines the requirements for
a)   Reviewing non-conformances including customer complaints;
b)   Determining the causes of non-conformances;
c)   Evaluating the need for action to ensure that non-conformances do not recur;
d)   Determining and implementing action needed;
e)   Records of the results of action taken; and
f)   Reviewing corrective action taken to determine its effectiveness.

The company must maintain records of the results of any actions taken.

5.5.3   Preventative Action

The company must determine action to eliminate the causes of potential non-conformances in order to prevent their occurrence.

Preventative actions must be appropriate to the effects of the potential problems.

The company must establish a documented procedure which defines the requirements for
   a)   Determining potential non-conformances and their causes;
   b)   Evaluating the need for action to prevent occurrence of non-conformances;
   c)   Determining and implementing action needed;
   d)   Records of results of action taken; and
   e)   Reviewing preventative action taken to determine its effectiveness.

The company must maintain records of the results of any actions taken.

6   Promotional Materials

6.1   Control of Promotional Materials
The company may use the "USDA Process Verified" shield or the term "USDA Process Verified" in promotional and advertising materials, which includes all labels, packaging, and other marketing materials.

The company must request the use of the shield or term within the QMS.

When applicable, the company must establish a documented procedure for promotional and advertising materials that
   a)   Addresses the development of the materials;
   b)   Ensures the specified process verified points are accurately represented in the materials;
   c)   Ensures the use of the "USDA Process Verified" shield or the term "USDA Process Verified" in direct association with a clear description of the specified process verified points in the materials;
   d)   Provides for the proper control and use of the shield or term on labels, packaging, and other marketing material on which it may appear.

All materials must be reviewed by the ARC Branch prior to use.

Definitions

Conforming Product – product within the QMS that meets, and can be verified as meeting, the product requirements. Such product may be identified and/or labeled as meeting the requirements of the USDA Process Verified Program.

Corrective Action – action to eliminate the cause of a detected non-conformance.

Correction – action to eliminate a detected non-conformance.

Customer Satisfaction – customer's perception of the degree to which the customer's requirements have been fulfilled.

Measurement – the actual determination of a value. Requires the use of a device to determine the numerical value of a product characteristic or process parameter at a given time.

Monitoring – a general term implying oversight over time. (Examples: normal process observation by employees, daily supervision by managers, automated alarms, etc.)

Non-conforming Product – product within the QMS that does not meet, or can not be verified as meeting, the product requirements. This includes raw materials and finished products. Non-conforming raw materials must be excluded from use within the program; and non-conforming finished products must be excluded from delivery. Additionally, the company must take appropriate actions when non-conforming product is detected after delivery or use has started.

Objective evidence – data supporting the existence or verity of something.

Planned Arrangements – arrangements that have been pre-determined.

Preventative Action – action to eliminate the cause of a potential non-conformance.

Procedure – a specified way to carry out an activity or a process. Procedures can be documented or not. The Process Verified Program requires 10 documented procedures.

Process Verified Points – the specified requirements of the product which are achieved through the implementation of a quality management system.

Process – a set of interrelated or interacting activities which transforms inputs into outputs.

Product – a raw material or a finished good. The type of product depends upon where it is within product realization. A product is the result of a process.

Product Realization – the process of developing a product from initial acceptance of the raw materials into the program through production to delivery to the customer.

Product Requirements – includes, but is not limited to, the requirements of this Procedure, the requirements outlined in the QMS, the customer requirements, and the specified process verification points.

Quality Policy – the overall intentions and direction of a company related to quality and formally expressed by top management.

Quality Objective – something sought, or aimed for, related to quality. These are generally based on the quality policy and specified for relevant functions and levels in the company.

Record – a document that states results achieved or provides evidence of activities performed. The Process Verified Program requires 20 records.

Top Management – a person or group of people who direct and control the company at the highest level.

Validation – confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled.

Verification – confirmation, through the provision of objective evidence, that specified requirements have been fulfilled.

1. Clause 1.2.2 – Quality Manual

2. Documented Procedures
   2.1   Clause 1.2.3 – Control of Documents
   2.2   Clause 1.2.4 – Control of Records
   2.3   Clause 3.2 – Training of Personnel
   2.4   Clause 4.5.1 – Receiving of Product from Outside Sources
   2.5   Clause 4.6.3 – Identification and Traceability
   2.6   Clause 5.2.2 – Internal Audits
   2.7   Clause 5.3 – Control of Non-conforming Product
   2.8   Clause 5.5.2 – Corrective Action
   2.9   Clause 5.5.3 – Preventative Action
   2.10   Clause 6.1 – Control of Promotional Material

3. Records
   3.1   Clause 2.6.1 – Management Reviews
   3.2   Clause 3.2 – Human Resources - Competence, Awareness, and Training
   3.3   Clause 4.2 – Planning of Product Realization
   3.4   Clause 4.3.2 – Review of Requirements Related to the Product
   3.5   Clause 4.4.2 – Design and Development Inputs
   3.6   Clause 4.4.4 – Design and Development Review
   3.7   Clause 4.4.5 – Design and Development Verification
   3.8   Clause 4.4.6 – Design and Development Validation
   3.9   Clause 4.4.7 – Control of Design and Development Changes
   3.10   Clause 4.5.1 – Receiving Process (2)
   3.11   Clause 4.6.3 – Identification and Traceability
   3.12   Clause 4.6.4 – Customer Property
   3.13   Clause 4.7 – Control of Monitoring and Measuring Devices
   3.14   Clause 5.2.1 – Customer Satisfaction
   3.15   Clause 5.2.2 – Internal Audit
   3.16   Clause 5.2.4 – Monitoring and Measurement of Product
   3.17   Clause 5.3 – Control of Non-conforming Product within the QMS
   3.18   Clause 5.5.2 – Corrective Actions
   3.19   Clause 5.5.3 – Preventive Actions

4. Any other documents necessary to ensure the effective operation and control of the QMS.

Appendix C

The National Animal Identification System (NAIS)

Why Animal Identification?
Why Now? What First?

Why Do We Need Animal Identification?

A rational, cost-effective animal identification program will
• Enhance foreign animal disease surveillance, control, and eradication;
• Facilitate epidemiologic investigations;
• Improve biosecurity protection of the national livestock population;
• Distinguish animals vaccinated or tested under official U.S. Department of Agriculture (USDA) disease-control or -eradication programs from unvaccinated and untested herdmates;
• Furnish official identification for animals in interstate or international commerce;
• Accurately identify blood and tissue specimens used for laboratory diagnostics;
• Track the health certification status of herds, States, and regions; and
• Enable effective regionalization and risk assessment in support of international trade.

Why Do We Need a National Animal Identification System (NAIS)?

The increasing number of animal disease outbreaks that have been reported around the globe over the past decade and the single cow that tested positive for bovine spongiform encephalopathy (BSE) in the United States in December 2003 have greatly intensified public interest in developing a national animal identification program for the purpose of protecting animal health. The European Union, Canada, and Australia already have animal identification systems in place. A strong U.S. identification system is in increasing demand as a necessary component of our Nation's agricultural infrastructure.

Some History

Animal identification is not a new concept in the United States. Back in the 1940s, the predecessor agency of USDA's Animal and Plant Health Inspection Service (APHIS) initiated an extensive program to identify cattle vaccinated for brucellosis. The official brucellosis vaccination tag with an ear tattoo provided the United States with a highly successful animal identification program for cattle for decades. However, since brucellosis is close to being eradicated in the United States, that system of tagging and identification is being phased out rapidly. Other animal health programs also include an animal identification component, and certain classes of livestock must be officially identified before entering interstate commerce. So there are multiple systems in place that exist for different purposes, but there is no uniform, nationwide animal identification system for all animals of any given species.

Animal identification is worthwhile to producers for various reasons, including performance recording and marketing opportunities. However, APHIS is focused on animal identification for one reason alone: to establish the foundation the agency needs to support its programs to control, eradicate, monitor, and survey for animal diseases.

Most individuals associated with animal agriculture recognize that finding potentially sick or exposed animals early in a disease outbreak is essential to containing the disease quickly. The NAIS would allow for rapid tracing of animals during an outbreak situation, helping to limit the scope and expense of the outbreak and allowing APHIS to minimize the impact on domestic and foreign markets. The NAIS will also be critical as APHIS works to complete disease eradication programs in which the Federal Government, States, and industry have invested many years of effort and millions of dollars.

NAIS: Goal and Objectives

The goal of the NAIS is to have the capability to identify all animals and premises that have had direct contact with a foreign animal disease or a domestic disease of concern within 48 hours after discovery. USDA believes that this goal can best be achieved

by focusing on the following objectives.

First, USDA does not want to burden producers with multiple identification numbers, processes, or requirements. What USDA, together with its industry and State partners, has envisioned is very simple: a system where every premises involved in livestock commerce or animal movement in which exposure to other animals could occur has a unique, seven-character identifier. Every animal needing to be identified individually would have a 15-character number. Groups or lots of animals may be identified with a 13-character number. Many producers already want to make a move to this numbering system from the multiple systems currently in use. As a result, APHIS is planning to pursue rulemaking to recognize for official use the 7-character premises identification number, the 13-character group/lot identification number, and the 15-character animal identification number (AIN). This process will allow producers who want to transition to the NAIS numbering system to begin doing so while not requiring its adoption for others who may not be ready.

Second, there is no "one-size-fits-all" technology. It is likely that some technologies will work better for some species than for others. Rather than focus on a specific technology, USDA will focus on the design of the identification data system—what information should be collected and when it should be collected and reported. Once the identification system is designed, the market will determine which technologies will be the most appropriate to meet the needs of the system.

Third, the NAIS should be built on national data standards to ensure that a uniform and compatible system evolves. The system also must not preclude producers from being able to use it in coordination with production management systems that respond to market incentives.

Fourth, the architecture for the system should be created without unduly increasing the role and the size of the Government. Both public and private funding will be required for the NAIS to become fully operational. Database systems must be developed and maintained, equipment must be purchased, animals must be identified and tracked, programs must be monitored, and labor is needed for all these activities.

Flexibility, Confidentiality, and Cost
Which Species Will Be Included in the NAIS?
The NAIS is being developed for all animals that will benefit from having a system that will facilitate rapid tracing in the event of a disease concern. Currently, working groups are developing plans for camelids (llamas and alpacas), cattle and bison, cervids (deer and elk), equine, goats, poultry, sheep, and swine.

Is the NAIS Mandatory?
While the NAIS is being developed and refined, producer participation will be voluntary. As the system continues to take

shape and is tested for all affected species, USDA will reassess the need for making some or all aspects of the program mandatory. Eventually, USDA may move toward a requirement for premises and animal identification for all species included in the system. If USDA does decide to make all or parts of the NAIS mandatory, APHIS will follow the normal rulemaking process. The public will have the opportunity to comment upon any proposed regulations.

When Is the NAIS Going To Be Fully Implemented?
Right now, there is no set timeline for full implementation of the NAIS. USDA is moving forward under a phased-in approach. The first priority is to register animal premises and those premises associated with animals, such as exhibitions and veterinary clinics. This task will be accomplished at the State level. Assigning unique premises identification numbers to geographic locations is a fundamental component of the NAIS. In case of an animal disease outbreak, animal health authorities need premises location data at their fingertips to ensure disease investigations progress rapidly and efficiently. As premises are registered, animal identification and tracking systems will be tested and integrated under established USDA data standards.

What Do Producers Need To Do First?
Producers should check with their State's or Tribe's animal health authority to find out whether a premises registration system is available in their area. Once a premises registration system is operational, producers should work with the State or Tribal authority to obtain unique premises identification numbers, as appropriate. The premises registration system will record information such as premises type, contact name, premises address, and phone number of the person in charge of the location. This system will be maintained at the State level. Key pieces of information will then be sent to the national premises information repository and may be accessed by animal health authorities during a disease traceback or for other appropriate animal-health-surveillance purposes.

Following premises registration, producers may participate in animal identification and tracking programs as provided in their State. As the NAIS progresses, producers will be able to contact an animal identification number distributor to obtain official AINs. These numbers will be issued to the premises and attached or assigned to the animals in a way that is appropriate for the species. The AIN distributor will submit to a national information repository a record of the numbers provided to each premises. By obtaining numbers from an AIN distributor, the producer will, in effect, automatically provide the initial record for registering his or her animals' location. AIN distributors will be authorized by USDA to distribute official devices. They could include breed associations, Federal area offices, State departments of

agriculture, and tag manufacturers, among others. Producers
should check with their State or Tribal animal health authority
to determine whom they should be contacting about AINs.
They can also contact the APHIS Area Veterinarian-in-Charge for
their State.

Who's Going To Have Access to the Information?
Federal, State, and Tribal animal-health officials will have access
to the national premises and animal identification information
repositories when they need data to administer animal health
programs at the State and national level. For example, they may
access the database if an APHIS–Veterinary Services program
disease—such as tuberculosis or brucellosis—or a suspected
foreign animal disease is reported and requires an epidemiologic
investigation. They may also access the database during
emergency-response simulations.
Animal health officials need access to this type of information to
carry out their responsibilities: retrieving this kind of data is a
critical part of their job. Every day, they conduct epidemiologic

investigations for a variety of reasons—to trace a tuberculosis or
brucellosis reactor or animal suspected of being infected, to
investigate the report of a suspected foreign animal disease, or to
assess the effectiveness of a surveillance and monitoring program.
In addition, public health officials may be provided access to this
information in the case of zoonotic disease outbreaks that could
affect both animals and humans.

Is the Information Going To Be Kept Confidential?
USDA is aware of producers' concerns about the confidentiality of
information collected in the NAIS and is taking them very seriously
as APHIS explores the most effective means for collecting animal
identification information. Accordingly, USDA is investigating
various options for protecting the information in the NAIS from
public disclosure. It is important to note that the national
repositories will include information only for animal and disease
tracking purposes. Proprietary production data will not be retained
by USDA.

**Will Livestock Producers Be Held Liable If Someone Develops
a Case of Food Poisoning?**
APHIS' goal for the NAIS is to enhance the agency's ability to
trace and respond to diseases in animal populations. The key
objective is to achieve timely tracebacks and traceforwards to
minimize the detrimental effect of a disease on the national herd.
Accordingly, USDA will collect and retain only necessary
identification data in the preharvest production chain and through
final inspection at slaughter establishments. The NAIS will
increase the accuracy of animal health information and will not
expose producers to additional liability. Liability resulting from

one's actions does not change as a result of the NAIS.

How Does This Relate to Country of Origin Labeling (COOL)?
The NAIS is not being implemented as a result of the COOL initiative. The intent of the NAIS is to create the ability to track animal disease to its source and other potentially exposed premises within a 48-hour period after detection. However, animal owners may be able to use information collected under the NAIS for other purposes, including the COOL program.

What Kind of Technology Will Producers Have To Purchase and Use?
USDA recognizes that there is no "one-size-fits-all" technology. An identification system that works for cattle may not work for goats. It is likely that some technologies will work better for some species than for others. Rather than focusing on a specific technology, USDA will focus on the design of the identification system—what information should be collected and when it should be collected. Once the identification system is designed, the market will determine which technologies will be most appropriate to meet the needs of the system.
USDA will work to incorporate identification systems already in existence, such as cattle brands and I.D. tags distributed as part of the scrapie eradication program, as we move forward with the NAIS.

What's the Cost?
At this point, USDA does not have a fully defined budget for implementing the NAIS. However, the size and scope of this undertaking demand that it be a cooperative effort. Because it is being developed as an industry–government partnership, it is expected that industry and the government will share the cost of the necessary elements. It is USDA's intent to minimize industry's share of NAIS' costs to individual producers as much as possible, but there still may be some expenses associated with participation.

How Can I Learn More?
Refer to the NAIS Web site at <http://www.aphis.usda.gov/lpa/issues/nais/nais.html>.

Appendix D

The United States Animal Identification Plan

January, 2004

The US Animal Identification Plan (USAIP) is needed to maintain the economic viability of American animal
agriculture. This national animal identification and tracking plan will enhance disease preparedness by rapidly
identifying animals exposed to disease, thus allowing quick detection, containment, and elimination of disease
threats. This is essential to preserve the domestic and international marketability of our nation's animals and
animal products. The USAIP will promote continued confidence in livestock products and will protect the
health status of the nation's herds and flocks.

The single case of BSE in the United States announced December 23, 2003, reinforces the need for a national animal identification program. The USAIP implementation plan by species provides for a timely, phased-in introduction of the national program with practical, flexible, and cost effective solutions.

The plan, when fully operational, will be capable of tracing an animal or group of animals back to the herd or premises that is the most logical source of a disease concern. It will also be able to trace potentially exposed animals that were moved out from that herd or premises. The plan's long-term goal is to establish a system that can complete the traces (back and forward) within 48 hours of discovery of a disease. Such capability is dependent on developing a practical yet comprehensive infrastructure that collects and records the movements of animals. The identification of premises (production points) is the foundation of the system and must be established before animals can be tracked.

The USAIP defines the standards and framework for implementing and maintaining a national animal identification system for the United States. It includes a premises numbering system, an individual and group/lot animal numbering system, and standards for radio frequency technology used for animal identification. The immediate priority is to have these standards recognized in the Code of Federal Regulations.

The cattle, sheep, and swine industries have already developed preliminary implementation plans. All

other livestock, including goats, cervids, equine, aquaculture, poultry, llamas, and bison, are becoming engaged in the plan. Some features of the plan are common to all species, while others are species specific. Species working groups are meeting to further define their needs and develop transition and implementation plans to include in the USAIP.

US Animal Identification Plan
January, 2004 Page 2
"Protecting American Animal Agriculture"

The USAIP timeline calls for the establishment of the National Premises System in 2004. The infrastructure for individual animal identification will be made available as premises become enrolled to provide for the timely introduction of official ID with the new national numbering system, the US Animal Identification Number. Recording the interstate movements of livestock on the national database is the first priority as animal tracking systems are put in place.

The plan contains no mandatory requirements at this point in its development. Eventually, as the plan is finalized and tested, all livestock and food animals will be able to be tracked through the system. Not all animals, however, will need to be individually identified if they are raised, fed, and harvested as a group. In that case, they can be identified with a group/lot identification number. This process will likely vary among species.

Confidentiality of identification data remains one of the greatest concerns of producers. The USDA is working on solutions to resolve these concerns.

While preliminary projections for financial requirements have been made, the plan is still being developed so no specific amounts are yet available.

Animals entering the United States from other countries will be subject to the same identification and tracking procedures as animals already in the country. The identification devices that are on animals entering the United States will remain on the animals as official devices. The Canadian identification program is compatible with the USAIP.

Radio Frequency Identification (electronic ID) is currently the preferred identification method for some types of livestock when individual animal ID will be needed. Other technologies (DNA, retinal imaging, etc.) will be integrated into the USAIP as standards and practical applications of the technology are presented to the industry.

The standards defined in the USAIP allow the opportunity for multiple manufacturers and service providers to participate in the program.

For more information, visit the US Animal Identification website at www.usaip.info.
Printed copies of the USAIP are available upon request. Contact:
John Wiemers Phone: (309) 344-1942
Email: john.f.wiemers@aphis.usda.gov
Neil Hammerschmidt Phone: (301) 734-5571
Email: neil.e.hammerschmidt@aphis.usda.gov
ID/INFO EXPO 2004, a national animal identification conference and trade show, is scheduled for
May 18-20, 2004, in Chicago:
Results of the USAIP Species Working Groups and other updates will be presented.
Sponsored by the National Institute for Animal Agriculture.
See www.animalagriculture.org for symposium information as it becomes available.

US Animal Identification Plan
January, 2004 Page 3
"Protecting American Animal Agriculture"

USAIP Standards

• Premises Identification Number
The National Premises Identification Number provides a nationally unique number for each premises
(location) involved in animal agriculture. The format (field specification) for the National Premises
Identification Number is defined below.

Structure Type Example Comments
7 Character Alphanumeric A123R69 Right most character is a check digit
• US Non-Producer Participant Number
The USAIP provides for the establishment of Non-Producer Participants who will be involved in the program, but do not manage or hold livestock. Such entities include tag manufacturers, service providers,
veterinarians, breed registries, etc. APHIS will establish enrollment/application procedures for Non-Producer

Participants and will assign unique Non-Producer Participant Numbers to such entities/individuals. Non-
Producer Participant Numbers are necessary for submitting required data to the national database.
The Non-Producer Participant Number is a unique 7-character field as presented in the following chart.

Structure Type Example Comments
7 Alphanumeric H892345 USDA will allocate unique numbers to approved
Non-Producer Participants using the same system
used for allocating premises identification numbers.

• US Animal Identification Numbering System
The national numbering system for individual animals, referred to as the US Animal Identification
Numbering (USAIN) System, will follow the ISO code structure standard for radio frequency identification
of animals. The USAIN will permit a single animal to be identified with a lifetime number that can be
printed on a visual tag, encoded on an RFID transponder, or a combination of both. The format (field
specifications) of the USAIN is defined below.

Structure Type Example Comments
3 Numeric 840 ISO 3166 Country code for USA
12 Numeric 123456789012 Start number > 002,000,000,000
*Note: Other identification numbering systems defined in the Code of Federal Regulations remain official through a
transition period.*

US Animal Identification Plan
January, 2004 Page 4
"Protecting American Animal Agriculture"

• Group/Lot Identification Number
Group/Lot ID will consist of the National Premises Identification Number of the location where the group
was established and a six digit numerical number reflecting the date the group was created. This format will
result in a unique number, for example: A234567100302.

Structure Type Example Comments
7 Alphanumeric A234567 First 7 characters is the entity's US
Premises ID Number
6 Date (MMDDYY) 100302
Group/Lot ID is an option for any species in which animals move as a group through the
production chain.

• Radio Frequency Identification Technology
Radio Frequency Identification (RFID) technology is the most common form of electronic identification used
in animal agriculture today. Other technologies, including bar codes and 2-D symbology, if used, must have

appropriate standards established. Other biometrics that store measures in digital formats will require

standardization as they mature and enter the marketplace. At this time, the primary focus is to foster the

adoption of national standards for the use of RFID devices in animals.

The following table explains the technology standards for radio frequency identification required when used

for official animal identification. Abbreviated versions of ISO 11784 and ISO 11785 are contained in the

USAIP Technical and Reference Supplement.

Issue Standard Comments

Code Structure ISO 11784 Radio Frequency Identification
of Animals
The entire code structure is a 64 bit
number, of which bits 16-26 are the
country code and bits 27-64 are the
animal number
Technical Concepts ISO 11785 Radio Frequency Identification
of Animals
Note: ISO Standards do not designate any minimum performance standards; i.e., read distance.

• Official Identification Devices

The official identification of an individual animal will require the attachment of a device to the animal with

the appropriate identification number printed on it and electronically encoded in the chip. While uniform

methods will be preferred within a species, it is realized that various methods of identification will need to be

provided across species. Devices currently defined in the Code of Federal Regulations will remain official

methods of identification unless noted otherwise. Official identification devices or procedures for various

species will need to be supported by the representative industry and approved by appropriate animal health

officials.

Appendix E

LIVESTOCK MARKETING ASSOCIATION
10510 NW Ambassador Drive, Kansas City, MO 64153
Telephone: 800-821-2048; Fax: 816-891-7926
E-mail: nrobinson@lmaweb.com; Website: lmaweb.com

MEMO

TO: USAIP Steering Committee
FROM: Billy Perrin, President, Livestock Marketing Association
DATE: January 26, 2004
SUBJECT: Initial Comments On The U. S. Animal Identification Plan (USAIP)

The Livestock Marketing Association (LMA), a national trade association representing livestock auction markets, dealers and order-buyers, appreciates the efforts of the USAIP Development Team, including those of our own participating staff, in putting together a very thorough proposal defining the standards and framework necessary to implement a national animal identification system. LMA welcomes the opportunity to comment on the initial USAIP and will follow up our preliminary comments with additional comments once LMA's Board of Directors meets in late February and the specie specific work groups hold their meetings in the coming weeks and months.

The livestock marketing sector, and livestock auction markets in particular, have a long history of being the pivotal point for livestock identification (ID) programs for animal health and disease surveillance, monitoring and traceback. These market ID programs, which have been critical to protecting the health of the national herd and thus protecting the financial investments of millions of farmers and ranchers, have often come at a heavy price to livestock markets in added costs for facility upgrades, additional workers and worker benefits, and compliance with burdensome regulatory requirements.

The establishment of a national individual animal ID and traceback system shares all the lofty purposes and benefits of all the earlier federal and state animal ID programs. Unfortunately, it also shares all the burdensome costs to the marketing sector of those earlier programs. Therefore, LMA is unlikely to support a national individual animal identification system, as envisioned by the USAIP, without some assurance that public funds will be available to substantially subsidize the costs of implementing and maintaining the system at livestock auction markets and other marketing facilities, such as buying stations, dealer holding pens, etc.

LMA believes the budget estimates to implement the USAIP are woefully understated, at least from what little we know from the "Preliminary Projection for Financial Requirements" chart on page 45 of the USAIP. It is important that the cost projections of the ID program as they relate to the markets consider much more than just the cost of the "Data Collection Infrastructure" or market readers, if indeed that is all that the current USAIP cost projections cover. For instance, the cost of refitting the markets' to accommodate the movement of animals through the market and past the readers will

likely be much greater than the cost of the readers themselves. Also, we anticipate that the cost of setting up and maintaining the computer infrastructure and hiring technical staff to run and maintain these systems in the markets will be equally enormous.

The cost projection information as presented in the USAIP simply does not provide us sufficient information at this time to make an informed judgment on whether the stated cost projections are realistic or not. Thus we urge the Development Team and Steering Committee to flesh-out the cost projections numbers and how they were arrived at so we can make more informed comments in this regard in the future.

Another likely cost to the livestock markets, which is not discussed in the plan, is the cost of setting up "Tagging Service Sites" at the markets. The USAIP anticipates that many producers, who do not have the facilities or equipment to tag their animals, will seek out their local livestock market to tag their animals as they come to the sale or prior to moving them into commerce. We agree such a scenario for tens of thousands of producers is extremely likely, which is what worries us. We understand that this issue has been discussed at length within the Transitions Work Group. However, we are not comfortable that the plan and those on the Development Team that devised it are still fully aware of the magnitude of the costs and the difficulty of accommodating the thousands of small producers, particularly in the Southeast, who cannot or will not tag their animals and will require the services of others (livestock markets) to do it.

The tagging service sites concept, which we understand was derived from the Canadian ID experience, on its face may seem like a terrific solution to the problem of untagged animals moving into commerce. However, before we can make that judgment, we need to know (1) what the costs will be to the producer in obtaining these tagging services; (2) what the costs will be for livestock markets in setting up and operating these tagging service sites; and (3) how will producers and the market tagging sites recover their associated tagging costs? One of the unstated goals of the USAIP is not to adversely impact small producers and other affected entities to the point of discouraging their continued operation. We can hardly see how this goal can be met if the costs associated with implementing the USAIP are not subsidized by the government and/or compensated for in the marketplace.

On a related subject, we note on page 38 of the plan that tagging service sites are to be considered a non-producer participant. So, if a market also serves as a tagging service site, are they a non-producer participant, a premise or both? If they are a premise and are tagging animals, then what about the statement on page 26, V.A.3, that, "Point of Origin (or an animal's premises when tagged) is achieved through the allocation/distribution of USAIN tags to a premises for individual animals." This statement would seem to imply that the market becomes the point of origin, though we know that is clearly not what is intended. Thus, if the market is not the true point or premise of origin, then do they have to become a certified AIN Manager in order to distribute and apply USAIN tags to individual animals from that animal's premise of origin? This issue becomes further complicated when producers come to the market without a premise ID and the markets are made responsible for sending premise information to the State Premise Allocation system. Are we all thoroughly confused by now? We are. It goes without saying that this conglomerate of ID responsibilities, activities and designations respective to the

livestock markets must be simplified or the entire program, at least as it pertains to our operations, will fall on its face.

Perhaps, given the responsibilities of the non-producer participant (submitting animal record to the National Animal ID Database, acting as an agent for purchasing of livestock, etc.), it makes more sense to have livestock markets designated as a nonproducer participant than it does to designate our operations as a premise. Or, perhaps the livestock markets need a wholly separate Market Participant designation with it's own role and set of responsibilities.

Another tagging issue that needs clarification is the issue of at what point the ID tag is read in the markets. We are aware that there has been some discussion within the Transitions Work Group and the ID Development Team on the feasibility of reading the tags coming in and going out of the market in order to identify the premise the animal came from and the premise to which it is going. No one, who knows how livestock are marketed through our facilities and who typically our buyers are, would ever suggest that we could know or identify what premise an animal is likely to end up at. Our records will be able to identify the premise number of a farmer or rancher buying the livestock or the non-producer participant number of a dealer or order-buyer but, beyond that, a market would be unable to associate an individual animal with a buyer who may be sending a pot load of cattle to five different locations or premises. This issue, if it is still an issue, must be resolved in the manner we have described so as to leave no doubt as to the market's responsibility in this regard.

On page 26 of the plan regarding animal tracking, it states that, "The infrastructure to obtain animal sighting records at markets and termination records at processing plant will be established at priority locations and will progress over time…" What exactly does this mean? How will the priority locations be determined, what progression timeline are we talking about here and would this progressive implementation at markets put markets not yet in the system at a competitive disadvantage? Also, on page 29, there is a reference to the integration of RFID readers as cattle volumes with RFID tags warrant. This seems a bit like the chicken and egg scenario. If readers are not put in place until there are sufficient numbers of cattle with RFID tags, why would producers go to the expense of tagging their animals if there are no readers to capture the information?

Regarding data file transmission, we note on page 23 of the USAIP "Only non-producer participants with the appropriate level of security will have access to the central (data file) location to transmit data files." On page 20, number 11 respective to the animal event/transaction record flow chart, the plan states that "Records obtained from the market, in particular ones collected from the RFID system, are automatically sent to the National ID DB (database)." These two statements point out again the confusion that is raised when you have different marketing entities with different designations, i.e. markets as a premise and dealers and order-buyers as non-producer participants. Also, we would appreciate more explanation as to exactly how the data files generated by our facilities will be uploaded "automatically" to the central data location and why we wouldn't similarly need access to the central data location required by dealers and order-buyers

who are designated in the plan as non-producer participants?

We are similarly concerned about how liberally AIN Managers will be certified and what the criteria for certification will be so that the integrity of the AIN Managers is maintained. Opening up the distribution of ID tags to potential abusers of the ID system or the data without some significant controls or penalties for mishandling the devices or the ID information could be a recipe for disaster.

Also, the USAIP needs to address the issue of how private treaty/country trades will be regulated and compliance with the ID requirements met. We can foresee a scenario where producers will attempt to circumvent the system through private treaty trades rather than go through markets and dealer where there is identification and data reporting controls in place. For instance, an LMA member has reported that the operator of a cattle backgrounding operation in his area is planning to buy calves off of neighboring farms and not require them to be tagged or identified to the premise of origin as a financial incentive for his neighboring producers to sell to him. While there are all manner of liability questions and associated costs to the backgrounder in doing this, it shows the difficulties that are sure to exist in regulating these private treaty trades. Therefore, we would like to see the USAIP Development Team address this issue more thoroughly in future drafts of the plan.

On page 25 of the plan, the Development Team and Steering Committee has inserted a note indicating that before the industry can support the USAIP, the "issues of confidentiality of the data and access to it, including FOIA, must be adequately addressed." LMA strongly supports that statement. Without strong assurances that proper security measures can and will be put in place to protect the ID information from abuse and misuse by those outside as well as inside the livestock industry and the ID system, the plan as far as our organization is concerned is a non-starter.
On a related security issue, we are interested in knowing how the information obtained through the national ID system will kept out of the hands of other government or law enforcement entities not associated with regulating animal health or disease. There is considerable concern that the animal ID database could be opened up to all manner of scrutiny to support unrelated law enforcement or government enforcement matters. If this is the case, then producers need to know this in making a judgment as to whether they will support anything more than the current plan, which is clearly being touted as a surveillance and traceback system for animal health and disease only.

We also note that there is no guidance in the USAIP for how imported animal will be handled. Will importing countries be similarly required to provide a premise ID and an RFID tag containing an individual animal ID for live animals moving into the United States. Given the integration of the Canadian and the Mexican livestock industry and the recent bovine spongiform encephalopathy incident involving an animal imported from Canada, can we afford not to require the same ID standards of our trading partners as we require for our domestic producers.
Lastly, the timeline established for implementation of various parts of the plan is clearly unrealistic and unachievable. (Many of the target dates are already upon us or are past

us.) We understand the initial intent of the Development Team and Steering Committee was to commit to an aggressive timeframe for implementation with the full understanding that it would have to be revised as the USAIP proceeded down the path toward its goals. However, this preliminary timeline is now being widely touted by outside information sources as being set in stone. As a result, there is great fear within our industry and elsewhere within the livestock industry that this very complex plan, which is still incomplete and has many months of fine-tuning and pilot studies ahead of it, will be imposed on us before it can reasonably and effectively be implemented. Thus, we urge the Steering Committee to revisit the suggested implementation timeline and/or make a public statement that puts the current timeline into perspective.

Over 39 million cattle and calves, 7.8 million hogs and pigs and 4 million sheep and lambs were traded through livestock markets in 2001. Dealers and order buyers handled another 33 million cattle and calves, 18.9 million hogs and pigs and 3.3 million sheep and lambs. Given the shear numbers of livestock marketed through livestock markets alone, the weight of managing this program through our market facilities appears nearly impossible. Thus, we will be most interested in the results of the pilot studies being conducted at markets to help us in determining the feasibility and costs of the current USAIP so that LMA can have further input into the animal ID planning process. Thank you for your consideration of our concerns and questions.

Appendix F

National Cattleman's Beef Association (NCBA)

Envision a system that will provide the USDA traceback for animal disease investigations and give USDA and Agricultural Industry credibility for the safety of the products provided as part of the world wide food supply.

National Animal Ident i f i c a t i o n S y s t e m (N A I S)
Page 1 2/24/2005

Assumptions

In the consideration of a private system several key assumptions were considered. In some cases the assumptions used were expectations that the Commission developed to guide development. In other cases the assumptions were merely a recognition of circumstances or conditions that must or should be met. The primary assumptions used in the development of the industry NAIS were the following:

1. Enhancement of the animal health surveillance system
2. Need for financial incentives, both private and government
3. Official Unique Individual Animal Identification
4. Reasonable timeline—Marketplace dictates adoption
5. Oversight for the system should be provided by the industry
6. A privately held, recognized, multi-species, centralized database—meeting USDA needs for disease surveillance, marketplace and industry requirements
7. The program may become mandatory at some point (time or participation rate)
8. A private system for animal health surveillance can provide the framework for value movement within the beef system.

National Animal Identification System (NAIS)
Industry Proposal White Paper for Consideration
Introduction/History

NCBA, through member developed policy, recognizes the need for an effective animal identification system. The creation of the NCBA Animal Identification Commission was a result of that policy and is charged with the responsibility of developing a workable solution for implementation of a national animal identification system

(NAIS) for the beef industry with the ability to accommodate other species as required.

USDA has yet to receive the level of funding necessary to fully implement a NAIS. Current funding appears to be adequate for the development of premises systems but not the NAIS network itself. The FY05 budget includes a total of $33 million for the purpose of animal ID. Confidentiality language has been drafted by USDA—however; the legislation has yet to be acted upon by either the House or the Senate.

After careful consideration of alternatives developed for the public sector a number of concerns with confidentiality, costs and flexibility in a public database system have led NCBA to work toward the development and support of a private system that still meets government objectives.

Future confidence levels, both here and abroad, in US beef supplies may depend upon the development of an effective and recognized NAIS.

This partnership between producers and animal health officials, when complete, will ensure that the needs of both government and industry are fulfilled, and that the flow of information throughout the national animal identification system (NAIS) is maintained in a secure and confidential manner.

Therefore, the focus of this paper is on the architecture for a NAIS that is part of an overall system solution that promotes those ideas and requirements. These requirements are:

• Meeting the Government needs of a complete trace-back within 48 hours for animal disease investigation and surveillance,

• Maintaining the confidentiality of information on animal movements and ownership in private hands— free from freedom of information act requirements of state and National Animal Ident i f i c a t i o n S y s t e m (N A I S)
Page 2 2/24/2005
federal governments,

• Providing animal ownership data, source verification and movement information to the government on specific animals that are involved in a given investigation, or surveillance.

• Providing a commercial information exchange infrastructure.

NCBA's Animal ID Commission will focus on an initial NAIS capable of efficiently tracking all bovine, swine, and sheep. The same system can also be enhanced to track other species without major design or infrastructure modifications.

This document is based on a system design that will be flexible enough to scale from a smaller voluntary source verification start-up emphasis to full scale animal movement and tracking across the entire industry.

A number of key assumptions, regarding the operating environment of the meat industry, were considered during the development of this NAIS design proposal.

The NAIS Solution

NAIS must provide a simple yet complete set of features and functions to address the various requirements of the USDA, State Animal Health Authorities and the various species within the livestock and poultry industries. The NAIS must maintain the privacy of producers, and be flexible to accommodate differences in production methods. Finally, it must all sit atop a strong technical foundation that allows for the flexibility and scalability to grow and adapt over time.

NAIS must be capable of providing trace-back within 48 hours of diagnosing an animal with a livestock disease, such as bovine spongiform encephalopathy (BSE), foot and mouth disease (FMD), or other animal diseases.

NAIS will recognize and maintain the private and public requirements of the system.

Stakeholders
Producers, Commercial Operators, Processors

The producers, commercial operators such as auction markets or order buyers and processors are the stakeholders most significantly impacted by NAIS. Failure to implement a NAIS solution or system failures such as significant system outages or security breach of NAIS will affect business operations, program trust, and possibly the level of participation in the program.

Under the following design, producers can participate in a number of different ways—directly, through a Service Provider or a Data Trustee.

Producers wishing only to validate the most basic information such as origin can simply report tag and premises information back to the private database with no further requirements.

Producers wishing to use the private database to transfer additional information for marketing will be required to either utilize a Data Service Provider (DSP) or establish themselves as a Data Trustee (DT).

The benefit to operating directly with the database is cost. Producers will have only the actual cost of the device for each animal (lot). The downside of direct communication (not through a DSP or DT) is that the producer or other subsequent owner loses the ability to verify information other than source, which is verified through premises numbers rather than producer provided information.

Data Service Providers (DSP)

Data Service Providers consist of software and/or services companies that provide computerized systems to Producers, Commercial Operators, Markets or Processors. These companies maintain the primary customer contact and animal information.

Individual producers or commercial operators can operate as a DSP if desired—provided they can meet the standards for electronic filing, information protection and system security. DSPs are not required to be electronically connected to the private database 24x7x365.

Information management companies, Livestock Markets, feedyards and processors will also be primary DSP's for much of the industry.

DSP's will provide a critical role in the system, creating the opportunity to take the next step in the system toward animal movement tracking. Additionally, DSP's will provide the means for most producers to transmit information that may have value in the marketplace. Many service companies already provide these services up to and including the management of information all along the production chain.

The downside to a producer operating as a DSP is the increased cost of infrastructure needed to meet NAIS operating standards, primarily electronic submission of data. The benefit is the greater ability to move and transfer information through the system for your benefit or those that contract with you for services.

Data Trustees (DT)

Data Trustees provide a 24x7x365 private information service supporting NAIS, and are the primary party for DSP companies to use to connect to the NAIS.

DT's will meet operational standards criteria as established by the industry oversight group, and will provide value added services for DSP's. Large commercial operators—especially those operating in a "lot" environment, state departments of agriculture, industry associations, and other entities may apply to be a DT. The NAIS private database itself will serve as a public DT for those industry stakeholders who want to send their animal movement information, for basic compliance, directly to the system database.

NAIS Network
The NAIS Network links the Data Trustees with the USDA and provides a number of services that individual Data Trustees cannot provide. The NAIS Network also may be used to link DSPs to DTs. This network also maintains data privacy by allowing the USDA or states to connect to the private NAIS database for information gathering purposes only, and does so 24x7x365 with 99.9% availability.

USDA/States
The industry works with USDA to establish official reports for reference and incident information. Inquiries are initiated by the USDA on an animal or premise basis to the NAIS network for investigations or surveillances. Responses from the NAIS populate the official reports and are analyzed by the USDA for further action. The USDA will also provide information to affected States, animal owners, and industry oversight groups as needed. State officials will utilize reporting systems to conduct surveillance and investigations, through direct connections that allow access to pertinent information in order to facilitate the important activities at the state level that occur on a daily basis. The system will protect producer information and will prevent data mining or unauthorized collection of data.

Industry Oversight
Industry would establish an oversight board with representatives of the industries participating in consultation with appropriate animal health authorities. The industry oversight board would also establish the business rules for the data management side of the NAIS and issue the operating contracts for the private NAIS database and the NAIS Network.
Industry organizations will encourage industry participation in the system development and deployment, monitor the government's use of NAIS, and provide audit compliance reviews of industry, Data Trustees, Data Service Providers, NAIS, and Government for protection and accuracy of industry data. They will also participate in establishing operating standards and rules to ensure information provided to the Government and public is timely and accurate.

HOW IT WORKS
The NAIS solution requires a robust technical solution that meets the requirements of ensuring security, availability, performance, scalability, and adaptability. Proven technical and industry solutions must be mobilized and integrated to meet the needs of all stakeholders, from the smallest producer to the USDA.

NAIS Feasibility
Consider the system components for creating a national animal identification and tracking database as falling into four categories: data collection through the DSP's and DTs, the private NAIS database, and the NAIS

Network, and the operational standards required to make the system work. Let's take these each in turn at various levels of detail, and with the assumption that the technology and standards exist to begin implementation of a NAIS system immediately. We submit rough estimates of less than 50 million identification registration events in the first year, evolving to 200-250 million event transactions at maturity. It is practical to create the NAIS system at National Animal Ident i f i c a t i o n S y s t e m (N A I S)
Page 4 2/24/2005
this time, considering the state of evolution of systems components.

Current State of the Technology
The oversight body will need to constantly evaluate new, existing, and improved technologies for the purposes of data collection and animal identification.

Currently multiple technologies are available for unique identification of animals. The evolving technology with the capability to collect data in varied environments and at the speed-ofcommerce necessary for livestock trade movements is RFID. RADAR technologies for military and commercial use have been evolving for over three decades, and current tag/reader/middleware solutions are at a point where common usage is being adopted at a rapid rate. While these usage scenarios tend to be unique to local/regional needs, the state of the technology is prompting widespread adoption. Further, we will see significant advances of RFID technology in the near future, ramping available data for a NAIS system with increasing acceleration. Industry must and can provide clear expectations of performance and uniformity to guide the necessary and continuing maturation of the technology.

Significant issues remain and leadership is necessary to guide this development. "Speed of commerce" data collection is a goal that will require substantial investment in research and development to insure that as we implement RFID technology in the marketplace we don't trade traceability for the gains we have made in Beef Quality Assurance over the past 15 years.

In 1993 the International Organization for Standardization (ISO) adopted ISO 11784 and ISO 11785 as the electronic specification standard for animal tag identification. The standard permits either Half Duplex (HDX) or Full Duplex (FDXB). Both FDXB and HDX transmit a unique 15-digit animal identifier consisting of the first three digits assigned to a specific manufacturer or a country and the remaining twelve digits available for the manufacturer ensuring that each tag is a unique number. The USDA further refined this in their EIN Identification code standard where the first three digits are the country code (840 for the US) and the remaining numbers specific to the animal.

The Electronic ID system consists of a tag and a reading system. Both the tag and the reader may be designed for a specific application, depending upon read distance, application, price, and location of the applied tag. Typical livestock electronic tags are readily available from a number of manufacturers. The ear tag, which is familiar to most producers, consists of a stud and disc, which is applied with a pliers type applicator.

Reading systems are designed for specific requirements such as mobile applications or fixed applications. For mobile applications, the reader may be a paddle reader, a handheld unit, or an integrated reader that is coupled with a data collection device. Portable readers generally have a shorter read range (approximately 8 to 10 inches

when reading an ear tag) than the fixed reader systems (24 to 48 inches). The shorter read range of the portable reader ensures the read of a single animal, which may be in a group. Fixed readers are used primarily in automated processes such as animals in an alley or in the packing plant. Automated systems allow data collection without adding additional labor to processing animals allowing for the data collection at the speed of commerce. Limitations of the technology due to the need for "speed of commerce" data collection are acceptable.

Due to the nature of electronic identification systems, interfacing a reader to a data collection device, such as a PDA, Laptop or computer, is possible. Most software applications used to collect information of animals through the various locations and processes currently allow a reader to import its identification numbers directly to the applications database. When the data collection device is connected to the Internet, the information can be automatically sent to the national database.

Database System Component—
Secure, reliable databases are omnipresent worldwide in government, military, and commercial applications. While change in technology is inevitable, conventional wisdom is that this technology is mature and fully capable of managing data in a secure and reliable fashion.

The database should be established at a state-of-the-art hosting facility. Redundant hardware is required for purposes of onsite real-time backup and system reliability is defined as 99.9% uptime; as measured 24 hours per day, 7 days per week. Disaster recovery, offsite storage, and middleware data-scrub software specific to RFID applications are also incorporated in the plan. The datascrub

looks for anomalies such as multiple reads of the same identifier, data fill-ins, and unintelligible data sidelined for intervention prior to merging the data into the database. The data will be managed using the most current version of commercial offthe-shelf database management systems.

Merge and search application software source-code, as well as any system documentation created as a historical National Animal Ident i f i c a t i o n S y s t e m (N A I S)
Page 5 2/24/2005
reference, would be kept off site to ensure survivability in the event of change of vendor.

Standards— It is the appropriate role of the Oversight Body to set operational standards for the overall system. They will participate in establishing operating standards and rules to ensure information provided to the Government and public is timely and accurate. They will set performance standards and will insure that all DT's are qualified to perform their obligation to report required NAIS information.

FUNDING OPTIONS
Manufacturer Tag Charge (Bovine and other species)
Each official identification device would carry a surcharge. Funds from the surcharge would be escrowed to allow for the expense of the system. Additional information or access would not be covered under the surcharge. USDA and states would fund premises system and the continuation and development of those systems and the disease management and surveillance systems at the state and national level. Regardless of funds sources, the operation of the system must be supported by consistent payment, including sufficient funds for expansion and growth. While demand will grow incrementally for any single industry,

the addition of additional industries will require large step increases in infrastructure investment. Substantial investment in data collection and reporting equipment and systems will be required in many sectors of the production, marketing and processing sectors. The industry working with USDA will explore methods and sources of funding to offset the initial cost of establishing systems.

Conclusion

The U.S. beef industry experienced significant loss during the twelve months since the December 2003 U.S. diagnosis of BSE. Industry experts conservatively estimate BSE has cost the U.S. cattle industry about $3 billion dollars in lost export value on beef, beef variety meats, hides and tallow. (*Credit: BSEinfo.org*).

This amount is staggering, considering the number of animals and short period of time involved. It is imperative that NAIS move forward with urgency.

2/24/2005

GLOSSARY of TERMS

APHIS

Animal and Plant Health Inspection Service is a division of the USDA. Website: http://www.aphis.usda.gov/. Their official

NAIS Website is http://www.usda.gov/nais.

BSE

Bovine Spongiform Encephalopathy or mad cow disease is a chronic, degenerative disorder affecting the central nervous

system of cattle. Consumption of BSE-contaminated cattle products has been linked to Creutzfeldt-Jakob disease (CJD or

vCJD) in humans. Website: http://BSEInfo.org

DSP

Data Service Providers offer a private service which provides computer systems and/or services to producers, processors,

or commercial operators to collect and administer herd management or animal tracking data.

DT

Data Trustees provide a private trusted location for storage of livestock tracking data which will be shared with authorized

organizations for animal health incident and surveillance purposes.

FMD

FMD, or Foot and Mouth Disease, is an acute infectious viral disease causing blisters, fever and lameness in animals with

hooves. The US has been free of FMD since 1929.

GUI

A Graphical User Interface provides an enhanced visual interface with an underlying application.

NAIS

The National Animal Identification System (NAIS) is a national program intended to identify specific animals in the United

States and record their movement over their life spans. It is being developed by the U.S. Department of Agriculture (USDA)

and State agencies, in cooperation with industry, to enable 48-hour trace-back of the movements of any diseased or

exposed animal. This will help to ensure rapid disease containment and maximum protection of America's animals. (credit:

http://www.usda.gov/nais.)
NCBA
The National Cattlemen's Beef Association. Website: http://www.beef.org/
USDA
The United States Department of Agriculture is a driving force in the formation of the NAIS on behalf of the Federal
government. Website: http://www.usda.gov.

Appendix G

R-CALF Position Paperon National Animal Identification

- R-Calf USA believes that identifying animals in order to allow for traceback and source verification can be an important component of disease control and eradication. While sharing the goal of improved animal health and consumer safety underlying the creation of the National Animal Identification System (NAIS), R-CALF is seriously concerned about the manner in which the program is being implemented.

- First, any system should it be built on the strength of the animal identification systems that already exist today, including state branding programs, sourcing and verification systems driven by the market, and pilot animal identification projects such as the Intertribal Cattle Connect.

- Second, R-Calf USA is not convinced that a mandatory system is ultimately needed, if a mandatory system is to be created, it is essential that it be administered and operated by federal, state and tribal health agencies. These are the agencies with the expertise, the experience, and the statutory responsibility to protect animal health.

- If Congress and the administration determine that a mandatory system is required to protect the public interest, it must be a publicly funded and operated system. There has been a no initial estimate of what such a mandatory system may cost, but these costs are likely to be a substantial. Producers should not bear the full brunt of the cost of a mandatory system enacted for the public benefit.

- In the addition, it is vital that any mandatory system remain in public hands to avoid manipulation of the system for private advantage. In particular, the proposal that a single, privately held animal tracking repository hold all animal source and movement data poses serious concerns. Private access to and control over such data could lead to misuse of the data for private ends. It is essential that the privacy of such data beef fully protected, and it only be accessed for be legitimate health and safety objectives of the program.

- R-CALF USA is committed to working with Congress and the administration on animal identification to ensure that :

     The industry is fully informed of the expected costs and benefits of any proposed system, producer input is taken into account and weighed fully before any mandatory system is created, if a single tracking database is created and submission of producer data are mandated, the system is exclusively managed by the federal government in coordination with state and tribal animal health authorities, and any national identification system builds upon the success of existing animal identification systems. There should be strong support for such systems and pilot projects that to comply with national standards and protect producer data.

David Wright
Curriculum Vitae

1718 S. Sangre #B1
Stillwater, OK 74074
(405) 880-5212
dave20018675@yahoo.com

Academic Degrees

PhD   Oklahoma State University   2007   Technical Communication, (ABD) Expected
                                            July 2007

MS   Oklahoma State University   1995   Higher Education Administration

BS   Oklahoma State University   1992   Psychology/Business

Professional Experience

Aug. 2006-Present: *Instructor*
                       Oklahoma State University Department of English

Responsible for teaching sections of English 3323: Technical Writing to undergraduate students
at Oklahoma State University, including grading, student conferences, and curriculum
development with other faculty and staff.

May 2005-Aug. 2006:   *Business Development and Communications Manager*
                       Pardalis, Inc.

Served as liaison between top management and external clients. Responsible for developing new
client leads, assessing needs of new and existing clients, and communicating those needs to top
management and the development staff. Served as supervisor and project manager for field
operations and inform top management and development staff of external trends and
developments to ensure correct information flow and scheduling. Responsible for developing user
documentation, usability studies, user testing and communication regarding development.
Conducted presentations and training for internal and external clients, systems demonstrations,
and resolution of production issues.

Sept. 2003-May 2005:   Instructor
                       Oklahoma State University Department of English

Responsible for teaching sections of English 3323: Technical Writing to undergraduate students
at Oklahoma State University, including grading, student conferences, and curriculum
development with other faculty and staff.

April 2001-Aug. 2003:   Countryside Communications

Specialized in training, editing and development of written and electronic materials for national and worldwide audiences, computer training, and information technology consulting.

Jan. 1997-April 2001:   Instructional Development Specialist
Oklahoma Department of Career and Technology Education

Coordinated production and development of instructional materials covering a wide range of topics for use in vocational education programs, high schools, and colleges, and the general public. Wrote curriculum, exams, and instructor materials. Worked with committees of instructors, students, and industry professionals to develop accurate materials and course design.

Jan. 1996-Jan. 1997:   Aerospace Education Specialist
Oklahoma State University Department of Aviation and Space Education

Produced educational supplements to accompany NASA publications including written materials, on-line resources, interactive materials, and multimedia educational tools.

Professional Affiliations

Society for Technical Communication
Vice President, Oklahoma State University Chapter 2004-2005

Publications

"Implicature, Pragmatics, and Documentation: A comparative study." Accepted for publication in 2007 by the Journal of Technical Writing and Communication.

Wright, David (2004). "Improving Quail Habitat: Facts and strategies for landowners." *Quail Unlimited,   August-September, 18-28.*

Name: Michael David Wright   Date of Degree: July, 2007

Institution: Oklahoma State University   Location: Stillwater, Oklahoma

Title of Study: TECHNOLOGY DIFFUSION AND THE BEEF INDUSTRY:
                 A COMMUNICATION INVESTIGATION

Pages in Study: 211   Candidate for the Degree of Doctor of Philosophy

Major Field: English/Professional Writing

This dissertation investigates the effects of technology diffusion, communication networks, communication theory, and linguistic principles upon the acceptance of the National Animal Identification System and its accompanying computer technology within the beef industry. By applying those principles, along with ethnographic methods of investigation, it shows that current communications from the USDA and other proponents of the National Animal Identification System are unlikely to be persuasive.

The investigation directly addresses livestock market owners and their customers, showing that communication networks and industry change agents within the scope of the livestock markets are in a position to control information concerning the National Animal Identification System and its accompanying computer technology. Finally, it discusses needs for future research and the need for persuasive language that can be directed toward specific segments of the beef industry.

Advisor's Approval: <u>Dr. Thomas L. Warren</u> _____