

## ***Plugging the Traceability Gap – The Spinach Lesson***

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By Michael McCartney, QLM Consulting and William R. Pape, AgInfoLink Global, Inc.

Last month this column asked you to assess the effectiveness of your company's traceability system in light of the recent E.coli 0157:H7 spinach contamination. This month we are going to take a deeper look at the specifics of that contamination, identify a key gap we see in the perishable produce industry, and make some specific recommendations to close it so the industry can limit damage from future contamination incidents.

Let's first review, though, the damage that's been done to date by this one contamination. According to the FDA's press release of 10 October, this contamination has been linked by the Center for Disease Control to three reported deaths, 199 reported illnesses including including 31 cases of Hemolytic Uremic Syndrome (HUS), and 102 hospitalizations. And these are only the cases that have been reported to the CDC. There are likely many others. The other fallout from this incident has been direct economic damage to the bagged fresh greens industry estimated at between US \$100 million to US \$150 million with the majority of these losses being borne by processors, shippers, and growers who are believed at this time to have had no role in the problem.

Since last month's column, agents from the FBI and the FDA have raided two produce packing plants -- Growers Express in Salinas, CA and Natural Selection Foods LLC in San Juan Batista, CA. They entered with search warrants and sidearms in hand, and spent over six hours meticulously reviewing records and computer files to discover possible evidence for a potential criminal indictment. It is difficult to know how much additional credibility damage to the entire produce industry occurred as images of these raids were viewed by millions of consumers, and consumer confidence was surely further eroded.

The other major finding since last month's column is that field inspections of nearby cattle operations have identified E.coli 0157:H7 in a handful of pastures and several have speculated that wild pigs tracked this infected manure from the pastures to the spinach fields. While this is one possible explanation, the sad fact is that over six weeks have passed since the offending spinach was packed, and the FDA's investigation still is unable to pinpoint the exact cause of this particular outbreak. Clearly there was a problem. But it's not clear whether the root cause came from the irrigation water, wildlife, non-sanitary human practices, or even contamination downstream from the packing plant? During the FBI and FDA raids, a substantial number of computer and paper records were removed from the plants. Even with this additional information, government agents are no closer to understanding exactly what happened.

What extra precautions and prevention measures need to be taken, and how can the perishable industry change the perception of the consumer from one of doubt to one of confidence? To identify the gap, let's look at the event timeline beginning from when the spinach was packed.

People began falling ill during the period between August 30<sup>th</sup> and September 4<sup>th</sup> with an increasingly large number requiring hospitalization. The last reported onset of symptoms occurred around September 9.

On September 8<sup>th</sup>, Washington and Oregon public health officials notified the Center for Disease Control that they had identified groupings or clusters of E.coli. The CDC then connected these possible disease cluster outbreaks with others that were appearing in other parts of the country, and performed DNA fingerprinting to confirm that these people were infected with the same E.Coli 0157:H7 strain. Once this connection was made, the FDA began its investigation.

On September 13<sup>th</sup>, spinach was identified as the highest potential source because 95% of those sick reported eating spinach within 10 days of the illness. The next day the FDA advised consumers to not eat any fresh spinach. Spinach was removed from grocery shelves and restaurant menus.

On September 15<sup>th</sup>, the FDA believed they had traced the spinach to a California packer, Natural Selection Foods, LLC and requested they issue a voluntary recall for all of its spinach products. The next day the FDA issued an advisory that expanded the recall to include all spinach containing products from all packers and labels.

Working with the packer's staff, the FDA concluded that the contaminated spinach was processed on or about August 15<sup>th</sup> at the Natural Selection processing plant in San Juan Bautista, California from spinach arriving from several different third-party growers representing numerous farm fields. It takes about two weeks for the product to be distributed to grocery stores, bought and consumed, and for the E.coli 0157:H7 strain to make people sick. This timing corresponds closely to what was observed.

During the next week, the investigation continued, open bags of Natural Selection spinach were discovered in the households of those afflicted, and these were shown to be contaminated with the E.coli 0157:H7.

On September 22<sup>nd</sup>, the FDA issued a new advisory and limited the warning to the three California counties that were the sources for the spinach that Natural Selection Foods processed during the defined time period, and a week later on September 30<sup>th</sup> the FDA declared that spinach is safe because their investigation showed that there were no additional E.coli cases and that the bad spinach was traced back to the processor.

Having made no major progress, agents of the FBI and FDA raided National Selection Foods and one other packer on October 4 to gather additional information. On 12 October the FDA released a report linking the contamination to cattle manure which carried the same E.coli 0157:H7 strain, and on the 26<sup>th</sup> of October they suggested that wild pigs may have been the vector from the contaminated manure to the spinach fields.

Looking at this timeline, the major question is how the perishable produce industry can improve. Clearly, all involved need to react faster and narrow the scope of the problem the next time this occurs. The reaction on October 4 by National Food Selection was to issue a press release indicating the additional testing steps they were taking to safeguard their product:

"We have begun to set in place a program of rigorous testing and analysis of field operations from the seed through to the harvest. Finally, and most importantly, we are testing every lot of fresh product before it enters our processing stream. If contamination is found, the product will either be refused or destroyed. Essentially, we are raising the bar on food safety for any grower whose product will be washed and packaged in our facility."

While stepped-up testing is certainly one way to reduce the potential of future contaminations, experience has shown that testing can not entirely eliminate the threat. Unfortunately, even with this more aggressive testing regime, we believe that there will be next time, and we need to plan how the industry can react more rapidly.

How can this goal best be accomplished? From our perspective, the place to look is at the packing process. If product from a single farm field was dumped on the packing line, and all of the product was immediately packed into bags bearing a single label, and these bags all carried a unique lot number, then there would be no lag time in connecting the contaminated product back to the farm field where the problem may have occurred. There would be a direct 1:1 relationship between a single bag and a farm field. Unfortunately, this is not the case in the perishable produce and specialty crop industries.

In today's competitive produce world, raw materials with different characteristics are often associated with different branded labels based upon size, grade or other quality variable. Therefore, product from a single farm field harvest rarely can satisfy 100% of any single order for a specific brand because the single farm field yields raw material with a wide range of quality variables. To meet the requirements of a customer's order for a number of bags for a particular brand, the packinghouse will typically grade, sort and co-mingle incoming raw product from one farm field with other raw product of similar characteristics from other farm fields. Co-mingling definitely complicates traceability as few packinghouses have systems which "connect the dots" from the raw material dump to the final carton packout. There may be some time delay between the receipt, grading and sorting of product and the final packout which further complicates traceability. Given today's consolidation of packing into relatively few factories, a typical plant will process thousands of cartons and tens of thousands of bags in a single shift. It is, therefore, no real surprise that it has taken so long for the FDA and the packinghouse to determine the source and cause of the spinach contamination.

So, what do we do differently? The one significant issue that would have made *the* difference in the most recent spinach incident would have had computerized systems in place which could have instantly connected the bag in the infected consumer's refrigerator with not only the date the product was processed and the shift it was processed in, but with the specific farm field or farm fields that potentially could have contributed product to the bag. As it was the information on the individual spinach lot and the farm it came from were lost the moment the product was received at the processing site. At the receiving area this lot was blended in with product from at least 20 third-party growers that were received on that day and the next day and the next day etcetera. What is required is a system which "connects the dots" on the factory and associate this information with each outgoing bag, each outgoing carton and each outgoing pallet the source of the raw material that filled the bag. A system that takes into account the raw product co-mingling that occurs, that takes into consideration the sorting that occurs, and takes into account the time delay from product dumping to product packout.

The authors have had extensive experience implementing packhouse systems which "connect the dots" within the packinghouse using both barcoded systems and RFID systems. System that creates a unique barcode for a unique case/bag, tracks the raw product through sortation, co-mingling and temporary storage, and ties it directly back to the unique farm, date harvested and production lot have been installed in a number of perishable produce industries and could have benefited this current situation. Rather than have 20 companies deliver the same product, there would be 20 different farm field sources uniquely identified. RFID could automate this whole cold chain because each bag would by design have its own unique Electronic Product Code number. All bag numbers can be electronically associated with cases, cases with pallets, and all case and pallet numbers can be associated with purchase orders and bills of lading. Once this information is in a company's database it can be looked up immediately - not in days or weeks- but in minutes. Having this computerized data structure and synchronizing data may not be what excites, however, it is the basic blocking and tackling that all business' need to perform to assist us all in creating a safer and secure perishable food supply chain.

The good news is that the spinach was bagged. Bagged spinach has at least a bar code identifier, a company name, a "best if used by" date, weight and many other identifying sources of information. It greatly assisted the FDA in localizing the problem. The is a good case scenario. What if the spinach was raw and then shedded before processing? What if the sources where organicially farmed and some farmed conventionally coming from different ownerships?

Future traceability problems are a given, what the industry needs to do is to work on quality controls and prevention. Next time the industry cannot expect the system to work any better unless we take immediate and swift corrective action now.

Further information can be found at [www.qimconsulting.com](http://www.qimconsulting.com) or [www.aginfoink.com](http://www.aginfoink.com).

All tests performed on our processing facilities, both those done by independent scientists and government investigators, have been negative (clean). We continue to believe that the source of the contamination was in the fields from which we buy our spinach.