

## Preventing Post-Processing Contamination in a Food Nugget Processing Line When Language Barriers Exist

J. A. Neal<sup>1\*</sup>, C. A. O'Bryan<sup>2</sup> and P. G. Crandall<sup>2</sup>

<sup>1</sup>Conrad N. Hilton College of Hotel and Restaurant Management, University of Houston, Houston, TX 77204

<sup>2</sup>Department of Food Science and Center for Food Safety, University of Arkansas, Fayetteville, AR 72704

### ABSTRACT

Post-processing contamination of food items may pose a potential risk to consumers; however, contamination may be minimized with proper employee training, supervision and commitment from the management of the food processing facility. The work force in the United States is consistently changing. Language barriers and communication are additional challenges and complications for front-line managers. This case study documents the implementation of an in-process hygiene training program that was developed based on inputs from employees identifying critical control points, corrective actions and monitoring procedures.

**Keywords:** Good Manufacturing Practices, Language Barriers, Post-Processing Contamination

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### INTRODUCTION

The U.S. Food and Drug Administration (FDA) defines post-process contamination by pathogens, chemicals, allergens, or foreign objects as the adulteration of a finished food product after processing at the manufacturing facility so that the food is no longer wholesome or safe, therefore rendering the finished product unsafe to eat (FDA, 2013). Post processing contamination may occur between a lethality treatment, for example cooking to a prescribed internal temperature and packaging or post packaging contamination at the processing plant.

While post-process contamination is responsible for spoilage of many canned foods, it has also caused of a number of outbreaks of food-borne disease. In 1995, the World Health Organization (WHO) conducted a study in Europe which indicated that approximately 25% of all food-borne illness outbreaks could be traced back to post-process contamination. The most significant factors contributing to the presence of pathogens in the food were: poor personal hygiene (1.6%), cross-contamination (3.6%), inadequate storage (4.2%), contaminated equipment (5.7%) and contamination by personnel (9.2%) (1995).

More recently, the FDA published the Retail Food Risk Factor Study and reported similar findings. While the results suggested that the control of food-

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Correspondence: J. Neal, jneal@central.uh.edu

borne illness risk factors has improved over the past ten years, there is still a need for improvements concerning poor personal hygiene, improper holding of food and contaminated food surfaces and equipment (FDA, 2010).

Post-process contamination has also occurred as a result of ineffective or inadequate cleaning and disinfection (Reij and Den Aantrekker, 2004). Good Manufacturing Practices (GMPs), Standard Operating Procedures (SOPs) and Sanitation Standard Operating Procedures (SSOPs) are key elements in the production of safe foods (Reij and Den Aantrekker, 2004). SOPs and SSOPs adopted by a food manufacturing facility are essential to insuring safe food manufacturing as well as to correcting errors that may occur during production. (Reij and Den Aantrekker, 2004). It is imperative for food production managers to conduct thorough hazard analysis assessments to identify potential risks and to provide employees adequate training to minimize those risks.

Once the SOPs have been identified, proper training of every employee must be provided. Effective training of hourly employees can be challenging even under the best of circumstances. However, in most modern food processing plants there is typically a diverse workforce with cultural and language barriers. Immigration is continuing to diversify the profile of the nation's workforce, and increasingly, the workforce is made up of persons for whom English is a second language (Canziani, 2006). According to the U.S. Department of Labor Statistics (2013), 25 % of service employees are foreign-born compared to 16% for all other occupations. The Hispanic population is the fastest growing ethnic minority group in the U.S., and a high percentage find their initial employment in food service (Humes, Jones, and Ramirez, 2011). This creates an environment where many non-English languages are spoken at home and on the job, including Spanish, Chinese and Vietnamese (Jackson, 2002).

According to economists, limited English skills of foreign born U.S. workers cost U.S. corporations \$65 billion annually in lost productivity (Bahls and Bahls, 1998). Many managers feel that this lack of a common language is a significant source of their frus-

tration which reduces their effectiveness as managers (Loosemore and Lee, 2002). As such, language barriers can affect the quality and effectiveness of the message (Yu and Huat, 1995). Tension, misunderstandings about work, safety risks, inefficiencies and the inability to communicate effectively with supervisors can escalate when people speak in different languages (Bahls and Bahls, 1998). Additionally, non-English speaking groups are more reluctant to communicate problems with managers than English-speaking employees (Loosemore and Lee, 2002).

Employee attitudes toward specific behaviors have been identified as a consistent predictor for overall employee behaviors and food safety in general (Pilling *et al.*, 2008). Although attitudes may be an important factor in predicting behavior, we must ask the question whether attitudes of English and non-English speaking employees differ about food safety, therefore, making it more challenging for managers to communicate safe food handling procedures.

Food safety classes are offered in multiple languages such as Spanish or Chinese; however, many of these classes do not address behaviors tempered by cultural upbringings (Niode *et al.*, 2010). Mitchell *et al.* (2007) reported that cultural background and upbringing, justification, and/or motivation for the particular behavior may predispose certain employees to improper food safety behavior; therefore, there may be common cultural misconceptions concerning food safety. Cho *et al.* (2010) stated that male Latino or female Latina restaurant employees believe that when they followed proper food safety practices, both customers and management's satisfaction and efficacy in the kitchen would increase. It has been suggested that this is a result of the cultural characteristics of the Latino population. Santiago-Rivera (2002) noted that collectivist cultures, such as those found in Mexico and other Latin American countries have a tendency to focus on the interest of a group, a family or extended relationships rather than on individual interests or concerns. Hence, not only do food service managers need to address communication barriers, they need to be culturally aware of cultural misconceptions concerning food

safety that must also be addressed.

Other challenges that managers face when teaching food safety practices include working with a low-skilled labor force and high employee turnover rates. Based on levels of education, non-English speakers may or may not be able to read or write in their native language; therefore, translating written food safety training materials to additional languages may not be completely effective. The U.S. Census Bureau noted that by 2015, the Hispanic population will be double the size it was in just 1990 (U.S. Census Bureau, 2009). As one of the largest employers of Hispanics, the food service industry must focus its efforts on training non-English speakers in food safety. Offering training material in Spanish may be a limited start but may not be a complete solution. By doing so, the assumption is made that all workers (not just Hispanic workers) are visual learners and that all have similar reading levels. In addition, young people entering the workforce may be more familiar with computers and online training. Another factor is that due to the notoriously high turnover rates of the food industry, managers may not want to invest a lot of time, money or effort into developing food safety training programs for an individual employee because within a few months of receiving this training, the employee may leave (Niode, 2010). Front line managers must identify where cultural barriers to food safety occur, learn effective methods for communicating proper food safety practices to non-English speakers and develop a delivery method that are rapid and effective.

## IMPLEMENTATION

This case study focuses on a Midwestern food production facility involving front line production workers and front line supervisors. The plant is located in a small town in Wisconsin. The workforce is a mix of Caucasian and Hispanic workers. Most of the training is conducted only in English; however, the majority of employees have limited English speaking skills. An executive team from the company's corporate office in Chicago conducted a hazard analysis and

risk assessment to determine the areas that demonstrated the greatest risk of food-borne illness in order to focus their initial training efforts. After the assessment and some discussion, the group decided that the main focus should be preventing post processing contamination. The feeling was that this was the most important area to be kept at a consistently high standard. The Midwestern plant manufacturing chicken nuggets was selected partly because it was a new addition to the company and did not have any formal employee training systems in place. The corporate directive to focus employee training on preventing post process contamination was sent to the company's training manager, Frank Nelson.

Frank had recently completed his Bachelor's Degree in Food Science at a large Midwestern university. While attending college, Frank spent his summers as a line employee at this same plant but when he graduated, he was hired in as their Training Manager. Accomplishing this corporate directive will be Frank's first big assignment, and he wants to do his best. However, despite Corporate's insistence on their ideas for training, Frank has never seen post process contamination as being the major issue and considers this yet another case of management being out of step with actual day to day operations. Not knowing where to start, Frank discusses this dilemma with Sergio Hernandez, the product line foreman who has worked at this facility since the day it opened. Over lunch, Sergio reminded Frank of all the steps that go into the process of making the chicken nuggets. Sergio then draws out the steps on a paper napkin showing all of the potential areas he thought could be a source of post processing contamination.

Once Frank looked at Sergio's diagram, he was able to visualize the potential areas that would need to be addressed in employee training. Sergio also recommended that Frank should call an employee meeting with all of the employees who work on this production line to get their feedback before developing an action plan. Frank was a little hesitant at first because over the past summers when he worked on the production line, he had personal communication issues with employees who did not speak English. Sergio reassured Frank that he would

be at the meeting to help translate and that this could potentially be a good team building exercise. Sergio also explained to Frank that from a cultural perspective, the Hispanic community tends to focus on the interest of their group rather than individuals. If approached from this group perspective, not only would the employees work to reduce the risk of food-borne illness, it would also strengthen the food safety culture of the entire organization. Frank was very appreciative of Sergio's advice and mentoring.

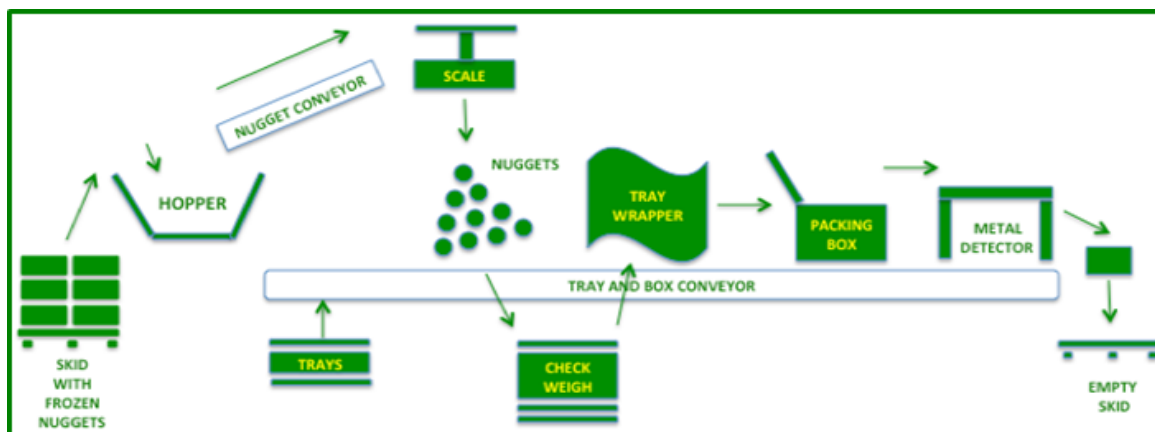
The next week, Frank scheduled a meeting at shift change between first and second shift when everyone would be there. He had chairs placed around round tables to encourage group discussions. Frank also provided coffee, donuts and breakfast tacos to thank the employees for coming to work a little early. Lastly, Frank took Sergio's napkin drawing of the line process and created a PowerPoint slide to show the employees the entire process (Figure 1).

Frank was a little nervous that no one would show up but right before the meeting was supposed to start, the room filled and almost every employee was in attendance. Frank welcomed them all and then explained how the production plant's new owners were concerned about post processing contamination but that he really didn't think it was a big deal. One of the employees then raised her hand and she politely told Frank that she disagreed with him and that the corporate office was wise in being concerned about post-process contamination. She then explained

how when she started three years ago, they had specific training on when to wash their hands and proper handling of the chicken nuggets once they were weighed and then the tray wrapper sealed the product. She also mentioned that the tray wrapper had not been working properly and how they often had to re-work the finished nuggets in trays that did not get sealed properly. Frank had no idea that this was happening and then many of the employees started discussing the challenges they were having with the packaging equipment. Frank looked at Sergio for help because the conversation was quickly becoming negative, and Frank wanted this to be a productive meeting and not just a complaint session. Without hesitation, Sergio went to the dry erase board and wrote out the following plan:

- A. Determine the sequence of behaviors for each important in-process hygiene step
- B. Identify the critical behaviors to measure
- C. Determine the possible deficiencies for each critical behavior
- D. Develop micro-pinpoint training courses for the identified critical behaviors
- E. Develop plant process for setting baseline and doing corrective observations
- F. Set up the following process:
  1. Set baseline for each behavior and each employee
  2. Train employees
  3. Observe and measure

Figure 1. Diagram of chicken nugget processing operations.



4. Give feedback and implement intervention
  5. Continue to train, measure, give feedback and implement intervention
  6. Track results and report
- G. Train the supervisors to be on-line Subject Matter Experts (SME) and effectively coach through the corrective observation process.

The employees were amazed with the clarity in which Sergio captured the problem and developed a written plan of action. They were also very excited about it and were ready to get started because they felt like they had been asked for their input and they felt that this plan of action would solve a lot of their frustrations.

## DISCUSSION QUESTIONS

What should be included in the final process?

1. What were the processes that need to be improved?
2. Are there specific behaviors that needed to be identified?
3. The nugget processing system could be broken down into small, discrete steps. What are these steps?
4. For each step, write a sequence of ++measurable behaviors should be identified
5. Within each sequence of behaviors, the critical in-process hygiene behaviors needs to be identified
6. For each set of critical in-process hygiene behaviors a comprehensive list of possible deficiencies needs to be identified and documented in a check list
7. Mini Pin-Point Courses will need to be developed for each area of in-process hygiene behaviors – what are they?
8. Supervisors should be trained as Subject Matter Experts to effectively execute the process – how should this be accomplished?
9. A baseline measurement will need to be

taken for each behavior per each employee – Develop this checklist.

10. Training will be administered to each employee in the relevant areas of in-process hygiene. What language should the training be delivered in? What role do pictures play in this training?
11. What are the “cultural” issues leading to communication barriers with supervisors and understanding the job description and training materials?
12. How will recruiting and hiring supervisors who are fluent in the language of the front line workers impact the operation?

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## TEACHING NOTES

This case study discusses the implementation of a processing plant hygiene program where language barriers exist by breaking processes down into specific behaviors and how to observe, monitor and measure these behaviors. It permits students the opportunity to think through a realistic scenario and to identify the various behaviors as well as ways effective to communicate them to employees.

## TEACHING OBJECTIVES

This case study offers a unique opportunity for students to identify post processing contamination risks and include the additional but realistic challenge of language barriers in the workforce. This scenario is becoming more a reality each year as the U. S. labor force diversifies and students may find themselves either supervising these types of operations or inspecting them in a regulatory or third party auditor situation. The following discussion topics are provided as a guideline to generate a deeper understanding of this case study.

- Post-processing contamination risks
  - Proper hand washing, glove use and uniforms
  - Proper equipment and layout design
  - Properly functioning equipment—like the tray overwrap in this case
- Language Barriers
  - Proper training materials
  - Written forms of communication may not be sufficient.
- Employee Turnover
  - The effect of high turnover with employees, supervisors
  - The hiring process and documentation of proper initial training and follow up
- Increasing Quality Assurance
  - Establishing Quality Assurance Standard Operating Procedures (SOPs)
  - Reducing Risk of Outbreaks

- o Identifying key behaviors to monitor, creating steps, monitoring protocols and record keeping

## **TEACHING STRATEGY**

This unique case study has been developed to challenge undergraduate and graduate students pursuing careers in quality assurance, food safety, food science and technology. Students should be encouraged to take holistic systems approach to addressing these challenges. To enhance the learning experience, students may be encouraged to work in teams or role play to represent the various groups represented in the case. Other variables to consider within the case may include communication barriers including language barriers, differences between shifts (morning crew vs. evening crew), proper glove use, how frequently should hands be washed, and how many hand-washing stations should be available within the facilities. This case study is intended to facilitate a realistic conversation and exercise in food production problem solving.