Vulnerability Assessment of a Meat Establishment – Part I

Overview
Students will utilize assessment skills to evaluate vulnerabilities of a simulated food processing facility, such as a meat establishment.

Objectives
• Familiarize yourself with ham production and layout at Circleville Farm
• List the steps that go into making a ham
• Conduct a mini risk assessment

Case study: Circleville Farm
For this exercise, you’ll view a video clip describing the Circleville Farm and key elements of its operation. The purpose of this case study is to teach students how to apply the CARVER+Shock assessment tool to find vulnerabilities in a meat establishment. This is only a teaching exercise. As such, we will not be assessing every node or aspect at the establishment, but only 3 selected nodes. A detailed description of every part of the company is not necessary for this case study. However, applying these techniques to an actual establishment, as you will in the final exercises, will require a detailed description of the entire operation.

Video
The video included in the VoiceThread shows scenes from a meat establishment with a fictitious name and location. Keep in mind that this establishment may not reflect production practices in all meat establishments across the United States. The video will present pertinent information about Circleville Farm to familiarize students with the establishment and the process for making smoked hams. The data and information presented in the video and in the text are necessary to complete the vulnerability assessment exercise in this module.

Video Transcript
In this video, we will go through the steps of making a ham --from fabrication of the ham from the slaughtered pig to the sale of the final product. Circleville Farms is a small meat processing facility located in a rural farm community of central Pennsylvania. They employ 12 full time employees and 3 temporary workers. The Circleville Farm slaughters local pigs, butchers the carcasses to obtain whole muscles (also known as primal cuts), and then processes the whole muscles into variety of products such as bacon, pork shoulder, pork loins, pork chops, and hams. On average, they process 25 to 30 pigs per day, all of which come from their own farm or other farms in the region.
Two hams are removed from each pork carcass, with each ham weighing approximately 25 pounds. After the hams are removed, the hams are skinned and the aitchbone is removed.

Workers will weigh out ingredients for the cure solution. These ingredients include phosphate, brown sugar, ham spice, cure, and salt. These compounds give hams their characteristic flavor and color. The cure is prepared fresh each day and one batch can be injected and used for the entire day’s production.

Next, workers apply the liquid cure solution to each ham with an injector system. The injector system ensures that the cure solution is evenly distributed throughout the ham. After injection, the hams are placed in large tubs along with additional cure solution that was prepared previously. These tubs are then stored at roughly 38 degrees Fahrenheit for up to 5 days. This step is known as a cover or pickle cure. Curing is an important step in the process since it gives ham the distinctive color that is seen after cooking and smoking.

Cured hams are stuffed into netting and hung on racks on a smokehouse tree. Once all the hams are netted and hung, the tree is rolled into the smokehouse.

After the hams are rolled into the smokehouse, wood chips are added to the hopper. Smoking with wood imparts the smoked flavor associated with cured hams. Hams are cooked and smoked for approximately 4 ½ to 5 hours. The process is complete when the ham reaches an internal temperature of 153 degrees Fahrenheit. After cooking and smoking, the hams are cooled to 40F overnight in the smokehouse cooler.

After cooling, the hams are removed from the netting and cut in half by a saw and trimmed by hand. While some hams can be sold whole, some can be sliced and sold in 1-2 pound packages. Ham slices are weighed and vacuum packaged in preparation for retail sale. Price and weight information are printed for each package of ham. All sliced ham packages are sold through the retail store at the farm. Because of the demand, each day’s production is sold within 2 days of slicing. Each 2-pound package has a shelf life of one week and serves 4 people.

**Background**

Circleville Farm is a small, family-owned meat establishment, located in central Pennsylvania and has been in business for over 35 years. The establishment is located on the outskirts of a large town, surrounded by a farming community, and in close proximity to the family farm. The establishment employs 6 full time employees (including the owner, his 2 sons, and son-in-law) and 2 part time workers. The United States Department of Agriculture Food Safety and Inspection Service (USDA-FSIS) employs a meat inspector who is present at all times of processing.
Circleville Farm receives livestock not only from their own family-operated farm, but also from other farms within a 50-mile radius. The establishment also processes venison for hunters during deer hunting season under a custom-exempt status. Under these circumstances, the establishment must maintain strict sanitation requirements set forth by USDA, but is not inspected daily.

Circleville Farm processes fresh meat and poultry products such as whole chickens, beef/pork/lamb roasts, steaks, chops, as well as ready-to-eat snack sticks, bologna, summer sausage, and kielbasa. Circleville Farms is best known in the community and beyond for their cured hams and sliced ham products. Due to the rural location and financial constraints, the establishment has no dedicated funding to enhance perimeter defense (such as cameras, gates, fences, etc.).

For ham processing, Circleville Farm slaughters local pigs, processes the carcasses to obtain whole muscles (also known as primal cuts), and then processes the whole muscles into variety of products such as bacon, pork shoulder, pork loins, pork chops, sausages, and hams. On average, they process 25 pigs per day, all of which come from their own farm or other farms in the region. At times, such as Thanksgiving, Christmas, and Easter, orders for hams increase substantially. To deal with the demand, Circleville Farms will work with a local meat distributor to bring in fresh hams for processing, allowing the establishment to sell more hams and ham slices during these busy times.

When processing pigs, two hams are removed from each pork carcass, with each ham weighing approximately 18-25 pounds. For 25 pigs, there will be 50 hams daily.

In preparation for ham processing, employees weigh out the different ingredients necessary for the cure solution, including phosphate, brown sugar, ham spice, cure, and salt. The ingredients are stored in airtight bins on an open shelf in the establishment. When incorporated into the ham process with cooking and smoking, these compounds give the hams their characteristic flavor and cured pink color.

The liquid cure is prepared fresh each day and one batch can be injected and used for the entire day’s production. Workers apply the liquid cure solution to each ham with an automated injector system to ensure the solution is evenly distributed throughout the ham. After injection, the hams are placed in large tubs along with a cover cure, which is made up of the same ingredients that are injected into the ham. These tubs are then stored at approximately 38 degrees Fahrenheit for up to 5 days. The cover cure is an important step in the process since it gives ham the distinctive color that is seen after cooking and smoking.

After 5 days in the cover cure, hams are stuffed into netting and hung on racks on a smokehouse tree. Once all the hams are netted and hung, the tree is rolled into the smokehouse which uses wood chips to generate smoke. The resulting smoke imparts
the distinctive smoked flavor associated with cured hams. Hams are cooked and smoked for up to 5 hours so the ham reaches an internal temperature of 153 degrees Fahrenheit. After cooking and smoking, the hams are cooled to 40F overnight in the smokehouse cooler. After cooling, the hams are removed from the netting and cut in half by a saw and trimmed by hand.

While some hams are sold whole or halved, most hams are sliced and sold in 1-2 pound packages. In the retail store, ham slices vacuum packaged and weighed with price and weight information printed on each package of ham. Along with other fresh and further processed meat and poultry products, sliced ham is sold through the retail store. Because of the demand, each day’s production is sold within 2 days of slicing. Each 1 or 2 pound package has a shelf life of one week and serves 2-4 people.

Circleville Farm Floor Plan

On the floor plan above, the animals are brought into the plant on the lower right and processed in the back of the plant, in the upper right. The carcasses are hung on the rail (orange dotted line) and pushed into the raw cooler until it is chilled for cutting. The carcasses are then brought into the cutting room where they are fabricated into the various cuts. The cuts are stored in the raw cooler until it’s time for the next process.
The ham processing starts in the processed products room where the cure is mixed and injected into the hams. The hams and cure are placed in a tub and rolled into the curing cooler. Next the hams are stuffed into the netting and put in the smoker, which is located in the processed products room. After cooking, the hams are rolled into the smoked meats cooler. After cooling, the hams are brought back into the cutting room where they are sliced, trimmed and vacuum packed. The ham is then put back in the smoked meats cooler until it is sold at the retail store.

Take a few minutes to look over the floor plan. Notice where the internal and external doors are located and think about who might have access to them.

Activity

Please complete the following tasks. These will not be handed-in or graded, but you will need them as a reference for the next part of the case study.

1. Develop a draft flow diagram for the ham process. In other words, what are the steps that go into making the ham?

2. List potential vulnerabilities. Look at your draft of the flow diagram and think about where something can go wrong.

3. Consider potential interventions to mitigate the vulnerabilities that you thought up. Especially those that address the 3 P’s: people, physical security, and processes.

4. List any additional issues that Circleville Farms faces.