

Investigation Report
Worker Fatally Injured
Thermal Burns from Contact with Hot Water
August 18, 2014

The contents of this report

This document reports Occupational Health and Safety's investigation of a fatal incident resulting from worker contact with steam heater water in August 2014. It begins with a short summary of what happened. The rest of the report covers this same information in greater detail.

Incident summary

Workers were troubleshooting a clogged pipe. They added water to the feeder line and heated it with steam in order to break down the materials blocking the pipe. During the draining phase, a relief cap on the feeder line was removed or dislodged causing steam heated water to contact the worker. The worker suffered severe burns to 80 percent of his body and died 41 days later in hospital.

Background information

JBS Food Canada Incorporated (JBS Foods) specializes in beef processing and distribution. The processing facility located in Brooks, Alberta employs approximately 2000 workers. They process and distribute various graded and ungraded meats, beef trim and ground beef. The incident occurred in the rendering section of the facility.

The rendering superintendent had worked in the processing facility for 17 years in various roles. He had been the rendering superintendent for approximately 4 years at the time of the incident. The rendering superintendent had completed numerous training programs related to rendering operations as well as JBS Foods' health and safety programs.

The rendering supervisor was fatally injured during the incident. He had been working with JBS Foods since December 10, 2012. He had previously worked at the processing facility when owned and operated by a different employer. He had been the supervisor of rendering for approximately two years prior to the incident and reported to the rendering superintendent. The rendering supervisor had completed numerous training programs related to operations as well as JBS Foods' health and safety programs.

Equipment and materials

Feeder Line 1

Feeder line 1 was a 30.5 cm wide stainless steel pipe that ran approximately 115 m from the raw materials plant (See Figure 1) terminating at a cooker located in the rendering plant (See Figure 2). The feeder line transported raw beef materials from the raw materials house to a super cooker in the rendering plant.

Figure 1.



Figure 1. shows the feeder line originated at the raw materials plant. The hydraulic pump could be seen to the right of the feeder line. A rubber pig could be added to the bottom of the pipe to clear blockages. This was the normal process to remove blockages. A. shows where the feeder line began and also where a rubber pig could be added to the feeder line.

The feeder line travelled directly vertical from the raw materials house, and then sloped downwards at approximately .63 cm every 30.5 cm (See Figure 2) towards the rendering plant; it then sloped vertically for approximately 7 m into the rendering plant and into the cooker (See Figure 3).

Figure 2.



Figure 2 shows the portion of the feeder line that travelled from the raw materials plant to the rendering plant. The picture shows the downward slope of the feeder line. A. shows the feeder line as it travelled from the raw materials plant towards the rendering plant.

Figure 3.



Figure 3 shows the termination point of the feeder line. The two pipes entered into the cooker at this point and were controlled by multiple valves to determine which feeder line was being used. At the time of the incident, the valve from feeder line 1 to the cooker was closed so as to prevent water from entering the operating cooker. **A.** shows feeder line 1. **B** shows the pipe cap that became dislodged and released the steam heated water and **C** shows where materials entered the cooker.

The installation of the piping occurred in 1995 and was designed by The Dupps Co., manufacturer of process machinery. The installation occurred prior to the acquisition of the facility by JBS Foods.

Feeder line 1 was considered a critical piece of equipment and thus had a back up for when there were problems with the line. The line could be isolated and materials processed through feeder line 2 if feeder line 1 became inoperative. This was the state of operation on the day of the incident.

Air and steam could be added directly to the line at the mezzanine level near the termination point of the feeder lines and the cooker (See Figure 4). The house air was under a pressure of sixty pounds per square inch.

Figure 4.



Figure 4 shows the control points for the air and steam. The rendering supervisor was standing on the mezzanine level operating these controls during the flushing operation. **A** shows the location of the steam and air controls for the feeder lines.

The Relief Cap

The relief cap was a 15.25 cm cast iron cap threaded onto an opening in the pipe that was installed so that workers could access that section of the pipe in case of freezing. (See Figures 5 and 6).

Figure 5.



Figure 5 shows the access cap that was removed or dislodged leading to the release of hot water and steam that contacted the worker during the flushing of the line. This picture was taken from the mezzanine platform where the rendering supervisor was located. The cap opening where the water came from is pointing towards the mezzanine platform. A. shows where the pipe cap was located on the feeder line.

Figure 6.

Figure 6 shows a close up of the pipe cap attached to feeder line 1.

The cap was not a design element of the initial installation. Although it wasn't clear when the cap was installed, it was noted that it was prior to the acquisition of the facility by JBS Foods. The cap was added to the system to deal with freezing concerns that were occurring in the feeder lines. After the incident, the cap was welded on to the opening so that it could never again be removed and/or dislodged.

The Water Line

The water line consisted of a ball valve with a chicago fitting so that a standard hose could be attached directly to the feeder line from the facility water lines (See Figures 7 and 8). Once the hose was removed, it was also to be used as a means to drain the line. Previous to the day of the incident, there were no means to add water directly to the feeder line. On the day of the incident, the rendering supervisor tasked rendering maintenance personnel to install the equipment necessary to add water to the feed line.

Figure 7.



*Figure 7. shows the view of the water drain line from the floor approximately where the rendering superintendent was standing at the time of the incident. **A** shows the feeder line with a view from the floor. **B** shows the connection added to the feeder line so that water could be added to the pipe.*

Figure 8.

Figure 8. shows a close up of the water line connection and planned drainage point for the water that was added to the feed line. Once the hose was removed, the water was to drain to the floor of the rendering plant.

Sequence of events

Approximately two weeks prior to the incident, a blockage was detected in feeder line 1. Blockages in the pipe were detected in the control room as less product fed into the cooker and pumps began to struggle to move product. On August 8, 2014, a rubber pig was added to the pipe to clear out any blockages (See Figure 9). The pig arrived at the cooker and rendering operations, in consultation with maintenance, determined the blockage to be cleared.

Figure 9.

Figure 9 shows an example of a rubber pig that was sent through the feeder lines to determine if there was a blockage.

Approximately two days later, the operations personnel in rendering experienced similar problems with feeder line 1 and determined there was a blockage in the line again.

On August 11, 2014, a third party was contracted to put a camera into the line to determine and remove the source of the blockage. The expansion joint on the roof was opened and a camera put into feeder line 1. It detected a material blockage at approximately 6.4 m from the expansion joint towards the cooker side. The third party contractor hydrovaced the feeder line and ran the hose approximately 9 m.

Another pig was put into the feeder line until it reached the cooker. Believing the blockage to be cleared, rendering operations resumed operation of feed line 1.

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Shortly after, the feeder line became blocked again with materials. It was determined at this time, that the feeder line needed to be dismantled at the Y intersection of the pipe feeding the cooker to determine the location and source of the blockage.

Maintenance personnel scheduled the removal of the pipe for the weekend of August 16th and 17th, but the planned maintenance was not performed as scheduled.

On Monday, August 18, 2014, the rendering supervisor arrived at work at approximately 6:30 a.m. to begin his day shift. The rendering superintendent waited for the rendering supervisor so that they could trouble shoot the line together.

The rendering superintendent and the rendering supervisor decided that they would add water directly to feeder line 1 and heat it with steam so that any material blockages could be broken down, freed and removed.

At this time, there were no means of adding water directly to feeder line 1. The rendering supervisor tasked rendering maintenance to add a connection point so that they could connect a standard hose to the feeder line. An elbow and ball valve was installed so that when the hose was disconnected, any residual water in the pipe would drain from the valve to the floor. The maintenance worker was then instructed to open the pipe at the raw materials house side so that the pipe could be drained to the floor of the raw materials house.

The rendering supervisor operated the steam and air controls on the mezzanine level near the cooker while the rendering superintendent observed the flushing from the raw materials plant.

The rendering supervisor added water to the feeder line for approximately one minute, then steam and then air to push the heated water through the line. They followed this process approximately three times. When water stopped draining from the raw materials side of feeder line, the rendering superintendent believed the line to be clear and told the rendering supervisor he could begin draining the line on the rendering plant side.

The rendering superintendent walked back to the rendering plant and spoke with the rendering supervisor outside of the rendering plant. He asked if the line was still draining and the rendering supervisor indicated that it was.

The rendering supervisor travelled to the mezzanine area by the termination point of feeder line 1, and the rendering superintendent travelled below the mezzanine level and was looking up towards the general direction of the installed drain line.

The rendering superintendent heard a pop, which was later identified as the cap dislodging from the feeder line. The rendering supervisor had been contacted by the steam heated water in the feeder line.

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The rendering superintendent immediately travelled to the mezzanine area. The rendering superintendent could see that the rendering supervisor had been burned. As the rendering supervisor travelled towards the rendering superintendent, he slipped down the first six steps and the rendering superintendent caught him. The rendering superintendent led the rendering supervisor to the emergency shower located at the control room.

Emergency Medical Services and facility nursing staff were called. They both arrived to the rendering supervisor at the same time. The rendering supervisor, with thermal burns to 80 percent of his body, was transported to Brooks Hospital and then transported to the burn unit at Calgary Foothills Hospital. He remained in critical condition until his death on September 28, 2014.

Completion

A review for enforcement action was completed on September 9, 2015, and it was determined that the file would be referred to Alberta Justice for review. The entire file was sent to Alberta Justice on April 13, 2016. Alberta Justice did not proceed with charges against the employer under the Alberta *Occupational Health and Safety Act*, Regulation and Code.

This file was closed on September 30, 2016.

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Signatures

ORIGINAL REPORT SIGNED

Lead Investigator

September 28, 2016

Date

ORIGINAL REPORT SIGNED

Manager

September 28, 2016

Date

ORIGINAL REPORT SIGNED

Director

September 28, 2016

Date