On February 16, 2015, a train hauling 109 tank cars of crude oil derailed in Mount Carbon, West Virginia. It has been reported that 27 tank cars in the train derailed. Some of the tank cars were damaged and released an unknown amount of crude oil, resulting in a large fire. Hundreds of families in the surrounding area were evacuated, but only one injury was reported.

Investigation into the fiery accident underway

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Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

Problem

What

When

Date

Time

Different, unusual, unique

Facility, site

Unit, area, equipment

Task being performed

Impact to the Goals

Safety

Customer Service

Regulatory

Production/ Schedule

Property/ Equipment

Labor/ Time

What Problem(s)

Crude oil train derailment

When

February 16, 2015

Time

1:30 PM

Different, unusual, unique

Heavy snow, new design of train cars

Facility, site

Train tracks near Mount Carbon, WV

Unit, area, equipment

Freight train

Task being performed

Transporting crude oil from North Dakota to Virginia

Impact to the Goals

Customer Service

More than 100 people evacuated

Environmental

Oil spilled into creek and ground

Regulatory

Formal investigation

Production/ Schedule

Train tracks closed to traffic

Property/ Equipment

Major damage to train

Labor/ Time

Significant emergency response/ investigation required

Cause Map

Why?

Effect

Solution

Evidence

Customer Service Goal Impacted

More than 100 people evacuated

Safety Goal Impacted

1 injury

Property/ Equipment Goal Impacted

Residence destroyed by fire

Labor/ Time Goal Impacted

Significant emergency response/ investigation required

Basic Cause and Effect

The significant aftermath of this derailment is known, but little has been released about what specifically caused the train to derail. It was snowing heavily at the time of the accident, which may have played a role. Data from the digital data recorder has shown that the train was not speeding at the time of the accident.

“The accident is another reminder of the need to improve the safety of transporting hazardous materials by rail. That is why this issue is included on our Most Wanted List. If we identify any new safety concerns as a result of this derailment, the Board will act expeditiously to issue new safety recommendations.”

- Christopher A. Hart, NTSB Acting Chairman

See Cause Map

### Analysis

**Customer Service Goal Impacted**

- More than 100 people evacuated

**Environmental Goal Impacted**

- Oil spilled into creek and ground

**Property/ Equipment Goal Impacted**

- Residence destroyed by fire

**Labor/ Time Goal Impacted**

- Significant emergency response/ investigation required

**1 training car caught fire**

Evidence: Photos of accident scene.

**Residence destroyed by fire**

Evidence: Photos of accident scene.

**Train tracks closed to traffic**

Evidence: West Virginia Route 61 was closed following the accident.

**Train derailed**

Potential root causes:

- Snowing heavily
- Train speeding
- No pipeline or other transportation options

**Regulatory Goal Impacted**

- Formal investigation

- Road adjacent to train tracks closed

- West Virginia Route 61 was closed following the accident.

**Production/ Schedule Goal Impacted**

- Train tracks closed to traffic

- Multiple train cars damaged

- Major damage to train

**1 train car caught fire**

Evidence: Photos from accident scene.

- Train cars transporting oil

- Oil spilled into creek and ground

- Spark

- Train derailed

- Transporting oil from ND to VA

- AND

- No pipeline or other transportation options

For a free copy of our Root Cause Analysis Template in Microsoft Excel, visit our web site.

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