

# Modernizing Process Safety Management in Pulp & Paper

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## Presenters

**Devon  
Downs**



- Attorney
- Concentrates her practice in environmental, health and safety (EHS) enforcement matters, and crisis management and workplace incident response involving federal and California laws.

**Dr. Trey  
Morrison**



- Chemical Engineer
- Focuses on process safety through hazard and risk analysis, failure analysis, and post-incident investigation. Analyzes origin, cause, and engineering of catastrophic incidents involving fires, explosions, and chemical process technology.

# Limitations

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- Published as a source of information only
- The material contained herein is not to be construed as legal advice or opinion

# Agenda

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This webinar will address a potential rationale for expansion of OSHA Process Safety Management (PSM) boundaries beyond regulatory requirements as a “best practice”

- U.S. Chemical Safety Board Recommendation
- OSHA PSM Background
- Managing Ambiguity in PSM – Defining the “Process” Boundary
- Conclusions

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# U.S. CHEMICAL SAFETY BOARD

## Background: The U.S. Chemical Safety Board

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- The U.S. Chemical Safety Board (CSB) is a small, independent federal agency that investigates industrial chemical accidents that resulted in a fatality, serious injury, or substantial property damage
- The CSB does not issue fines or citations, but does make recommendations to plants, regulatory agencies such as the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA), industry organizations, and labor groups

## Recent CSB Pulp & Paper Investigation

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- In April 2018, CSB concluded its investigation into a foul condensate tank explosion at a pulp and paper mill, and prepared a report urging the industry to reconsider the application of PSM at paper mills that operate non-condensable gas (NCG) systems
- CSB recommended that paper mills:
  - Expanding PSM program boundaries beyond legal requirements to provide heightened coverage of process safety hazards
  - Applying PSM to NCG system and beyond to help industry identify and mitigate process safety hazards

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# PROCESS SAFETY MANAGEMENT (PSM)



# PSM

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- Industrial processes involving chemicals often pose risks to employees, the public, and the environment
- Process Safety Management involves a company's program to identify and control those risks
- Guidelines for PSM programs may be corporate, industry, and/or regulatory
- Different regimes may require different, complementary approaches

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# OSHA PSM

## Existing Legal Requirements

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- The U.S. Occupational Safety and Health Administration (OSHA) PSM Standard [29 CFR 1910.119] and the U.S. Environmental Protection Agency (EPA) Risk Management Program [40 CFR Part 68] set out various requirements applicable to “covered processes”
  - An OSHA “covered process” is a defined term that subjects certain equipment to PSM regulatory requirements such as Process Hazard Analyses, Management of Change, and Mechanical Integrity inspections
  - Previous TAPPI guidance has narrowly defined “covered process” within the pulp and paper industry as equipment containing threshold quantities of highly hazardous chemicals

## OSHA PSM Definition of “Process” 1910.119(b)

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- *Process* means any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities.
- For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process.

*How is this not the entire process unit?*

*Is this more expansive than TAPPI guidance?*

*How to set the boundary for the covered process?*

# Wynewood Decision Expands PSM Boundaries

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- Recent OSHA Review Commission decision took broad approach to PSM applicability determination in refining OSHA PSM enforcement context
  - A vessel itself need not contain any highly hazardous chemicals to be considered interconnected
  - For co-located vessels, location must be such that “highly hazardous chemical could be involved in a potential release.”
- Review Commission applied fact-specific analysis to steam boiler connected to and located near multiple process units and found equipment was both interconnected and co-located
- Refinery filed request for review with 5th U.S. Circuit Court of Appeals

## Poll the Audience

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- Who has turpentine?



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# PLACING BOUNDS ON THE COVERED PROCESS

# Bounding the Process

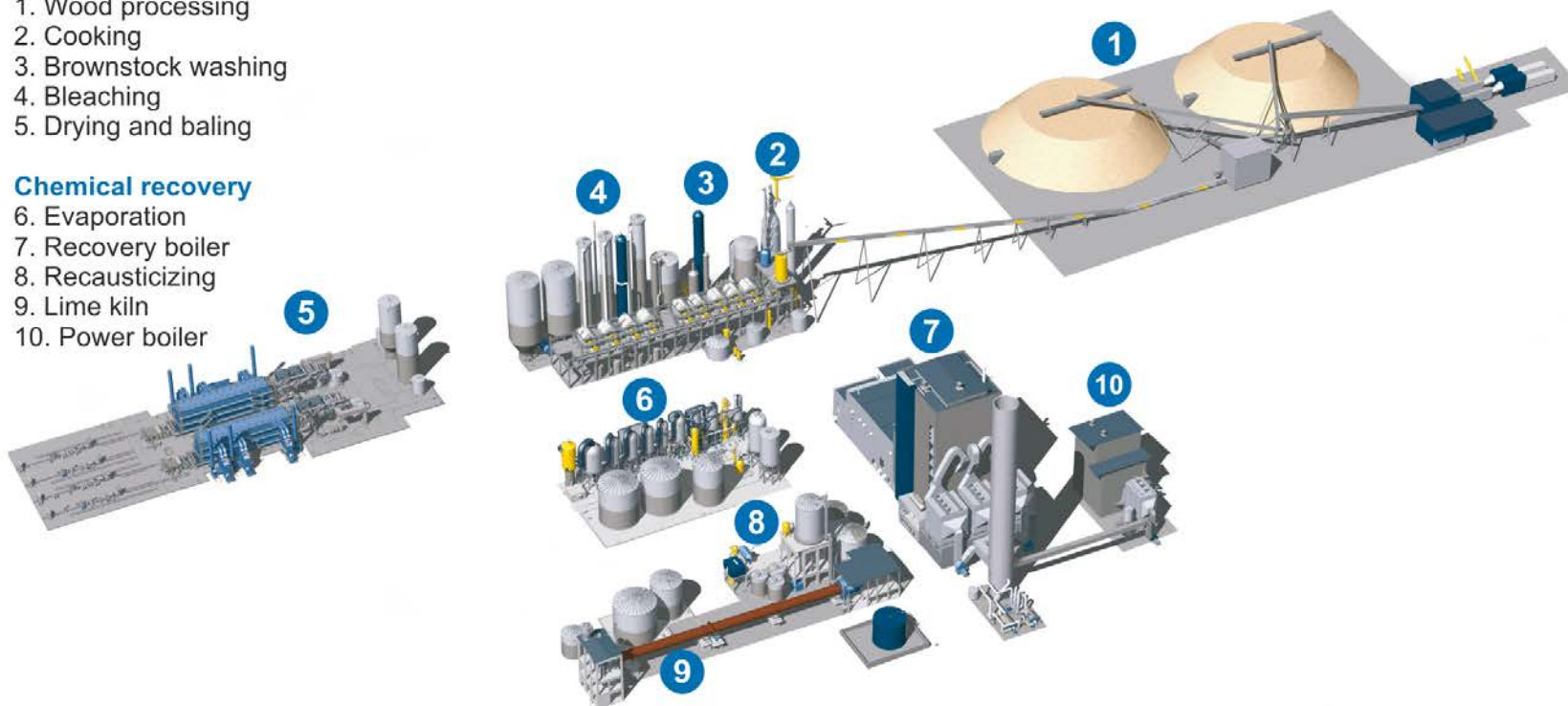
- A pulp & paper mill is an integrated chemical plant

## Pulp line

1. Wood processing
2. Cooking
3. Brownstock washing
4. Bleaching
5. Drying and baling

## Chemical recovery

6. Evaporation
7. Recovery boiler
8. Recausticizing
9. Lime kiln
10. Power boiler





# Approach

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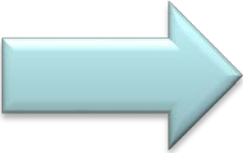
1. Identify the chemicals
2. Are they subject to PSM?
3. Where are they present and in what form?
4. Are they above the threshold quantity?
5. Apply a risk-based technique to define the boundary of the covered process
  - How much of the mill should be subject to PSM?

# Highly Hazardous Chemicals

## 29 CFR 1910.119(a)(i)

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A process that involves a chemical at or above the specified threshold quantities listed in Appendix A: Highly Hazardous Chemical (HHC)

- Pulp and paper chemicals may include:
    - Hydrogen Sulfide
    - Methyl Mercaptan
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- NCGs

# Highly Hazardous Chemicals

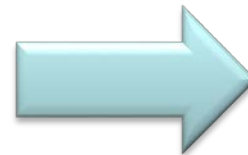
## 29 CFR 1910.119(a)(i)

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- Pulp and paper chemicals may include:

- Hydrogen Sulfide
- Methyl Mercaptan
- >52% Hydrogen Peroxide
- Chlorine
- Chlorine Dioxide



Pulp Bleaching

# Highly Hazardous Chemicals

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- Pulp and paper chemicals may include:

- Hydrogen Sulfide
- Methyl Mercaptan
- >52% Hydrogen Peroxide
- Chlorine
- Chlorine Dioxide
- Turpentine



Storage & Handling, NCGs

# Flammable Gases & Liquids as HHCs

## 29 CFR 1910.119(a)(ii)

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A process which involves a Category 1 flammable gas (as defined in 1910.1200(c)) or a flammable liquid with a flashpoint below 100°F (37.8°C) on site in one location, in a quantity of 10,000 pounds or more except for:

(B) Flammable liquids stored in atmospheric tanks or transferred which are kept below their normal boiling point without benefit of chilling or refrigeration.

- Pulp and paper flammable liquid = Turpentine
  - Flashpoint may be <100°F
  - Also condensed from vapor phase by chilling

# Apply a Risk-Based Analysis

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- Define total extent of process system
- Examine that process and ask, “What equipment or at what locations can there be a catastrophic release of an HHC?”
- Definition of catastrophic release:
  - “An uncontrolled loss of containment of toxic, reactive, or flammable materials from a process that has the potential for causing onsite or offsite acute health effects, significant environmental effects (e.g., compromise of a public drinking water supply), or significant on-site or off-site property damage.” CCPS Process Safety Glossary, <https://www.aiche.org/ccps/resources/glossary/process-safety-glossary>
- Qualitatively address risk of catastrophic releases

# Examples of Risk-Based Techniques

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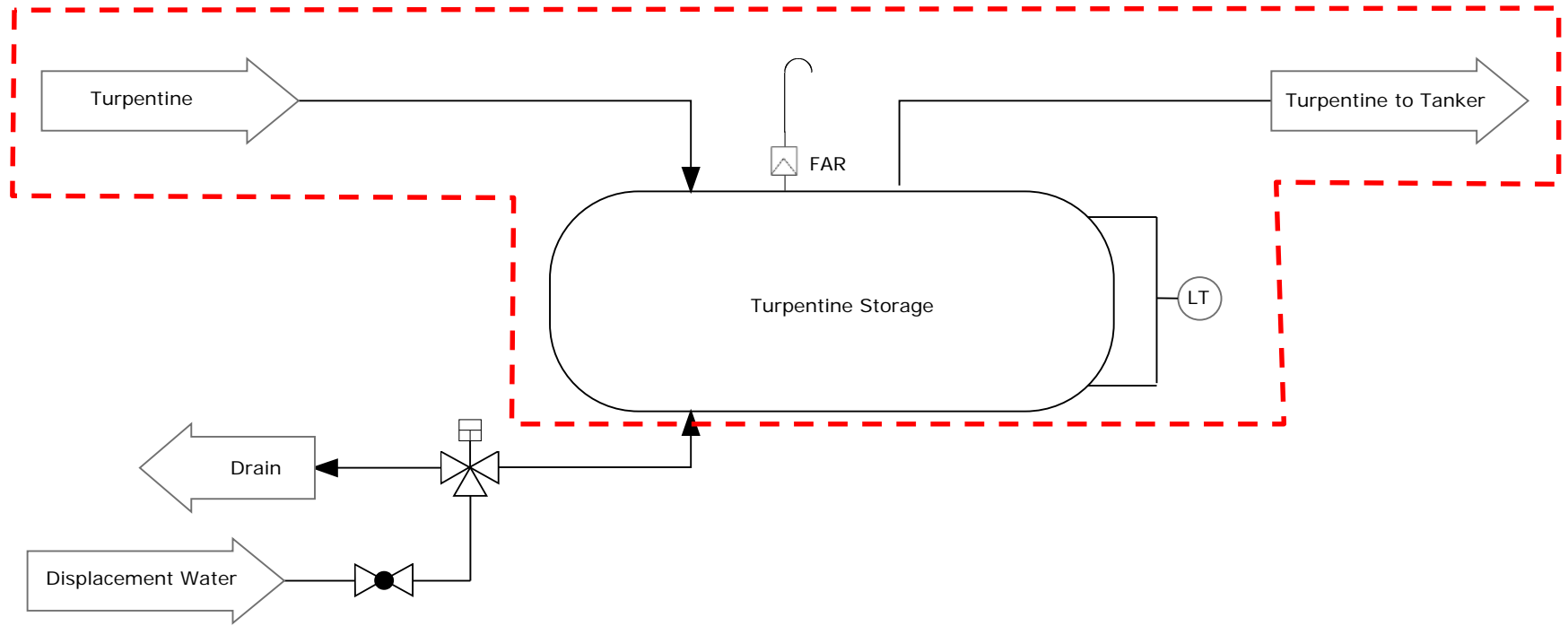
- Preliminary Hazard Analysis
- What If Analysis
- HAZOP
- Fault Tree Analysis
- Event Tree Analysis
- Layer of Protection Analysis (LOPA)

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# EXAMPLES



# Turpentine Storage Tank



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# DISCUSSION

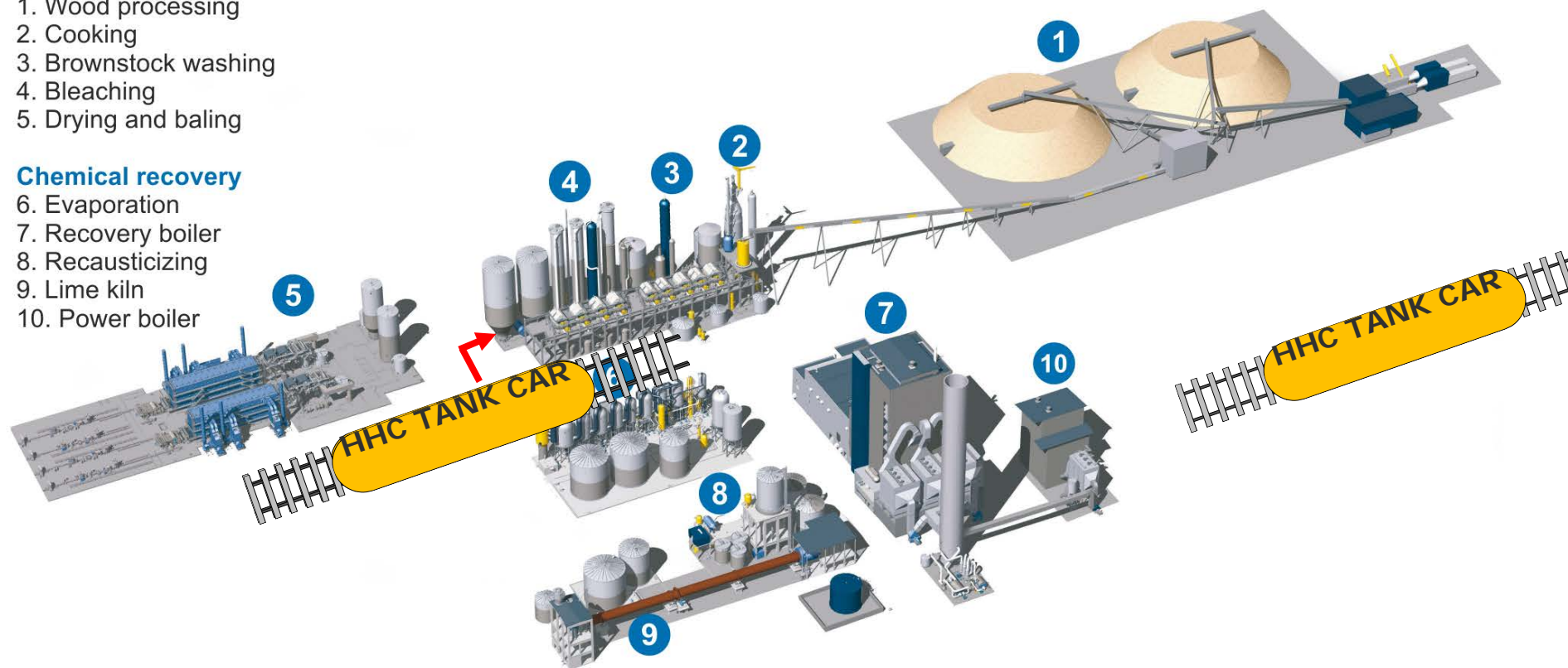
# Rail Tank Car of HHC in Bleaching

## Pulp line

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# DISCUSSION

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# CONCLUSIONS

## Conclusions

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- CSB recommends that the pulp and paper industry consider “heightened coverage” of process safety hazards, including treatment of equipment with HHCs below TQ as subject to OSHA PSM
  - CSB did not issue a recommendation to OSHA regarding the legal application of OSHA PSM boundaries;
  - OSHA has not publicly addressed suggestion that paper industry voluntarily expand PSM boundaries beyond legal requirements; however consider *Wynewood* OSHA Review Commission decision
- NCG systems typically contain chemicals below the TQ, but may be interconnected to a “covered process”
  - The industry may consider an “interconnectedness” evaluation when determining whether to treat portions of the NCG system as subject to PSM as a “best practice”

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# QUESTION & ANSWER

## About the Presenters- Devon Downs

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- Devon is an Associate in Katten Muchin Rosenman LLP's Houston and San Francisco offices, concentrates her practice in environmental, health and safety (EHS) enforcement matters, and crisis management and workplace incident response involving federal and California laws.
- Devon has supported the response to multiple major workplace accident investigations by US Chemical Safety Board (CSB), US Environmental Protection Agency (EPA), and national Occupational Safety and Health Administration (OSHA). She counsels companies on post-incident evidence and site control processes and other aspects of government investigations. As part of responding to incidents, she works with clients to assess their process safety management compliance, integrity management practices, due diligence and other aspects of EHS performance.



## About the Presenters- Trey Morrison

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- Dr. Morrison is a Professional Engineer licensed in several states, a Certified Fire and Explosion Investigator, and a Certified Process Safety Professional
- Within Exponent's Thermal Sciences group, Dr. Morrison's practice areas encompass product safety, product liability, and process safety through hazard and risk analysis, failure analysis, and post-incident investigation. He specializes in evaluations of origin, cause, and engineering issues related to catastrophic incidents involving fires, explosions, and chemical process technology.
- His expertise includes chemical engineering, fire dynamics, process safety management, and the system safety of products and industrial equipment. Dr. Morrison's practical research encompasses self-heating materials and reactive chemical hazards and evaluating scenarios such as spontaneous ignition of vegetable oil-contaminated fabrics and self-heating of reactive chemicals.