

**Developing Student's
Troubleshooting Skills in Energy
Programs
NSF/ATE Project**

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ptse Overview

- **Series of major accidents in the energy-production sector prompted a consortium of educational institutions and companies to apply for an NSF/ATE grant**
- **Purpose of the grant was to develop problem-based equipment, process, and systems troubleshooting instructional materials.**
- **Goal is to increase students' knowledge of, and demonstrate skills in, troubleshooting methods and tools**
- **Results: improvements in safety, environmental, and efficiency in energy systems operations**



Photo U.S. Chemical Safety Board

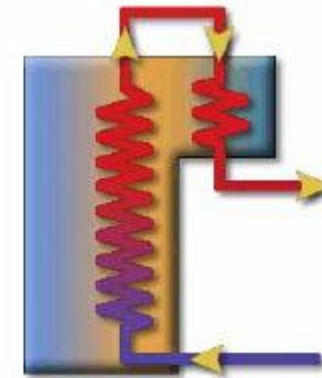
 **ptse** Overview**Key issues for troubleshooting:**

- **Teaching problem-solving skills/critical thinking and how to apply specific methods and tools**
- **Addressing abnormal operations**
- **Averting threats to personnel, facility, environmental, and community safety**
- **Developing a critical skill set for use in a variety of industries along with energy, such as food and beverage, pharmaceuticals, pulp and paper, and mining**



Overview

- **Basic Modules**
 - Common to all systems
 - Pumps
 - Compressors
 - Heaters
 - Pipes & Valves
- **Advanced Modules**
 - Industry Specific (e.g. Biofuels)
 - Distillation (Refining/Petrochem)
 - Steam Turbines (Power Generation)
 - Fermentation (Ethanol Production)



 **ptse** Overview

- **Operations include petrochemical, refining, power generation, oil and gas production, ethanol production, and biodiesel production**
- **Deliverables are a set of open source (no cost) troubleshooting learning materials, including equipment and process-specific modules, hands-on activities, simulation exercises, evaluation instruments, resources**

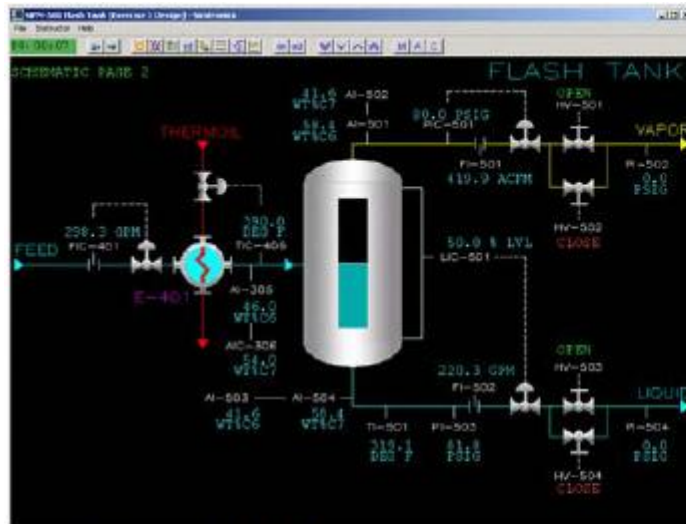
 **ptse** Overview

- **Materials intended for use as part of a "capstone" course in Process Technology degree programs offered at colleges & universities, and industry in-house training programs**
- **Grant team working under name of Process Troubleshooting Skills for Energy**



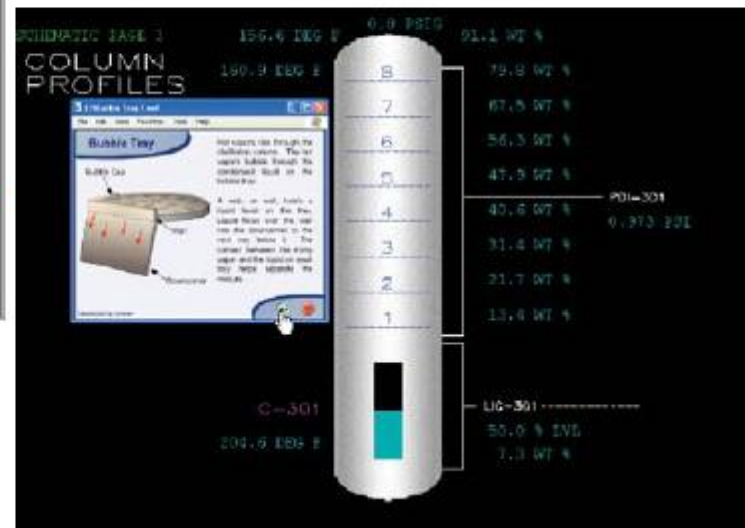
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Overview



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Example simulation exercises





ptse Grant Partners



The logo for ptse consists of a stylized green and black circular graphic on the left, followed by the lowercase letters "ptse" in a bold, green, sans-serif font.

ptse Leadership Team

- Dr. John K. Galiotos, PI, Lone Star College
- Daniel Schmidt, Co-PI, Bismarck State College
- Martha McKinley, Project Director
- Linda Luehrs Wolfe, Program Manager, Lone Star College
- Maribeth Stitt, Lone Star College
- John Flynn and Linda Rehfuss, External Evaluators, IEC LLC.
- Susanne Mathis, Senior Instructional Designer
- John Dees, Web Developer and Communication Specialist, d3 consulting
- Dave Young, Simulator Representative, Simtronics, Inc.
- Mike Tucker, Industry Representative, Eastman Chemical

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ptse Success Factors

- Get input and feedback from a variety of Subject Matter Experts representing different industry and education segments
- Coordinate with partners and build new relationships
- Conduct extensive evaluations
- Put sustainability plans in place
- Maintain fiscal records and project documentation