Background

FATE™ software is a product for waste technology and decommissioning and dismantling (D&D) applications developed by Fauske & Associates, LLC, an affiliate of Westinghouse Electric Company LLC. FATE software is used for process design and safety analyses, and can consider engineering process components as well as an entire facility.

Description

FATE software is used to calculate temperatures, pressures, flow rates, and compositions for fluids, gases, and structures associated with a waste treatment process and its surrounding facility. FATE software is uniquely suited to nuclear facility applications because it combines models for fluid flow and heat transfer with models for aerosol transport and deposition, explosions, and fire. FATE software has been developed and is maintained under the Westinghouse and Fauske & Associates Quality Assurance program. FATE software has been applied to dozens of United States Department of Energy (DOE) and commercial nuclear applications for over 15 years.

Benefits

- Evaluate flammability and explosion hazards
- Evaluate aerosol and toxic material source terms
- Example situations for impact evaluation:
  - Imperfect heating, ventilation and air conditioning (HVAC), or open doorways or vents
  - Partial or complete loss of power on facility conditions
  - Explosion and fire effects on tanks, equipment and cables
  - Soot loading on filters affecting dispersal of toxic materials

FATE predecessor won U.S. DOE award for metallic spent nuclear fuel applications
Experience

FATE software has been applied to numerous facilities and processes including:

- Vacuum drying of metallic uranium particles from spent nuclear fuel
- Shipping and storage of uranium-metal-bearing spent fuel sludge
- High temperature passivation of uranium-metal-bearing spent fuel sludge
- Vacuum drying of 2000 tons metallic spent nuclear fuel
- Vitrification plant waste tank and ventilation system pressure and flow
- Mixed oxide (MOX) facility fire and source term analysis including soot loading
- Dry storage of Cs/Sr salt capsules
- Storage tank hydrogen explosion and source term
- Underground storage tank solvent vapor explosion and source term
- Storage tank thermal response to loss of cooling
- Nuclear power plant detailed fire modeling

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