FATE 2.0™

Facility Flow, Aerosol, Thermal, and Explosion Model

FATE 2.0™ is used for design, safety, and D&D analyses of nuclear and chemical facilities. FATE 2.0™ is the successor to computer codes used extensively for U.S. Department of Energy projects at the Hanford site and elsewhere.

General capabilities of FATE 2.0™

Facility model: Regions (rooms, vessels, ducts) are connected in actual topology by flow paths (doors pipes, vents); Region atmosphere is either well-mixed or stratified (separate temperature, pressure, and composition).

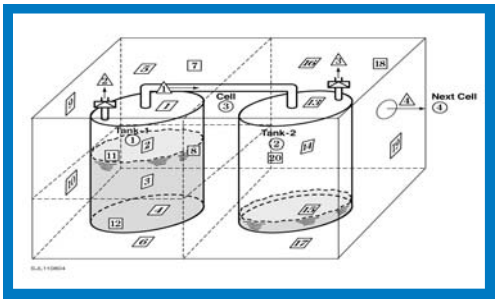
Transport: Gas, aerosol, and condensed species; Flows are pressure-driven, counter-current, and diffusional; Fan curves, check valves, choked flow; species property library.

Aerosol behavior: Coagulation, sedimentation, transport with flow; Deposition on bends and filters; Filter clogging; Deposition by condensation; Formation by boiling, fog and entrainment.

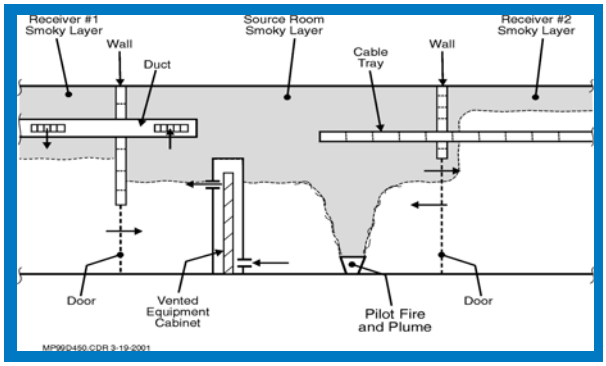
Heat transfer: Convection of liquids and gases to structures with internal temperature distributions; Linking for 2D and 3D heat transfer; Condensation.

Sources and time-dependent conditions: Prescribe liquid, gas, and aerosol source histories and environmental conditions.

Nuclear fuel and waste models including chemical reactions.



Combustion, Pressure Piling, Relief, and Aerosol Entrainment Example



Facility Fire Model: Coupled with Aerosol Release and Leak Path Factor Models

New major models introduced with FATE 2.0™ are:

Flammability and combustion of gases, vapors, and aerosols: User specifies reactions. Examples are solvent vapors, hydrogen, and metal or organic dusts.

Entrainment of deposits to form aerosols: Powder, liquid, and sludge may be entrained by combustion or flow.

Thermal radiation networks: View factor models and automatic network balancing.

Event-oriented simulation: Intervention criteria and actions for scenario evolution.

Fire model: Define burn rate and yields; Smoky layer growth; Stratification and smoke transport to any room.

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