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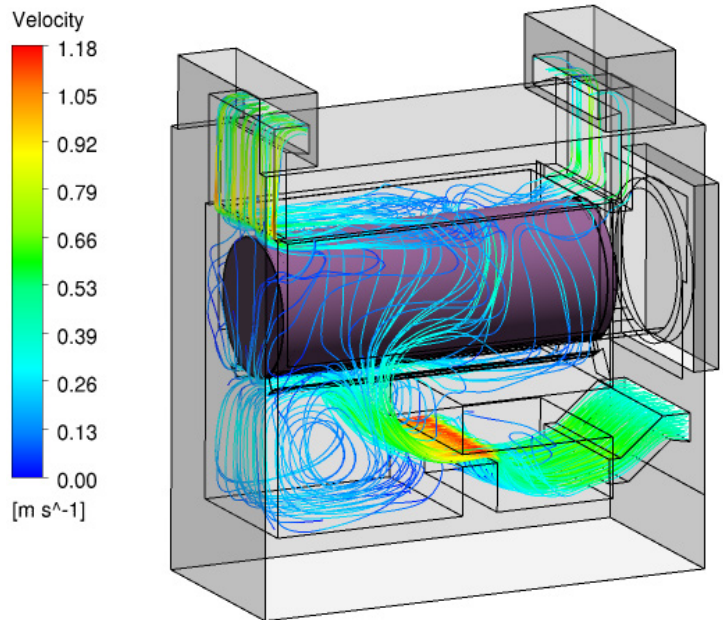
# Spent Nuclear Fuel Storage and Transportation

The Center for Nuclear Waste Regulatory Analyses (CNWRA<sup>®</sup>) at Southwest Research Institute<sup>®</sup> (SwRI<sup>®</sup>) has comprehensive experience and expertise providing technical assistance regarding the safe storage and transportation of spent nuclear fuel. The combination of technical resources, experience, and thorough knowledge of the regulatory process strongly positions CNWRA in this area. Furthermore, we have experience assisting in environmental reviews and public outreach as part of regulatory actions, including those addressing spent fuel storage facilities.

## CNWRA Technical Expertise

CNWRA and affiliated groups at SwRI have a wide range of relevant technical expertise, including:

- Civil and structural engineering
- Computational fluid dynamics
- Environmental sciences and environmental engineering
- Geochemistry and radiochemistry
- Geology and geophysics, including structural geology and remote sensing
- Geological and geotechnical engineering
- Health physics, including worker and public dose assessments
- Hydrology and climatology, including flood analysis
- Material sciences and corrosion
- Mechanical engineering
- Nuclear engineering, including criticality and neutronics
- Performance assessment and probabilistic risk assessment
- Public outreach and stakeholder engagement support
- Quality assurance
- Seismology and related earthquake and tsunami risk assessments



Computational fluid dynamics models are developed to predict the temperature evolution inside horizontal and vertical dry cask storage systems.

## CNWRA Example Projects Related to Spent Fuel Storage and Transportation

CNWRA has supported interim storage, extended storage, and transportation programs using a risk-informed performance-based approach. Technical assistance has included:

- Safety reviews, safety evaluation report preparation, and hearing support for the proposed Private Fuel Storage consolidated interim storage facility (CISF) in Utah
- Safety reviews, safety evaluation report preparation, and licensing support for
  - At-reactor independent spent fuel storage installations (ISFSI), including renewals
  - Away-from-reactor ISFSIs
- Support for environmental reviews in many licensing activities
- Assessment of a U.S. Department of Energy safety analysis of a non-site-specific centralized interim storage facility design
- Evaluation of the technical basis for and resolving regulatory and technical gaps associated with regulating extended storage of spent nuclear fuel and supporting the Continued Storage rulemaking for the U.S. Nuclear Regulatory Commission
- Thermal modeling of dry cask systems using computational fluid dynamics
- Evaluation of cask-drying requirements for spent nuclear fuel
- Experimental measurements of stress corrosion cracking of dry storage canister materials
- Assessment and recommendations regarding instrumentation for functional monitoring of storage casks
- Support for technical development of aging management guidance for dry cask storage
- Transportation risk assessment for rail and truck transport
- Detailed forensic analyses of materials recovered from long-duration severe fires involving materials transportation

### Benefits of CNWRA Support

- Staff members have been significant contributors to safety and environmental regulatory reviews
- We provide independent support, free from conflict of interest
- Our experience in technical analyses and research provides a solid basis for implementer and regulator support

### For additional information, please contact:

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*CNWRA measured corrosion rates of stainless steel used for spent fuel storage canisters to evaluate the potential effects of airborne salts.*

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## SOUTHWEST RESEARCH INSTITUTE®

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