## Nuclear fuel safety research projects

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| HALDEN Fuel and Material | Fuel and clad behaviour in accidents, fuel safety | Norway | Ongoing2021-2023 |
| CABRI Water Loop | Fuel and clad behaviour in RIA transients | France | Ongoing2000-2026 |
| SCIPSCIP-2SCIP-3 | Pellet-clad mechanical interaction in transients Fuel and clad behaviour in LOCA, fuel fragmentation and dispersion | Sweden | Completed 2004-20082009-20142014-2019 |
| SCIP-4  | Fuel and clad behaviour in back-end and LOCA conditions | Sweden | Ongoing2019-2024 |
| Paks Fuel Project | Fuel assembly damage | Hungary | Completed2004-2007 |
| Sandia Fuel Project | Fuel assembly damage in spent fuel pool | USA | Completed 2009-2012 |
| FIDES INCA | Cladding creep, Zr alloys and Cr-coated | Czech Republic | Ongoing2021-2024 |
| FIDES P2M | Power to melt and manoeuvrability | Belgium | Ongoing2021-2024 |
| FIDES LOCA MIR | Gd-doped fuel rod behaviour under LOCA | Russia | Ongoing2021-2024 |
| FIDES HERA | Modern high Burn-up fuel in RIA transients  | USA, Japan | Ongoing2021-2024 |
| QUENCH-ATF | ATF claddings in accident conditionsDBA and BDBA conditions | Germany | Ongoing2021-2025 |

## Primary and secondary circuit thermal-hydraulics projects

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| LOFT  | LOCA integral tests | USA | completed1983-1989 |
| SETH | LOCA, boron dilution, shut-down state tests | Germany | completed2001-2006 |
| PSB-VVER | LOCA in VVER, natural circulation, scaling tests | Russia | completed2003-2008 |
| ROSAROSA-2 | LOCA, SGTR, natural circulation, 1-ɸ and 2-ɸ flows, mixing, stratification, complex flows, scaling (ROSA/PKL)  | Japan | completed2005-20092009-2012 |
| PKLPKL-2PKL-3PKL-4 | LOCA including DEC, cool down and late SAM procedures, boron dilution and precipitation, shut-down states, MSLB, MSGTR, scaling (ATLAS/PKL/ROSA) | GermanyHungary | completed 2004-20072008-20112012-20162016-2020 |
| ETHARINUS | LOCA including DEC, passive systems, cool down and late SAM procedures, cooling with core blockage, MSGTR, scaling (PPKL/ATLAS) | GermanyFinlandRussia | ongoing2021-2024 |
| ATLASATLAS-2 | LOCA including DEC, SGTR, natural circulation, 1-ɸ and 2-ɸ flows, mixing, stratification, complex flows, scaling (ATLAS/PKL)  | Korea | completed2014-20172017-2020 |
| ATLAS-3 | LOCA including DEC, integral tests with RCS/containment interactions, natural circulation, passive systems, scaling (ATLAS/PKL)  | Korea | ongoing2021-2024 |
| RBHT | High quality data for core reflooding models, uncertainty analysis  | USA | completed2019-2022 |

**Containment thermal-hydraulics, systems and hydrogen risk management**

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| BUBCON | VVER bubbler condenser, containment pressure suppression system  | Russia | completed2001-2002 |
| SETH | Gas stratification and mixing in containment (in relation to H2 combustion) | Switzerland | completed2001-2006 |
| SETH-2HYMERES | Gas stratification and mixing in containment, effects of safety systems (sprays, coolers, H2 recombiners, rupture disks), scaling (PANDA/MISTRA), high quality data for CFD modelling | SwitzerlandFrance | completed2007-20102013-2016 |
| HYMERES-2 | Effect of internal structures on flows, effects of combination of safety systems, BWR pressure suppression pools  | Switzerland | completed 2017-2020 |
| PANDA | Effect of internal structures on flows, BWR pressure suppression pools, SMRs systems  | Switzerland | ongoing2021-2025 |
| THAITHAI-2THAI-3 | H2 mixing including effects of spray systems, H2 recombiners performance, H2 combustion | Germany | completed 2007-20092011-20142016-2019 |
| THEMIS | Recombiners performance and combustion in late phases of a severe accident (H2/CO mixes)  | Germany | ongoing2020-2024 |

## Severe accident projects

Accident progression and melt coolability in-vessel and ex-vessel

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| RASPLAV | In-vessel melt coolability with and without external cooling, melt chemical composition effects on stratification and thermal loads on RPV | Russia | completed1994-2000 |
| OLHF | RPV deformation and failure, mechanical analysis  | USA | completed1998-2002 |
| MASCAMASCA-2 | In-vessel melt coolability, melt chemical composition effects on stratification and thermal loads on RPV, fission products partitioning, scaling to reactor applications  | Russia | completed2000-20032003-2007 |
| SERENA | Molten fuel coolant interaction, steam explosion, scaling to reactor applications | FranceKorea | completed2007-2012 |
| MCCIMCCI-2 | Ex-vessel melt coolability and long term containment basemat concrete erosion by melt, scaling to reactor applications  | USA | completed2002-20052006-2010 |
| ROSAU | Ex-vessel melt coolability by top flooding and underwater spreading, scaling to reactor applications | USA | ongoing2019-2024 |

Source term projects

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| LOFT | Gap fission product (FP) release in LOCA FP release in severe accident  | USA | completed1983-1989 |
| BIPBIP-2BIP-3 | Iodine (I) source term in containment I chemistry in sumps and in gas phase incl. effects of contaminants Interactions with surfacesOrganic iodides (RI) formation)  | Canada | completed2007-20112011-20142016-2018 |
| THAITHAI-2THAI-3 | PARs poisoning and iodine formation by aerosols interacting with PARsWash-down of soluble aerosolsI reaction with aerosolsFP re-entrainment from boiling pools FP resuspension by H2 deflagration | Germany | completed2007-20092011-20142016-2019 |
| THEMIS | Interaction of IOx with aerosolsFP retention by pool scrubbingAerosol interactions with PARs | Germany | ongoing2020-2024 |
| STEMSTEM-2 | I and ruthenium (Ru) source terms (Ru transport in RCS, irradiation of iodine-bearing aerosols, IOx formation, I interaction with aged paints and RI formation) | France | completed2011-20152016-2019 |
| ESTER | FP (Cs, I, Mo, Te) remobilisation from deposits (differed releases)RI formation | France | ongoing 2020-2024 |

Major accidents projects (TMI-2, Fukushima-Daiichi)

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| TMI-VIP | TMI-2 accident analysis with a focus on RPV integrity, analysis of material from RPV lower head | USA | completed1988-1993 |
| BSAF | Fukushima-Daiichi accident analyses with a focus on thermal-hydraulic response of RPV and PCV over six days  | Japan | completed2012-2015 |
| BSAF-2 | Fukushima-Daiichi accident analyses extended to three weeks and including radioactive release | Japan | completed2016-2018 |
| PreADES | Preparatory studies for fuel debris retrieval in damaged units at Fukushima-Daiichi | Japan | completed2017-2021 |
| ARC-F | Compilation and analysis of data and information from damaged units at Fukushima-DaiichiAccident analyses with a focus on in-vessel and ex-vessel accident development, hydrogen explosion events and radioactive release  | Japan | completed2019-2022 |
| FACE | Continue supporting preparation of fuel debris retrieval from damaged units at Fukushima-Daiichi Refine accident analyses with a focus on effects of accident measures | Japan | ongoing2022-2025 |
| TCOFF | Enhancement of thermodynamic databases for Fukushima-Daiichi accident analysis  | Japan | completed2017-2020 |
| TCOFF-2 | Enhancement of thermodynamic databases for severe accident analysis including for ATF material | Japan | ongoing2022-2025 |

## Material ageing experimental projects and events database projects

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| HALDEN fuel and material | Crack initiation and growth rate in BWR and PWR reactor core components | Norway | ongoing2021-2023 |
| SMILE | Harvesting of aged components in Swedish BWR and PWR under decommissioning Investigations of aged low alloy RPV steels, of core support structures and internals alloys and of pressure boundary austenitic alloys | Sweden | ongoing2021-2025 |
| SCAP | Stress corrosion cracking events database (integrated in CODAP)Cable ageing database (integrated in CADAK) | NEA | completed2006-2010 |
| OPDE | Piping failure data exchange database (integrated in CODAP) | NEA | completed2002-2011 |
| CADAK | Cable ageing database | NEA | completed2011-2014 |
| CODAP | Component Operational Experience, Degradation and Ageing database | NEA | ongoing2021-2023 |
| COMPSIS | Computer-based Systems Important to Safety database Project (integrated in ICDE) |  | Completed2006-2011 |
| ICDE | International Common-cause Failure Data Exchange |  | Ongoing2023-2026 |

## Fire research projects (experimental and fire events database)

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| PRISMEPRISME-2PRISME-3 | Fire and smoke propagation (fuel pools, electrical cabinets and cables fires) in various multi-rooms configurations, consequences on equipment, effects of fire extinction systems | France | completed2006-20112011-20162017-2022 |
| FAIR | Cable fire propagation, poorly ventilated combustion, multi-source and multi-rooms scenarios | France | Ongoing2023-2026 |
| HEAF | HEAF experiments with commercial NPP electrical cabinets, modelling of HEAF scenarios | USA | completed2012-2017 |
| HEAF-2 | HEAF experiments with commercial NPP electrical cabinets and bus ducts, modelling of HEAF scenariosEffect of bus bar and bus duct material on HEAF consequences  | USA | ongoing2018-2024 |
| FIRE | Fire incident records database | NEA | ongoing2023-2025 |

## Projects on other topics (Human and organisational aspects of safety, projects on HTGR)

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| **Project name** | **Subject** | **Host country** | **Status****Mandate** |
| Human and organisational aspects of safety |
| PLASMA | Development of a plant safety monitoring and assessment system for VVERs | Norway | completed1998-2000 |
| HALDEN HTO | Human performance, digital I&C – safety assurance, control room design and evaluation, human-automation collaboration, digital systems for operation and maintenance, digital transformation of decommissioning, cybersecurity for main control rooms | Norway | Ongoing2021-2023 |
| High temperature gas phase reactors |
| DRAGON | First high temperature gas-cooled reactor which operated between 1966 and 1975 | UK | completed1958-1975 |
| LOFC | Loss of forced cooling transients without SCRAM, reactor kinetics, coupled core physics and thermal-hydraulics in JAEA HTTR reactor | Japan | ongoing2011-2024 |