

# NEA joint projects:

## *nuclear safety, radioactive waste management, radiological protection*

NEA joint projects and information exchange programmes enable interested countries, on a cost-sharing basis, to pursue research or the sharing of data with respect to particular areas or issues in the nuclear energy field. The projects are carried out under the auspices, and with the support, of the NEA. All NEA joint projects currently under way are listed below.

At present, 17 joint projects are being conducted in relation to nuclear safety, three in support of radioactive waste management, and one in the field of radiological protection. These projects complement the NEA programme of work and contribute to achieving excellence in each of the respective areas of research.

Project	Participants	Budget	Objectives
<b>Behaviour of Iodine Project (BIP)</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: July 2007-June 2010	Belgium, Canada, Finland, France, Germany, Japan, Netherlands, Republic of Korea, Spain, Sweden, Switzerland, United Kingdom, United States	≈€ 350 K /year	<ul style="list-style-type: none"> <li>• Provide separate effects and modelling studies of iodine behaviour in a nuclear reactor containment building following a severe accident.</li> <li>• Provide data and interpretation from three radioiodine test facility (RTF) experiments to participants for use in collaborative model development and validation.</li> <li>• Achieve a common understanding of the behaviour of iodine and other fission products in post-accident reactor containment buildings.</li> </ul>
<b>Cabri Water Loop Project</b> Contact: <a href="mailto:radomir.rehacek@oecd.org">radomir.rehacek@oecd.org</a> Current mandate: 2000-2010	Czech Republic, Finland, France, Germany, Japan, Republic of Korea, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, United States	≈€ 74 million	<ul style="list-style-type: none"> <li>• Extend the database for high burn-up fuel performance in reactivity-induced accident (RIA) conditions.</li> <li>• Perform relevant tests under coolant conditions representative of pressurised water reactors (PWRs).</li> <li>• Extend the database to include tests done in the Nuclear Safety Research Reactor (Japan) on BWR and PWR fuel.</li> </ul>
<b>Computer-based Systems Important to Safety (COMPSIS) Project</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: January 2008-December 2010	Chinese Taipei, Finland, Germany, Hungary, Republic of Korea, Sweden, Switzerland, United States	€ 80 K /year	<ul style="list-style-type: none"> <li>• Define a format and collect software and hardware fault experience in computer-based, safety-critical NPP systems in a structured, quality-assured and consistent database.</li> <li>• Collect and analyse COMPSIS events over a long period so as to better understand such events, their causes and their prevention.</li> <li>• Generate insights into the root causes of and contributors to COMPSIS events, which can then be used to derive approaches or mechanisms for their prevention or for mitigating their consequences.</li> <li>• Establish a mechanism for efficient feedback of experience gained in connection with COMPSIS events, including the development of defences against their occurrence, such as diagnostics, tests and inspections.</li> <li>• Record event attributes and dominant contributors so that a basis for national risk analysis for computerised systems is established.</li> </ul>
<b>Co-operative Programme on Decommissioning (CPD)</b> Contact: <a href="mailto:patrick.osullivan@oecd.org">patrick.osullivan@oecd.org</a> Current mandate: January 2009-December 2013	Belgium, Canada, Chinese Taipei, France, Germany, Italy, Japan, Republic of Korea, Slovak Republic, Spain, Sweden, United Kingdom	≈€ 66 K /year	<ul style="list-style-type: none"> <li>• Exchange scientific and technical information amongst decommissioning projects for nuclear facilities.</li> </ul>
<b>Fire Incidents Records Exchange (FIRE) Project</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: January 2006-December 2009	Canada, Czech Republic, Finland, France, Germany, Japan, Netherlands, Republic of Korea, Spain, Sweden, Switzerland, United States	≈€ 75 K /year	<ul style="list-style-type: none"> <li>• Collect fire event experience (by international exchange) in the appropriate format and in a quality-assured and consistent database.</li> <li>• Collect and analyse fire events data over the long term with the aim to better understand such events, their causes and their prevention.</li> <li>• Generate qualitative insights into the root causes of fire events which can then be used to derive approaches or mechanisms for their prevention or for mitigating their consequences.</li> <li>• Establish a mechanism for the efficient feedback of experience gained in connection with fire including the development of defences against their occurrence, such as indicators for risk-based inspections.</li> <li>• Record characteristics of fire events in order to facilitate fire risk analysis, including quantification of fire frequencies.</li> </ul>
<b>Halden Reactor Project</b> Contact: <a href="mailto:radomir.rehacek@oecd.org">radomir.rehacek@oecd.org</a> Halden contact: <a href="mailto:Fridtjov.owre@hrp.no">Fridtjov.owre@hrp.no</a> Current mandate: 2009-2011	Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Japan, Kazakhstan, Norway, Republic of Korea, Russian Federation, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, United States	≈€ 43 million	Generate key information for safety and licensing assessments and aim at providing: <ul style="list-style-type: none"> <li>• extended fuel utilisation: basic data on how the fuel performs, both under normal operation and transient conditions, with emphasis on extended fuel utilisation in commercial reactors;</li> <li>• degradation of core materials: knowledge of plant materials behaviour under the combined deteriorating effects of water chemistry and nuclear environment, also relevant for plant lifetime assessments;</li> <li>• man-machine systems: advances in computerised surveillance systems, virtual reality, digital information, human factors and man-machine interaction in support of control room upgradings.</li> </ul>
<b>Information System on Occupational Exposure (ISOE)</b> Contact: <a href="mailto:brian.ahier@oecd.org">brian.ahier@oecd.org</a> Current mandate: 2008-2011	Armenia, Belgium, Brazil, Bulgaria, Canada, China, Czech Republic, Finland, France, Germany, Hungary, Italy, Japan, Lithuania, Mexico, Netherlands, Pakistan, Republic of Korea, Romania, Russian Federation, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States	≈€ 450 K /year	<ul style="list-style-type: none"> <li>• Collect, analyse and exchange occupational exposure data and experience from all participants.</li> <li>• Provide broad and regularly updated information on methods to improve the protection of workers and on occupational exposure in nuclear power plants.</li> <li>• Provide a mechanism for dissemination of information on these issues, including evaluation and analysis of the data assembled and experience exchanged, as a contribution to the optimisation of radiation protection.</li> </ul>

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<b>International Common-cause Failure Data Exchange (ICDE) Project</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: April 2008-March 2011	Canada, Finland, France, Germany, Japan, Republic of Korea, Spain, Sweden, Switzerland, United Kingdom, United States	≈€110 K /year	<ul style="list-style-type: none"> <li>• Provide a framework for multinational co-operation.</li> <li>• Collect and analyse common-cause failure (CCF) events over the long term so as to better understand such events, their causes and their prevention.</li> <li>• Generate qualitative insights into the root causes of CCF events which can then be used to derive approaches or mechanisms for their prevention or for mitigating their consequences.</li> <li>• Establish a mechanism for the efficient feedback of experience gained in connection with CCF phenomena, including the development of defences against their occurrence, such as indicators for risk-based inspections.</li> <li>• Generate quantitative insights and record event attributes to facilitate the quantification of CCF frequencies in member countries.</li> <li>• Use the ICDE data to estimate CCF parameters.</li> </ul>
<b>Melt Coolability and Concrete Interaction (MCCI) Project</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: April 2006-December 2009	Belgium, Czech Republic, Finland, France, Germany, Hungary, Japan, Norway, Republic of Korea, Spain, Sweden, Switzerland, United States	€3.4 million	<ul style="list-style-type: none"> <li>• Provide experimental data on melt coolability and concrete interaction (MCCI) severe accident phenomena.</li> <li>• Resolve two important accident management issues:               <ul style="list-style-type: none"> <li>– the verification that molten debris that has spread on the base of the containment can be stabilised and cooled by water flooding from the top;</li> <li>– the two-dimensional, long-term interaction of the molten mass with the concrete structure of the containment, as the kinetics of such interaction is essential for assessing the consequences of a severe accident.</li> </ul> </li> </ul>
<b>Piping Failure Data Exchange (OPDE) Project</b> Contact: <a href="mailto:alejandro.huerta@oecd.org">alejandro.huerta@oecd.org</a> Current mandate: June 2008-May 2011	Canada, Czech Republic, Finland, France, Germany, Japan, Republic of Korea, Spain, Sweden, Switzerland, United States	≈ €50 K /year	<ul style="list-style-type: none"> <li>• Collect and analyse piping failure event data to promote a better understanding of underlying causes, impact on operations and safety, and prevention.</li> <li>• Generate qualitative insights into the root causes of piping failure events.</li> <li>• Establish a mechanism for efficient feedback of experience gained in connection with piping failure phenomena, including the development of defence against their occurrence.</li> <li>• Collect information on piping reliability attributes and influence factors to facilitate estimation of piping failure frequencies, when so decided by the Project Review Group.</li> </ul>
<b>PKL-2 Project</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: April 2008-September 2011	Belgium, Czech Republic, Finland, France, Germany, Hungary, Italy, Japan, Republic of Korea, Spain, Sweden, Switzerland, United Kingdom, United States	€3.9 million	<ul style="list-style-type: none"> <li>• Investigate safety issues relevant for current PWR plants as well as for new PWR design concepts.</li> <li>• Focus on complex heat transfer mechanisms in the steam generators and boron precipitation processes under postulated accident situations.</li> </ul>
<b>PRISME Project</b> Contact: <a href="mailto:carlo.vitanza@oecd.org">carlo.vitanza@oecd.org</a> Current mandate: January 2006-December 2010	Belgium, Canada, Finland, France, Germany, Japan, Netherlands, Republic of Korea, Spain, Sweden, United Kingdom, United States	€7 million	<ul style="list-style-type: none"> <li>• Answer questions concerning smoke and heat propagation inside a plant, by means of experiments tailored for code validation purposes.</li> <li>• Provide information on heat transfer to cables and on cable damage.</li> </ul>
<b>Rig of Safety Assessment (ROSA) Project</b> Contact: <a href="mailto:carlo.vitanza@oecd.org">carlo.vitanza@oecd.org</a> Current mandate: April 2009-March 2012	Belgium, Czech Republic, Finland, France, Germany, Hungary, Japan, Republic of Korea, Spain, Sweden, Switzerland, United Kingdom, United States	€2.1 million	<ul style="list-style-type: none"> <li>• Provide an integral and separate-effect experimental database to validate code predictive capability and accuracy of models. In particular, phenomena coupled with multi-dimensional mixing, stratification, parallel flows, oscillatory flows and non-condensable gas flows are to be studied.</li> <li>• Clarify the predictability of codes currently used for thermal-hydraulic safety analyses as well as of advanced codes presently under development, thus creating a group among OECD/NEA member countries who share the need to maintain or improve technical competence in thermal-hydraulics for nuclear reactor safety evaluations.</li> </ul>
<b>Sandia Fuel Project (SFP)</b> Contact: <a href="mailto:carlo.vitanza@oecd.org">carlo.vitanza@oecd.org</a> Current mandate: June 2009-June 2012	Czech Republic, France, Germany, Hungary, Japan, Norway, Republic of Korea, Spain, Sweden, Switzerland, United Kingdom, United States	€4 million	<ul style="list-style-type: none"> <li>• Address potential accident conditions and perform a highly detailed thermal-hydraulic characterisation of full-length, commercial pressurised water reactor (PWR) fuel assembly mock-ups.</li> <li>• Provide data for the direct validation of appropriate codes.</li> <li>• Address applicability to other fuel designs, also considering that BWR data will be made available to project participants.</li> </ul>
<b>SETH-2 Project</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: March 2007-December 2010	Czech Republic, Finland, France, Germany, Japan, Republic of Korea, Slovenia, Sweden, Switzerland	€2.5 million	<ul style="list-style-type: none"> <li>• Generate high-quality experimental data that will be used for improving the modelling and validation of computational fluid dynamics (CFD) and lumped parameter (LP) computer codes designed to predict post-accident containment thermal-hydraulic conditions (for current and advanced reactor designs).</li> <li>• Address a variety of measured parameters, configurations and scales in order to enhance the value of the data for code applications.</li> <li>• Study relevant containment phenomena and separate effects, including effects of jets, natural convection, containment coolers and sprays.</li> </ul>
<b>Sorption-3 Project</b> Contact: <a href="mailto:patrick.osullivan@oecd.org">patrick.osullivan@oecd.org</a> Current mandate: November 2007-April 2010	Australia, Belgium, Czech Republic, Finland, France, Germany, Japan, Republic of Korea, Spain, Switzerland, United Kingdom, United States	€170 K /year	<ul style="list-style-type: none"> <li>• Demonstrate the potential of thermodynamic sorption models to improve confidence in the representation of radionuclide sorption in the context of radioactive waste disposal.</li> </ul>

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<b>Steam Explosion Resolution for Nuclear Applications (SERENA) Project</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: October 2007-September 2011	Canada, Finland, France, Germany, Japan, Republic of Korea, Slovenia, Sweden, Switzerland, United States	€2.6 million	<ul style="list-style-type: none"> <li>• Provide experimental data to clarify the explosion behaviour of prototypic corium melts.</li> <li>• Provide experimental data for validation of explosion models for prototypic materials, including spatial distribution of fuel and void during the pre-mixing and at the time of explosion, and explosion dynamics.</li> <li>• Provide experimental data for steam explosions in more realistic, reactor-like situations to verify the geometrical extrapolation capabilities of the codes.</li> </ul>
<b>Stress Corrosion Cracking and Cable Ageing (SCAP) Project</b> Contact: <a href="mailto:akihiro.yamamoto@oecd.org">akihiro.yamamoto@oecd.org</a> Current mandate: June 2006-June 2010	Belgium, Canada, Czech Republic, Finland, France, Germany, Japan, Mexico, Norway, Republic of Korea, Slovak Republic, Spain, Sweden, Ukraine, United States	€480 K /year	<ul style="list-style-type: none"> <li>• Establish two complete databases on major ageing phenomena for stress corrosion cracking (SCC) and for degradation of cable insulation.</li> <li>• Establish a knowledge base by compiling and evaluating collected data and information systematically.</li> <li>• Perform an assessment of the data and identify the basis for commendable practices which would help regulators and operators to enhance ageing management.</li> </ul>
<b>Studsvik Cladding Integrity Project (SCIP)</b> Contact: <a href="mailto:carlo.vitanza@oecd.org">carlo.vitanza@oecd.org</a> Current mandate: July 2009-June 2014	Czech Republic, Finland, France, Germany, Japan, Republic of Korea, Spain, Sweden, Switzerland, United Kingdom, United States	€7 million	<ul style="list-style-type: none"> <li>• Assess material properties and determine conditions that can lead to fuel failures.</li> <li>• Improve the general understanding of cladding reliability at high burn-up through advanced studies of phenomena and processes that can impair fuel integrity during operation in power plants and during handling or storage.</li> <li>• Achieve results of general applicability (i.e. not restricted to a particular fuel design, fabrication specification or operating condition).</li> <li>• Address LOCA issues by means of out-of-reactor testing.</li> </ul>
<b>Thermal-hydraulics, Hydrogen, Aerosols, Iodine (ThAI) Project</b> Contact: <a href="mailto:jean.gauvain@oecd.org">jean.gauvain@oecd.org</a> Current mandate: January 2007-December 2009	Canada, Czech Republic, Finland, France, Germany, Hungary, Netherlands, Republic of Korea, Switzerland	€930 K /year	<ul style="list-style-type: none"> <li>• Address outstanding questions concerning the behaviour of hydrogen (combustion and removal using recombiners), iodine and aerosols (wall deposition, wash-out and interaction) in severe accident situations.</li> <li>• Improve understanding of the respective processes for evaluating challenges to containment integrity (hydrogen) and for evaluating the amount of airborne radioactivity during accidents with core damage (iodine and aerosols).</li> <li>• Generate data for evaluating the spatial distribution of hydrogen in the containment, its effective removal by means of equipment such as passive autocatalytic recombiners, and slow hydrogen combustion.</li> </ul>
<b>Thermochemical Database (TDB) Project</b> Contact: <a href="mailto:mireille.defranceschi@oecd.org">mireille.defranceschi@oecd.org</a> Current mandate: 2008-2012	Belgium, Canada, Czech Republic, Finland, France, Germany, Japan, Republic of Korea, Spain, Sweden, Switzerland, United Kingdom, United States	≈€441 K /year	Produce a database that: <ul style="list-style-type: none"> <li>• contains data for elements of interest in radioactive waste disposal systems;</li> <li>• documents why and how the data were selected;</li> <li>• gives recommendations based on original experimental data, rather than on compilations and estimates;</li> <li>• documents the sources of experimental data used;</li> <li>• is internally consistent;</li> <li>• treats all solids and aqueous species of the elements of interest for nuclear waste storage performance assessment calculations.</li> </ul>

