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**OECD/NEA Post-Fukushima approach -
Integrated response plan
Nuclear safety research**

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Outline

- ❑ NEA Integrated Response Plan to the Fukushima Dai-ichi Accident
- ❑ Areas of NEA Technical Study Being Considered in Response to Fukushima
- ❑ Joint International Research Projects
- ❑ NEA Safety Research Going Forward
- ❑ Concluding Remarks

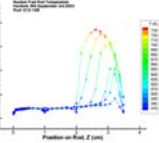
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Committee on the Safety of Nuclear Installations (CSNI)



- Senior regulators, TSO and research leaders, some utility representation
- Maintaining, harmonizing and further developing the scientific and technical knowledge base required to assess and enhance the safety of nuclear reactors and fuel cycle facilities
- Main areas of work include:
 - Analysis and management of accidents
 - Integrity and ageing of components and structures
 - Risk assessment
 - Fuel safety
 - Safety of fuel cycle facilities
 - Human and organizational factors
 - Safety research projects and activities



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NEA Integrated Response to Fukushima Accident

- In immediate aftermath of accident, CSNI developed a Concept Paper on "Considerations and Approaches for Post-Fukushima Dai-ichi Follow-up Activities"
 - Provided initial technical opinions along the following topical lines:
 - External and Internal Hazards Assessments
 - Plant Robustness and Defence-in-Depth Evaluations
 - Review of Safety Management Approaches
 - Assessment of Emergency Preparedness Methods and Approaches
 - Research Needed to Close Technical Knowledge Gaps (e.g., severe accident progression phenomenon, modelling of human behaviour under SA conditions, etc.)

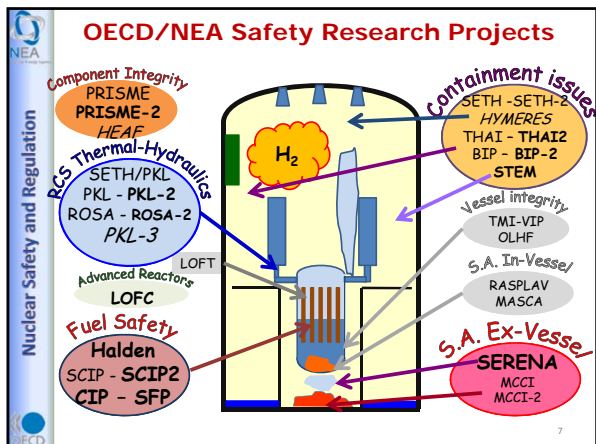
OECD/NEA Joint Projects

□ **Motivations and Goals**

- Resolve issues relevant for the nuclear community by means of research shared by many countries
- Enhance technical exchange, co-operation and consensus-building internationally
- Support the continued operation of unique test facilities which are of value to the OECD/NEA nuclear community
- CSNI is committed to promote and facilitate Safety Research, through scientific and technical cooperation between member countries
- The availability of safety research results is key in assuring the high level and long-term safety of nuclear facilities
- This goal can however only be reached if dedicated and sustained funding for safety research is maintained. The availability of experimental infrastructures is also essential

NEA Joint International Research Projects

	<ul style="list-style-type: none"> HALDEN Fuel and Materials, I&C, Human Factors Norway CABRI Fuel in RIA transients France SCIP-2 Fuel integrity Sweden SFP Spent fuel safety USA PRISME2 Fire Safety France ROSA System TH Japan PKL-2 PWR SG behaviour Germany LOFC RCS safety in GCR Japan BIP-2 Iodine chemistry Canada SERENA Steam explosion Korea & France THAI-2 Containment (H2, I) Germany STEM Source term mitigation France
	<ul style="list-style-type: none"> Databases 1. FIRE 2. ICDE 3. CODAP 4. CADAK 5. COMPSIS



- ### Safety Research Post-Fukushima
- Importance of future safety research highlighted in CSNI Concept Paper on Fukushima, CNRA STG Recommendations to CNRA and other supporting strategy/policy documents
 - Phased approach within NEA:
 - ✓ Comprehensive review of past safety research - **done**
 - ✓ Gap analysis based on research issues from Fukushima - **ongoing**
 - Discuss possible expansion of existing projects and/or
 - New R&D project proposals
 - ✓ CSNI review of research direction – **June 2012**

Overview of NEA Research Projects

Thermal Hydraulics Projects	Fuel Behaviour Projects	Severe Accident Phenomenology Projects	Other (Systems and Event Database Projects)
<ul style="list-style-type: none"> • LOFT, Loss-of-Fluid Test Project (1983-1989) • BUBCON, Bubble Condenser Project (2003-2002) • SETH, SESAR Thermal-hydraulics Project (2003-2006) • SETH-2, SETH Phase 2 Project (2007-2010) • PSL-VVER Project (2003-2008) • PKL, Primärkreislauf Project (2004-2007) • PKL-2, PKL Phase 2 Project (2008-2011) • ROSA, Rig of Safety Assessment Project (2005-2009) • ROSA-2, ROSA Phase 2 Project (2009-2012) • PRISME, Fire propagation in elementary, multi-room scenarios Project (2006-2011), PRISME-2 Project (2011-2016) • LOFC, Loss of Forced Coolant Project (2011-2013) 	<ul style="list-style-type: none"> • HALDEN, Halden Reactor Project (1958-present) • CIP, Cold Water Loop International Project (2000-2015) • PAKS, OECD-IAEA Paks Fuel Project (2006-2007) • SCIP, Studsvik Cladding Integrity Project (2004-2009) • SCIP-2, SCIP Phase 2 (2009-2014) • SFP, Sandia Fuel Project (2008-2012) 	<ul style="list-style-type: none"> • TMI-VIP, TMI-2 Vessel Investigation Project (1988-1993) • RASPLAV Project (1994-2000) • OLHF, Sandia Lower Head Failure OECD Project (1998-2002) • MASCA, Material Scaling Project (2000-2003) • MASCA-2, MASCA Phase 2 Project (2003-2007) • MCCI, Melt Coolability and Concrete Interaction Project (2002-2005) • MCCI-2, MCCI Phase 2 Project (2006-2010) • BIP, Behaviour of Iodine Project (2007-2011), BIP-2 (2011-2014) • SERENA, Steam Explosion Resolution for Nuclear Applications Project (2007-2012) • THAI, Thermal-hydraulics, Hydrogen, Aerosols, Iodine Project (2007-2009), phase 2 (2011-2014) • SFP, Sandia Fuel Project (2008-2012) • STEM, Source Term Evaluation and Mitigation (2011-2015) 	<ul style="list-style-type: none"> • SCORPIO Project (1996-1998) • PLASMA Project (1998-2000) • International Common-cause Failure Data Exchange (ICCF) Project (1994-2014) • Piping Failure Data Exchange (PFDE) Project (2002-2011) • Fire Incidents Records Exchange (FIRE) Project (2002-2014) • Computer-based Systems Important to Safety (COMPISIS) Project (2006-2011) • Stress Corrosion Cracking and Cable Ageing Project (SCAP) (2006-2010) • Component Operational Experience, Degradation and Ageing (CODAP) Project (2011-2014) • Cable Ageing Data And Knowledge Project (CADAK) (2011-2014)

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Concluding Remarks

- > First priority for NEA countries is safety and regulation
- > CSNI has a long history of supporting NEA member country safety institutions in producing valuable and timely outputs towards continual enhancement of nuclear safety including safety research
- > CSNI is a recognized forum to coordinate and where appropriate cooperate on safety R&D activities among NEA member countries
- > NEA joint research projects have contributed to address common safety concerns and to retain countries' technical expertise and infrastructure in strategic fields of nuclear safety
- > From NEA perspective, concerted actions among technical safety institutions should build upon the successful framework existing today

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