

**AGREEMENT**  
**ON THE**  
**OECD NUCLEAR ENERGY AGENCY (NEA)**  
**FRAMEWORK FOR IRRADIATION EXPERIMENTS II**  
**(FIDES II)**

# AGREEMENT

## on the OECD Nuclear Energy Agency (NEA) Framework for Irradiation Experiments II (FIDES II)

### *Preamble*

The signatories to this agreement (the “**Agreement**”) on the OECD Nuclear Energy Agency (NEA) Framework for Irradiation Experiments II (FIDES II) duly designated by their governments, and listed in Appendix A (hereinafter individually referred to as a “**Party**”, or collectively as the “**Parties**”);

CONSIDERING that the mission of the NEA is to, *inter alia*, assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally sound and economical use of nuclear energy for peaceful purposes;

CONSIDERING that, pursuant to Article 5 of the NEA Statute, the NEA is entrusted with promoting the formation of joint undertakings (also referred to as joint projects) for the production and uses of nuclear energy for peaceful purposes;

CONSIDERING that for the safe and efficient use of nuclear technology, it is of prime importance to maintain experimental capacities, to share them and the cost of the experiments to test material and fuel under irradiation;

CONSIDERING that the Parties desire to address a wide scope of experimental programmes, implemented in different countries, facilities, and/or organisations by sharing goals, resources and results; and that they desire to set up and implement the above within the framework of an NEA joint project;

CONSIDERING that the Governing Board of the OECD Framework for Irradiation Experiments (FIDES) has approved the transfer of identified funds and activities from FIDES to FIDES II.

CONSIDERING that the Parties wish to enter into the FIDES II Agreement;

CONSIDERING that FIDES II will be an ongoing and long-term project that will be operated in a multiple phase approach;

AGREE to take part in the NEA FIDES II (hereinafter the “**Framework**”), on the terms and conditions described in this Agreement.

### DEFINITIONS

**Act of Adhesion:** the act to be signed by an Applicant to become a new Party to this Agreement, as detailed under Article 11(b)2) herein, and in the form provided in Appendix D.

**Agreement:** the present agreement on the OECD Nuclear Energy Agency (NEA) Framework for Irradiation Experiments II (FIDES II).

**Applicant:** an organisation applying to become a new Party to this Agreement in accordance with Articles 11(a) and 11(b) herein.

**Call for Contributions:** invoices issued to the Parties by the NEA upon the approval of the Governing Board, in accordance with Article 5(b).

**Cross-Cutting Activity or CCA:** an activity that may be developed by Parties to contribute to the Purpose and is cross-cutting across the Framework (including between JEEPs and other projects across the NEA), as defined in Article 3(c)6.

**Confidential Information:** information that is disclosed by a Party to be protected according to the terms and conditions in Article 6.

**Contributions:** the contributions provided by the Parties, both monetary and/or in-kind, which are approved by the Governing Board in accordance with Article 3. A table showing the monetary Contributions expected from the Parties upon the entry into force of the Agreement is detailed in Appendix C.

**Disclosing Party:** a Party that discloses information to another Party in connection with the implementation and execution of this Agreement, as further defined in Article 6(a).

**Framework:** the collaborative activities described in this Agreement, including the JEEPs and CCAs, that are necessary to carry out the Purpose defined in Article 1.

**Framework Funds:** the total amount of monetary Contributions provided by the Parties under this Agreement.

**Framework Results:** information or intellectual property arising from the execution of the project by the Parties, to be protected according to the terms and conditions of Article 7, excluding JEEP Results.

**Governing Board:** the group of representatives designated by the Parties to manage, oversee and decide on the Framework, as further defined in Article 3.

**JEEP:** the joint experimental programme set up under the Framework to test material and fuel under irradiation.

**JEEP Advisory Group:** a group established by the Governing Board to support the management of each JEEP.

**JEEP Agreement:** the agreement that shall be entered into by the JEEP Core Group (unless the JEEP Core Group is constituted of a single Party), which will determine the terms and conditions to carry out the relevant JEEP.

**JEEP Budget:** the budget allocated to a JEEP, consisting of the portion of Framework Funds allocated to it by the Governing Board, and of the monetary and/or in kind contributions provided to it by the JEEP Core Group.

**JEEP Co-ordinator:** a person nominated by a JEEP to liaise with the Governing Board and NEA Secretariat.

**JEEP Core Group:** the Party or Parties that (i) have a special interest in the experiments to be carried out in a JEEP, (ii) jointly submit a Proposal to establish the JEEP to the Governing Board pursuant to Article 2(b), (iii) agree to provide funds and/or in kind contributions to implement the JEEP and (iv) are parties to the relevant JEEP Agreement. The Operating Agent(s) of a JEEP will be part of the JEEP Core Group.

**JEEP Facility:** a facility that is operated to implement a JEEP.

**JEEP Programme of Work:** the work to be performed under each JEEP.

**JEEP Results:** the information or intellectual property arising from the execution of a JEEP Programme of Work by the relevant Operating Agent(s), to be protected and administered according to the terms and conditions of Article 7.

**Operating Agent:** the Party or Parties, identified as the Operating Agent in JEEPs, that will perform the JEEP's Programme of Work.

**Party:** an organisation that has agreed to participate in the Framework and has therefore signed the Agreement or an Act of Adhesion. The initial Parties to sign the Agreement are listed in Appendix A.

**Project:** the programme to be performed under this Agreement, which will include the JEEPs and CCAs. The proposed initial programme is detailed in Appendix B.

**Proposal:** the written document to be prepared by the JEEP Core Group outlining the JEEP, including but not limited to the JEEP Programme of Work, JEEP Budget and timeline, to be submitted for approval by the Governing Board.

**Purpose:** the purpose of the Framework, as defined in Article 1.

**Receiving Party:** a Party to whom another Party discloses information in connection with the implementation of this Agreement, as further defined in Article 6(a).

**Technical Advisory Group (TAG):** a group of experts that may be designated by the Parties to provide technical support to the Governing Board, as further defined in Article 4.

**Technical Expert:** a Third Party (e.g. consultant, academic, student, etc.) who may be invited by a Party, or who may be given access to JEEP Results and/or Framework Results in accordance with the terms of this Agreement, including in particular Article 6(d), to participate in technical discussions and to contribute to the realisation and interpretation of JEEP Results.

**Third Party:** all persons or organisations that are not Parties to this Agreement.

**Unanimously Approve/Unanimous Approval:** when all of the members of the Governing Board have expressed their approval in writing.

In this Agreement, except where the context requires otherwise, words indicating one gender include all genders, and words indicating the singular also include the plural and vice versa.

## *Article 1*

### **PURPOSE**

Article 5 of the NEA Statute entrusts the NEA with promoting the formation of joint undertakings (also referred to as joint projects) for the production and uses of nuclear energy for peaceful purposes, endeavouring to secure the participation of the greatest possible number of countries.

The purpose of the Framework (the “**Purpose**”) is to:

- (1) Establish a framework for international collaboration to provide continuity and sustainability of experimental capacities, foster and facilitate irradiation experiments to test materials and fuels, through the gathering of a large multinational community in the field of safety, industry and research that will share goals, resources and results to define and implement joint experimental programmes (JEEPs) and cross-cutting activities (CCAs).
- (2) Create and provide the necessary conditions, including the due identification of needs, funding and capacities by providing access to JEEP Facilities for the use and sustainability of the current and future world-wide available nuclear capacities (research reactors, hot cells, related skills, etc.) to allow for the implementation of JEEPs and any other activity associated with their implementation.
- (3) Collaboration under this Agreement shall be conducted only for peaceful purposes and in accordance with the Parties’ shared non-proliferation objectives.

## *Article 2*

### **IMPLEMENTATION OF THE PROJECT**

- (a) To implement the Purpose, the Parties shall identify opportunities and foster their development through JEEPs.
- (b) The JEEP Core Group shall make a written Proposal to the Governing Board in order to implement a JEEP.

#### 1) Each JEEP:

- i. shall ensure access to the JEEP Facilities listed in the Proposal, under terms specified in the JEEP Agreement;
- ii. shall be governed by a JEEP Agreement which shall be consistent with and governed by the provisions of this Agreement, and contain provisions including those set forth in Article 2(b)(2) hereunder. In the event of inconsistency or contradiction between a JEEP Agreement or this Agreement, this Agreement shall prevail;
- iii. shall have one or several Operating Agents, as set forth in the Proposal, that shall operate the JEEP Facilities listed in the Proposal and shall perform the JEEP Programme of Work. The Operating Agent(s) shall be part of the JEEP Core Group;

- iv. may be overseen and supported by a JEEP Advisory Group. If the Governing Board decides to establish a JEEP Advisory Group, it can consist of Governing Board and/or TAG and/or JEEP Core Group members and/or representatives designated by the Parties. The Governing Board shall decide the mandate and powers of the JEEP Advisory Group. Unless Unanimous Approval is specifically required in this Agreement, decisions of the JEEP Advisory Group may be adopted at a meeting or by the written process and should be sought on the basis of consensus. Consensus is reached when no member objects within the timeframe provided for a decision. When consensus is not reached, the JEEP Advisory Group will be considered as having adopted a decision if members contributing to at least 75% of the overall JEEP Budget have approved. If the Governing Board decides not to establish a JEEP Advisory Group, it shall directly oversee the JEEP;
- v. shall have a detailed JEEP Programme of Work that will be submitted by the JEEP Core Group in a written Proposal to the Governing Board for approval;
- vi. shall nominate a JEEP Co-ordinator.

2) Each JEEP Agreement shall contain provisions concerning, *inter alia*:

- i. detailed responsibilities of the different JEEP Core Group members
- ii. internal cost sharing approach within the JEEP Core Group, including in-kind contributions according to the Proposal
- iii. decision making procedure within the JEEP Core Group
- iv. intellectual property (including any co-ownership of JEEP Results by the JEEP Core Group members), including JEEP Results, and use and disclosure of Confidential Information, including for JEEP Results, which shall be consistent with this Agreement;
- v. practical and legal aspects concerning nuclear materials and information, including but not limited to export, transport, ownership and nuclear waste disposal, if necessary;
- vi. the adhesion and/or withdrawal of FIDES II Parties and adhesion to the JEEP Agreement;
- vii. the adhesion and/or withdrawal of a JEEP Core Group member; and
- viii. the Proposal as approved by the Governing Board as an Appendix.

- (c) Each JEEP Agreement shall remain in effect so long as this Agreement remains in effect, unless it expires or is terminated before that time. However, any collaboration initiated under a JEEP but not completed at the expiration or termination of this Agreement may continue to completion under the provisions of this Agreement (including in particular Article 12(e)) and of the JEEP Agreement.

### Article 3

#### GOVERNING BOARD

- (a) The Parties delegate management and decision-making of the Framework to a Governing Board constituted under this Article.
- (b) Each Party shall have one representative at the Governing Board and shall notify the NEA in writing of its designated member for the Governing Board, and at least one alternate member in case the designated member is not available. Each Party shall notify the NEA in writing of any changes in its designated or alternate members.
- (c) The Governing Board shall, *inter alia*:
  - 1) Manage, oversee and decide on the Framework including the definition of the strategy, perspectives and priorities to be addressed;
  - 2) Approve any modifications to Appendix B (Project), and Unanimously Approve any modifications to Appendix A (List of Signatories), Appendix C (Initial Contributions of the Parties) and Appendix D (Act of Adhesion Template);
  - 3) Approve any additional Third Parties to be added to Appendix E (List of Third Parties) or additional permissions to be granted to Third Parties in Appendix E (List of Third Parties) and Unanimously Approve any removal of Third Parties or diminution of permissions under Appendix E (List of Third Parties);
  - 4) Unanimously Approve any modifications to the overall scope of the Purpose and to the Contributions of the Parties;
  - 5) Approve the breakdown of the Framework Funds to be allocated to the different JEEPs and CCAs;
  - 6) Examine the Proposal(s) submitted by Parties to establish new JEEPs, and approve their establishment, the JEEP Budgets and their respective JEEP Programme of Work, as well as any modifications and/or termination thereof;
  - 7) Examine the proposal(s) submitted by Parties to establish CCAs that contribute to the Purpose and approve their establishment, the CCA Budgets and their respective Programme of Work, including, but not limited to data preservation and quality assurance, training and education, and instrumentation; as well as any modifications and/or termination thereof;
  - 8) Approve the financial reports, the issuance of Calls for Contributions and the payments from the Framework Funds to the NEA and the JEEPs;
  - 9) Establish processes and procedures, consistent with the Project and provisions of this Agreement, as may be required for the sound management of the Framework;
  - 10) Approve the establishment of a Technical Advisory Group (TAG), as described in Article 4;

- 11) Consider all matters brought before it by any Party, the NEA or the TAG (if constituted);
  - 12) Ensure that all the relevant information (including, but not limited to, Framework Results and JEEP Results) resulting from the work performed under the Framework is duly reported to the Parties. All results and related reports produced under the Framework, including Framework Results and JEEP Results that are to be published as provided in Article 7(d)2, shall be produced and compiled in the manner and format approved by the Governing Board;
  - 13) Approve the length of the non-disclosure period and approve the publication of the Framework Results or JEEP Results, as provided in Article 7;
  - 14) Carry out the other functions conferred upon it by this Agreement and by the Unanimous Approval of the Parties.
- (d) Unless Unanimous Approval is specifically required in this Agreement, the Governing Board shall operate and seek to reach its decisions (during a meeting or in writing) on the basis of consensus. Consensus is reached when none of the representatives of the Parties objects within the timeframe provided for a decision. When consensus is not reached and Unanimous Approval is not expressly required by this Agreement, decisions of the Governing Board (during a meeting or in writing) shall require the approval of the Parties contributing to at least 2/3 (two thirds) of the total Framework Funds.
- (e) The Governing Board shall elect a Chairperson and a Vice-Chairperson from amongst its members. The Governing Board can decide to elect a new Chairperson and/or Vice-Chairperson as circumstances dictate.
- (f) The Governing Board shall meet as called by its Chairperson or at least once a year. The Chairperson must call for a meeting of the Governing Board after receiving a request from a simple majority of the Parties or from a JEEP Co-ordinator.
- (g) Unless otherwise specifically agreed by the Governing Board, the Chairperson shall ensure that the time, place and agenda of a Governing Board meeting be provided to the designated and alternate members with at least thirty (30) days prior notice.
- (h) The Chairperson shall ensure that after each meeting, all the members of the Governing Board are sent the summary record of the meeting including any actions and decisions of the Governing Board. The summary record will be adopted by Unanimous Approval of the Governing Board.

#### *Article 4*

### **TECHNICAL ADVISORY GROUP**

- (a) The Governing Board may decide to establish a Technical Advisory Group (TAG) in accordance with this Agreement, to provide technical support to the Governing Board.
- (b) If a TAG is constituted, each Party shall notify the NEA in writing of whether or not it wishes to designate a member for the TAG, and at least one alternate member in case the designated member is not available to attend a meeting. Each Party shall notify the NEA in writing of any changes in its designated or alternate members.



- (c) The TAG shall perform the work assigned to it by the Governing Board, which may include, but is not limited to:
- 1) provide technical advice and recommendations to the Governing Board concerning the Project and related budget;
  - 2) review technical aspects of the JEEP Proposals and CCA proposals, the JEEP Programmes of Work, the Project and provide recommendations about necessary high-level modifications as well as ensuring consistency between the Project and the JEEPs;
  - 3) liaise with JEEP proposing organisations to ensure complementarity between experiments; and co-ordinate a strategy within similar categories of experiments;
  - 4) make recommendations to the Governing Board for decisions about the JEEP Proposals (including JEEP Programme of Work and JEEP Budget) and CCA proposals;
  - 5) assess the outcome resulting from the Framework Results and JEEP Results and provide related recommendations; and
  - 6) provide any other technical assistance as requested by the Governing Board.
- (d) The TAG shall elect a Chairperson and possibly a Vice-Chairperson from amongst its members. The TAG can decide to elect a new Chairperson and/or Vice-Chairperson as circumstances dictate. At its first meeting, the TAG shall define its mode of operation and, thereafter, any changes thereof, and shall inform the Governing Board accordingly. The TAG can meet in conjunction with the Governing Board. The Governing Board can call a TAG meeting.
- (e) Members of the TAG and any person accompanying a member at a TAG meeting (such as accompanying staff or Technical Experts) shall be subject to the conditions of Article 6(d). Members of the TAG shall notify the NEA of any accompanying staff or Technical Experts in advance.
- (f) After the summary record has been adopted by Unanimous Approval of the TAG, the TAG Chairperson shall ensure that a copy of the summary record of a TAG meeting is sent to the Governing Board.

#### *Article 5*

### **FINANCE**

- (a) In accordance with Article 5(b) of the NEA Statute, the work undertaken under this Agreement shall be at the Parties' own cost. Each Party commits to the amount of monetary Contributions set forth in Appendix C.
- (b) The monetary Contributions of the Parties shall be paid in Euros into accounts designated by the NEA and managed in accordance with the OECD Financial Statutes. Payments shall be made according to Calls for Contributions issued to the Parties by the NEA upon the approval of the Governing Board. The NEA shall administer these Contributions and shall, upon the approval of the Governing Board pursuant to Article 3(c), pay NEA costs.
- (c) Expenditures shall be reported by the JEEP Co-ordinator to the Governing Board in a format and at a frequency agreed by the latter.

- (d) Each Party is responsible for its own costs of involvement in the Framework (including, but not limited to, staff time and travel expenses).

## *Article 6*

### **CONFIDENTIAL INFORMATION**

- (a) All information in whatever form or mode of communication, which is disclosed by a Party (the “**Disclosing Party**”) to any other Party (the “**Receiving Party**”) in connection with the implementation and execution of this Agreement (such as but not limited to information regarding the JEEPs, JEEP Proposals, Framework Results and JEEP Results) and which the Disclosing Party has marked as “confidential” at the time of disclosure or, when disclosed orally, (i) has identified as confidential at the time of disclosure, and (ii) has confirmed the confidential nature of the information in writing within five (5) calendar days from oral disclosure at the latest, is considered as “**Confidential Information**” under this Agreement, unless it:
- 1) was already known to the Receiving Party, other than under an obligation of confidentiality, at the time of disclosure by the Disclosing Party;
  - 2) was generally available to the public or part of the public domain at the time of its disclosure to the Receiving Party, or became available to the public or part of the public domain thereafter (other than through an act or omission in breach of this Agreement);
  - 3) was lawfully disclosed by a Third Party to the Receiving Party. The disclosure is lawful when the Third Party is legally entitled to possess the Confidential Information and is legally entitled to provide it to the Receiving Party;
  - 4) was independently discovered or developed by the Receiving Party without the use or benefit of Confidential Information belonging to the Disclosing Party, as documented by the Receiving Party; or
  - 5) was identified, in writing, by the Disclosing Party as not Confidential Information, or if the Receiving Party received prior written approval from the Disclosing Party to disclose the Confidential Information.
- (b) The Disclosing Party shall retain all right, title, and interest in and to the Confidential Information (other than JEEP Results and Framework Results which are co-owned with other Parties) and to any intellectual property developed by the Disclosing Party prior to the Effective Date or independently of this Agreement. The Parties shall take all necessary measures in accordance with this Article and applicable laws to protect Confidential Information and shall not use for any purpose other than as provided for under this Agreement any Confidential Information disclosed to it, in whatever form or mode of communication, by the Disclosing Party. The Parties shall return or destroy (with confirmation of such destruction) any Confidential Information received from the other Parties (excluding Framework Results and JEEP Results) at the expiry of the non-disclosure period according to Article 7(c).
- (c) Where necessary, and/or if so required by the laws, rules, regulations applicable to the Disclosing Party as well as internal policies of the Disclosing Party, additional rules and procedures regarding protection, use, and disclosure of Confidential Information shall be adopted by the Governing Board acting by Unanimous Approval and in conformity with this Agreement.

- (d) Any Party wishing to invite a Third Party that is not listed in Appendix E (such as a Technical Expert) to participate in a Framework activity where Confidential Information is likely to be disclosed shall notify the Governing Board (any member of which may object to the invitation within a timeframe that shall be specified in the notification provided such objection is not unreasonably motivated) and must ensure that the Third Party is bound by a non-disclosure agreement that contains obligations on confidentiality that are at least as restrictive as those contained in this Agreement and any additional rules and procedures adopted as per Article 6(c). The non-disclosure agreement shall include, but not be limited to, restrictions on the ability of the Third Party to use, distribute or publish Confidential Information.

## *Article 7*

### **FRAMEWORK RESULTS AND JEEP RESULTS**

- (a) For the purposes of this Agreement, JEEP Results refer to information or intellectual property arising from the execution of the JEEP Programme of Work by the Parties and/or Operating Agent(s) in JEEPs (the “**JEEP Results**”) and Framework Results refer to information or intellectual property arising from the execution of the Project by the Parties, excluding JEEP Results (the “**Framework Results**”). Intellectual property shall have the meaning found in Article 2 of the Convention establishing the World Intellectual Property Organization done at Stockholm on 14 July 1967.
- (b) The Parties agree that the Framework Results shall be jointly owned by the Parties. The JEEP Results shall be jointly owned by the Parties constituting the relevant JEEP Core Group, who shall grant a right of use exclusively for internal research and development purposes to all the other Parties to this Agreement. All Framework Results and JEEP Results will be deposited with the NEA.
- (c) The Parties agree that the Frameworks Results and JEEP Results shall not be disclosed to Third Parties, except as listed in Appendix E, during a non-disclosure period which shall be decided by the Governing Board, or by the JEEP Advisory Group if this task has been delegated to it except as provided in paragraph (d) and (e) below. If no such period is set, that period shall end 9 (nine) years following the entry into force of this Agreement.
- (d) During this non- disclosure period:
- 1) A Party wishing to disclose Framework Results or JEEP Results to a Third Party that is not listed in Appendix E (including, but not limited to, a Technical Expert) shall request prior written approval from the Governing Board and must ensure that such Third Party is bound by a non-disclosure agreement that contains obligations on confidentiality that are at least as restrictive as those contained in this Agreement. The non-disclosure agreement shall include, but not be limited to, restrictions on the ability of the Third Party to use, distribute or publish Framework Results or JEEP Results.
  - 2) A Party wishing to publish a Framework Result or JEEP Result (e.g. for publication, use for benchmarks, presentation at a conference or workshops, etc.) shall request prior written approval from the Governing Board. The Governing Board may delegate this role to the JEEP Advisory Group.
- (e) After the expiry of the non-disclosure period of 9 (nine) years following the entry into force of the present Agreement, or any other period decided by the Governing Board (or by the JEEP

Advisory Group if this right has been delegated to it), the Framework Results and JEEP Results will be provided to NEA member countries upon request.

- (f) Each Party shall, without prejudice to any rights of authors and inventors under its national laws, take the necessary steps to secure such co-operation or assignment of rights as are required to implement the provisions of this Article. Each Party has the responsibility to pay awards or compensation according to the laws of its country.
- (g) The Parties recognise and agree that Confidential Information, including Framework Results and JEEP Results are made available as is, without representation or warranty of any kind as to their accuracy and completeness. Each Party agrees that any reliance upon or conclusions drawn therefrom shall be at such Party's own risk and shall not give rise to any liability of another Party.
- (h) The expiration or early termination of this Agreement as well as the withdrawal of a Party from this Agreement shall not affect the rights and obligations of the Parties as set out in this Article. Without prejudice of its ownership rights, a withdrawing Party shall retain access to the Framework Results and JEEP Results that were produced until the date of withdrawal, except as decided otherwise by the Unanimous Approval of the Governing Board.

#### *Article 8*

### **OECD NUCLEAR ENERGY AGENCY (NEA)**

- (a) The Parties take note that in accordance with its Statute, the NEA encourages the broadest possible participation in the Framework by its member countries, and endeavours to co-ordinate the Framework with its other activities in this field.
- (b) The Parties also take note that the NEA's Steering Committee for Nuclear Energy is updated by NEA staff on the progress of the Framework each year.
- (c) The Parties agree that the NEA shall provide administrative support to the Framework and technical secretariat services to the Governing Board, the TAG (if constituted) and their Chairpersons. The Parties also agree that the NEA shall manage the Framework Funds in accordance with the OECD Financial Statutes. The NEA shall submit to the Governing Board for approval financial reports regarding the Framework Funds, as well as the related expenditures.
- (d) The NEA's fee for its support and services shall be annually paid from the Framework Funds according to Appendix C and thereafter as approved by the Governing Board, and for any travel costs to be calculated pursuant to the OECD's Staff Regulations, Rules and Instructions Applicable to Officials of the Organisation.

#### *Article 9*

### **LEGISLATIVE PROVISIONS**

- (a) All activities carried out to implement the Project shall be subject to the laws and regulations applicable in the State on whose territory the activities in question are carried out. In particular, the Operating Agents shall be responsible for ensuring that their work under the relevant JEEP is carried out in accordance with all applicable laws and regulations.

- (b) Each Party shall be solely responsible for all legal liabilities and any related claims and costs arising out of the performance of its own obligations under this Agreement, and shall not be liable for any other Party's actions arising out of the performance of such other Party's obligations under this Agreement, including, but not limited to, the actions of the Operating Agent in performing the relevant JEEP Programme of Work.
- (c) Parties shall facilitate the completion of any formalities required through the work of the Framework for the movement of persons, and the importation of materials and equipment.

#### *Article 10*

### **SETTLEMENT OF DISPUTES**

- (a) Attempts should be made to amicably resolve any dispute among the Parties concerning the interpretation or application of this Agreement through the Unanimous Approval of the Governing Board. If that is not possible, the services of the NEA shall be sought to reach an amicable resolution, up to and including referring the matter to the NEA Director-General.
- (b) Any dispute arising out of or in connection with this Agreement, that is not settled amicably, shall, upon mutual written agreement of the disputing Parties, be finally settled by arbitration under the Rules of Arbitration of the International Chamber of Commerce. The seat of arbitration shall be Paris, France. One arbitrator appointed in accordance with these Rules shall conduct the arbitral procedures in the English language. The appointed sole arbitrator shall resolve any such dispute by reference to the terms and conditions of this Agreement only, and the decision shall be final and binding on the Parties concerned.
- (c) Unless otherwise agreed in writing by the disputing Parties, this Agreement shall be governed by the laws of France.

#### *Article 11*

### **ADHESION AND WITHDRAWAL OF PARTIES**

- (a) The government of an NEA member country may designate an organisation whose headquarters are based in its country (the "**Applicant**") to become a Party to this Agreement by submitting a written designation to the Governing Board. The Applicant shall thereafter submit a written application to the Governing Board, which shall either reject or Unanimously Approve the application, subject to any additional conditions that it might determine.
- (b) Where an application obtains Unanimous Approval from the Governing Board:
  - 1) The Governing Board shall Unanimously Approve the modifications to be made to Appendices A, B, C and E of this Agreement to include the new Applicant in the Framework (in accordance with Article 3(c)2).
  - 2) An Act of Adhesion in the form set forth in Appendix D shall be submitted by the Governing Board to the Applicant for signature, to which a copy of this Agreement, along with its updated Appendices A, B, C, and E, shall be annexed. The Act of Adhesion shall

specify that the Applicant assumes all the rights and obligations of a Party under this Agreement, and meets any condition determined by Unanimous Approval of the Governing Board, if any.

- 3) The Applicant shall become a Party to this Agreement upon signature of the Act of Adhesion by an authorised representative of the new Party.
- (c) Upon notification of the Governing Board (any member of which may object), a Party may be replaced by another organisation. The process set forth in paragraphs (a) and (b) of this Article shall apply.
- (d) A Party may withdraw from this Agreement upon six-months written notice to the Governing Board, unless a different length of notice period is Unanimously Approved by the Governing Board. A Party's withdrawal from this Framework Agreement shall automatically constitute withdrawal from all the JEEPs in which it was participating, whether it had signed a JEEP Agreement or not, except as otherwise decided by Unanimous Approval of the Governing Board. A Party that has withdrawn from this Agreement and any JEEPs shall still be obliged to meet the requirements set out in Article 6 (Confidential Information) and Article 7 (Framework Results and JEEP Results). Moreover, the withdrawal of a Party does not affect the rights and obligations of other remaining Parties.
- (e) If a Party fails to fulfil its obligation(s) under this Agreement, the Chairperson may decide to send notice to the defaulting Party specifying the nature of the defaulting obligation(s) and specifically invoking this clause. If the defaulting Party fails to remedy the defaulting obligation(s) within sixty days after its receipt of notice invoking this clause, the defaulting Party shall be considered to have withdrawn from this Agreement and all JEEPs in which it was participating, whether it had signed a JEEP Agreement or not.

## *Article 12*

### **FINAL PROVISIONS**

- (a) This Agreement shall enter into force upon signature by at least two (2) Parties (the “**Effective Date**”). Thereafter, this Agreement shall enter into force for each additional Party on the date of signature of the Agreement (for Parties listed in Appendix A) or an Act of Adhesion. This Agreement shall remain in force until 31 March 2024 and may be extended for an additional period of up to three (3) years with the Unanimous Approval of the Governing Board. In case of extension, Appendix B, Appendix C and associated secretariat costs shall be updated by the Governing Board. Any further extension shall be treated as an amendment to this Agreement in accordance with Article 12(b).
- (b) This Agreement may be amended or terminated at any time by the written approval of all the Parties.
- (c) The original of this Agreement and any Acts of Adhesion shall be deposited with the Director-General of the NEA and a copy of the certified Agreement and any Acts of Adhesion shall be provided to each Party.
- (d) This Agreement sets the rights and obligations of the Parties as defined herein and does not constitute an international agreement.



- (e) The provisions of Article 6 (Confidential Information), Article 7 (Framework Results and JEEP Results), 9 (a) and (b) (Legislative Provisions) and Article 10 (Settlement of Disputes) shall survive the expiration or termination of this Agreement and shall continue to apply to a withdrawn Party. In particular, the Parties shall address the disclosure of Framework Results or JEEP Results at the final Governing Board meeting. If no meeting takes place, the decision shall be made by consensus after the expiration or termination of this Agreement, instead of the Governing Board as provided under Article 6 and Article 7.
- (f) The activities of the Parties under this Agreement shall be subject to the availability of appropriated funds, personnel and other resources. If adequate appropriated funds, personnel and other resources are unavailable and alternative financing cannot be ensured, the concerned Party shall withdraw from this Agreement according to Article 11(d).
- (g) Activities undertaken under this Agreement shall be conducted in the English language.
- (h) The Appendices to this Agreement constitute an integral part of this Agreement and can only be modified in accordance with the procedure detailed in this Agreement.
- (i) Notwithstanding the above, if the Project is not carried out for reasons beyond the reasonable control of the Parties or if it is decided to suspend or cancel any activities in order to safeguard the health, safety or security of the Parties' personnel and experts, the Parties will discuss how the Project could resume at a later date, in different locations, or through alternative means. Should the Governing Board reach Unanimous Approval of new implementing conditions, the Parties will discuss in good faith how associated costs would be covered. Failing such Unanimous Approval, the Parties may terminate the Agreement in accordance with Article 12(b). In the event of termination of the Agreement or the cancellation or suspension of activities, the Parties will cover, in accordance with Article 8(d), expenses (including staff costs) incurred or irrevocably committed by the NEA up to the date of termination, cancellation or suspension as well as any expenses incurred or committed by the NEA as a result of having to cancel or modify such commitments.

This Agreement may be signed in counterparts, all of which, when taken together, shall constitute the ***Agreement on the OECD Nuclear Energy Agency (NEA) Framework for Irradiation Experiments II (FIDES II)***

## *Appendix A*

### **LIST OF THE INITIAL PARTIES**

<b>Country</b>	<b>Organisation</b>
Belgium	Belgian Nuclear Research Center (SCK CEN)
Czech Republic	Research Centre Rez, Ltd. (CVŘ)
	Nuclear Research Institute of the Czech Republic (ÚJV Řež, a. s.)
	ALVEL, a.s.
Finland	Ministry of Economic Affairs and Employment (MEAE)
France	Électricité de France (EDF)
	Institut de Radioprotection et de Sûreté Nucléaire (IRSN)
	Commissariat à l'énergie atomique et aux énergies alternatives (CEA)
	Framatome SAS
Germany	Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH
Hungary	Centre for Energy Research (EK)
Japan	Nuclear Regulation Authority (NRA)
	Japan Atomic Energy Agency (JAEA)
	Central Research Institute of Electric Power Industry (CRIEPI)
	Mitsubishi Heavy Industries, LTD. (MHI)
Korea	Korea Hydro & Nuclear Power Co., Ltd. (KHNP)
	Korea Atomic Energy Research Institute (KAERI)
	KEPCO Nuclear Fuel CO., Ltd. (KNF)
the Netherlands	Nuclear Research and Consultancy Group (NRG)
Spain	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT)
Sweden	Westinghouse Electric Sweden AB
Switzerland	Eidgenössisches Nuklearsicherheitsinspektorat (ENSI)
	Paul Scherrer Institute (PSI)
United Kingdom	National Nuclear Laboratory (NNL)
United States of America	United States Nuclear Regulatory Commission (US NRC)
	United States Department of Energy (US DOE)
	Electric Power Research Institute (EPRI)
European Commission (EC)	Joint Research Centre (JRC)



## Appendix B

### SUMMARY OF RESEARCH AND EXPERIMENTAL PROGRAMME OF WORK PROPOSED FOR IMPLEMENTATION WITHIN FIDES II IN 2021-2027 (PROJECT)

*The original agreement that became effective on 03 October 2022 was extended on 18 March 2024 by unanimous approval of the Governing Board until 31 March 2027. Furthermore, the Governing Board approved on 25 March 2024 and on 17 June 2024 the extension of the work programme as outlined in this Appendix.*

#### INTRODUCTION

Following the worldwide decline of neutron irradiation capacities, the NEA has initiated the establishment of FIDES II for multinational utilisation of experimental facilities in joint fuel and materials projects. This framework will help regulators, their technical support organisations, research organisations and the industry to consolidate their needs and resources in order to create a dynamic forum for implementing several Joint Experimental Programmes (JEEPs) in the key nuclear fuel and materials facilities around the world and to ensure that core capabilities to conduct fuel and materials irradiations including the necessary related services are preserved and available to support national nuclear programmes. Reviews of these capabilities, needed to support safe and effective use of nuclear power, have demonstrated that international co-operation is the best way to preserve the required breadth and depth of technical capability. This is a long-term strategic need making it important for FIDES II to be an on-going Framework.

To establish FIDES II and build its research and experimental Programme of Work (PoW) for the first triennial, the NEA organised a series of bilateral discussions and international workshops, bringing together representatives from utilities, fuel vendors, regulatory bodies and their technical support organisations, research institutes, and experimentalists. A dialogue between stakeholders in fuel and material testing evolved over the course of the high-level international fora hosted by the NEA in 2018-2020. The PoW for the first triennial was approved by the FIDES II Governing Board (GB) on their first meeting and it was expanded during the project phase. This document includes the first triennial PoW, which includes work in four JEEPs whose execution might continue even after the time period of the first triennial.

A working group of FIDES-II members collaborated to outline their priorities for the project, culminating in a report of the *FIDES-II Strategic Plan*, which was approved by the FIDES-II members in April 2023. Proposals for the second triennial were prepared by Operating Agents to address various aspects of the Strategic Plan and were presented and discussed in October 2023. Final proposals were reviewed by the Technical Advisory Group (TAG) according to the *FIDES-II Recommendations on Proposing and Evaluating JEEPs*. The TAG provided the outcome of its review to the FIDES II Governing Board (GB).

This document builds on the first triennial PoW to present the work for the second triennial, that was approved FIDES II Governing Board (GB). The activities of the work programme are reflected with their status at the time of approval by the GB and they might be subject to changes depending on the decisions of the TAG and GB during the course of the project. The association of deliverables to a certain triennial has the meaning that the work to achieve this deliverable is funded from the budget of that triennial regardless of the actual time of execution of the work. The provisional expenditure breakdown is presented in Table B1.

#### PROGRAMME OF WORK: PROPOSAL FOR 2021-2027

##### **JEEP P2M: Power to Melt and Maneuverability**

The JEEP “Power to Melt and Manoeuvrability” (P2M) has been proposed by the Belgian Nuclear Research Centre (SCK CEN, Belgium), Commissariat à l'énergie atomique et aux énergies alternatives

(CEA, France) and Électricité de France (EDF, France). Integral in-pile tests are planned to be performed in the Pressurised Water Capsule (PWC) in the BR2 reactor in SCK CEN, aiming at reaching incipient fuel melting at the end of a specific long lasting power transients to assess the actual operational margins. A demonstration test using a stainless steel dummy pin (P2M-d) will be performed to test hot cell handling and rig mounting. An irradiation test of P2M-D (surrogate rod with tungsten fuel pellets) and an irradiation of P2M-Q1 (irradiation of high burnup test rod under steady state conditions w/ minor operating transients without melting) are to be performed in order to guarantee the quality and safety of the actual melt experiments. A calibration test (P2M-Q2) of the experimental protocol, with determination of low fuel melt fraction at high power, and the second test (P2M-T1) at higher power to increase the volume of melted fuel are planned, beyond 2023. The pre- and post-test fuel rods verifications and the experimental irradiation in BR2 will be performed by the Operating Agent (OA) SCK CEN. The fabrication of the instrumented (centreline fuel thermocouple and rodlet pressure sensor) fuel rods and the post-irradiation experiments (PIEs) (both non-destructive and destructive examinations) will be performed at the LECA hot-cell laboratory in France in the OA CEA.

The main objective of both tests is to study the overall fuel rod behaviour during a slow and long lasting operational high power transient enabling to reach incipient fuel centreline melting. The enhanced pellet cladding mechanical interaction (PCMI) resulting from the partial melting will be measured. In addition, the fuel thermal fission gas release (FGR) threshold will be confirmed during the stepwise power increase. The scenario for the first phase of the test will be quite similar to those performed within the framework of the Halden Reactor Project (HRP) integral test series IFA-700 and IFA-720. In the second phase of the test, the linear heat rate will be increased to a level enabling the study of the effects of the gaseous fuel swelling and the partial centreline fuel melting on the overall fuel rod behaviour. The goal is to assess the operational margins at high power.

The first preparatory actions at the Hot Laboratory were originally planned to commence in the first quarter of 2021 leading to a first irradiation test in BR2 by summer 2023. This schedule was afterwards revised in consultation with the FIDES-II members. At its meeting in April 2023, the TAG recommended based on a suggestion from the P2M Core Group to include a milestone after the completion of the P2M-D test and the PIEs on the P2M-Q1 father rod. This recommendation was afterwards approved by the GB. The continuation of the JEEP will be reassessed when the milestone is reached.

*Status of the P2M deliverables for the first triennial:*

<b>Estimated Date</b>	<b>No.</b>	<b>Description</b>
Issued 05/23	D0	P2M rodlet drawing
02/24	D1	P2M-d rig design and hot cell handling
11/23	D2	P2M-D rodlet fabrication and control
10/23	D3	P2M-D test definition
08-11/24	D4	P2M-D irradiation report
09-12/24	D5	P2M-D synthesis report
06/24	D6	Father rod DE report for P2M-Q1/Q2

*Deliverables for P2M triennial 2 and associated targeted dates:*

<b>Estimated Date</b>	<b>No.</b>	<b>Description</b>
09/24	D7	P2M-Q1 rodlet fabrication and control
12/24	D8	P2M-Q1 test definition
06/25	D9	P2M-Q1 irradiation report
08/25	D10	Pre-test and post-test NDE report for P2M-Q1
06/27	D11	Destructive examination report for P2M-Q1
06/25	D13	P2M-Q2 rodlet fabrication and control
09/25	D14	P2M-Q2 test definition
03/26	D15	P2M-Q2 irradiation report
05/26	D16	Pre-test and post-test NDE report for P2M-Q2
12/26	D19	P2M-T1 rodlet fabrication and control
03/27	D20	P2M-T1 test definition

The execution of the P2M-T1 test with associated PIE's is foreseen for the 3<sup>rd</sup> triennial.

### **JEEP INCA: In-pile Creep Studies of ATF Claddings**

The JEEP “In-pile Creep Studies of ATF claddings” (INCA) has been proposed by the Czech Republic nuclear organisations namely CVŘ, UJV, Alvel and supported by CEA and the Technical Research Centre (VTT, Finland) to perform irradiation tests focusing on the assessment of the irradiation induced cladding creep, which has a significant impact on reliable and safe fuel rods performance during operation. To study the creep properties of the advanced cladding materials (standard, optimised Zr alloys and ATF) in LVR-15 reactor at the OA CVŘ. The irradiation experiments are planned to be performed in the “high-dpa” rig (named OKaP) for the first test and in the advanced MELODIE-II rig for the second one. The project is planned to be conducted in two phases.

**For the first phase**, the “high-dpa” test rig will be loaded in the high flux LVR-15 position with unfuelled and pre-pressurised cladding samples providing creep data with sufficient quality and quantity which will enable to optimise and qualify ATFs and optimised Zr-alloys through accurate and direct comparison. The test rig will carry sixteen samples mounted in four axial strings, each containing up to four tubes of length 8-10 mm and pressurised to 7 MPa. The irradiation test will be performed in the inert gas environment of the test rig designed to provide heating of the samples to the temperature of about 300°C, high flux rig position in the reactor core and fast neutron flux of  $6.7\text{E}13\text{ cm}^{-2}\text{s}^{-1}$  ( $E>1.0\text{MeV}$ ). Small unpressurised samples are also planned to be irradiated in the same rig in order to evaluate the impact of the irradiation growth on the in-pile creep determination.

Pressurised water reactor (PWR) fuel manufacturer Westinghouse-Sweden expressed its interest to the Project. The Project is also strongly supported by Czech utility CEZ and UJP Praha (Institute of Nuclear Fuel). The discussions with other potential suppliers will occur in 2020 and the tentative matrix of the test samples may be defined by early 2021.

Therefore, the main objective of the first phase of the proposed project is to provide the experimental data to enhance the understanding and improve the modelling of creep behaviour of several candidates of ATF cladding materials (coated Zr-based cladding samples) as well as optimised Zr alloys.

This will be achieved not only by the in-pile creep experiments in the LVR-15, but also by supplementary studies of the evolution of the cladding mechanical properties under irradiation and the associated microstructure studied through PIE performed in well-equipped hot lab at CVŘ. Additionally, the in-pile data from LVR-15 will be compared with similar optimised Zr-alloys samples irradiated in the Temelin NPP, also at the hot lab at CVŘ.

*Status of the INCA deliverables for the first triennial:*

<b>Estimated Date</b>	<b>No.</b>	<b>Description</b>
10/23	D2.3	Irradiation in OKaP and status of MeLoDIE-II manufacturing and licensing
12/23	D2.4	Irradiation status and status of MeLoDIE-II implementation at LVR-15
01/24	D3.1	Evaluation of irradiation in OKaP
03/24	D3.2	Status report for post-irradiation inspections, comparison with VVER-1000 data and MeLoDIE-II out-of-pile testing
03/24	D3.3	Summary report

**For the second phase of the INCA project**, the advanced device MELODIE originally designed for OSIRIS reactor will be modified and optimised for further in-pile material creep tests. Such tests will be using the biaxial loading technique together with on-line measurements, of axial displacement and also diameter gauge measurements of the cladding samples during irradiation with verified methodology. This program will further allow continuity, extension and transfer of the advanced research technique dedicated to cladding materials in the future Jules Horowitz Reactor (JHR). A

refined plan with more details of the second phase was presented to the FIDES II members for evaluation and was approved by the GB.

Until the MELODIE device is ready for use in LVR-15, for the further stages of the INCA project there is a plan to use the improved MELODIE II rig in LVR-15 for on-line detection of the irradiation induced creep testing of the ATF fuel cladding materials.

The first phase of the INCA JEEP was initiated at the beginning 2021 and irradiation started in May 2022 until November 2023. It is foreseen that the TAG may decide on further modifications of irradiation schedule based on rig operational data.

The second phase of the Project including preparation and qualification of the advanced MELODIE II device is proposed to begin in parallel with the first phase. The irradiation stage of the second test may be commenced in 2024-2026. Detail work-scope of phase 2 will be proposed by Core Group and continuously discussed with FIDES II TAG members.

*Deliverables for INCA triennial 2 and associated targeted dates:*

<b>Estimated Date</b>	<b>No.</b>	<b>Description</b>
06/24	D01	Pre-characterization report A – Sample dimensions, photo documentation and R/S OKAP assembly reports
12/25	D02	Pre-characterization report B – Testing of the reference materials
06/26	D03	Post-Irradiation Examination report ROKAP_A – Sample dimensions, photo documentation
12/28	D04	Post-Irradiation Examination report ROKAP_B – Testing of the irradiated material
03/27	D05	Post-Irradiation Examination report SOKAP_A – Sample dimensions, photo documentation
12/29	D06	Post-Irradiation Examination report SOKAP_B – Testing of the irradiated material
12/25	D07	Preparation MeLoDIE-II for irradiation and Melodie-II installation in LVR-15 core
02/27	D08	MeLoDIE-II irradiation and unloading from LVR-15 core
12/28	D09	Pre- and Post-Irradiation Examination of MeLoDIE-II sample after irradiation
12/29	D10	Evaluation of MeLoDIE-II device development and performance – lessons learned
12/24	D11	Out-of-pile creep test report
03/25	D12	Irradiated & unirradiated creep results comparison and evaluation report

## **JEEP HERA: High burn-up Experiments in Reactivity Initiated Accident**

The JEEP High burn-up Experiments in Reactivity Initiated Accident (HERA), proposed by the OA Idaho National Laboratory (INL), is dedicated to the understanding of LWR fuel performance at high burn-up under reactivity-initiated accidents (RIA). In-pile RIA experiments have been performed on high burn-up fuels in excess of 60 GWd/t in the CABRI reactor in France, and the Nuclear Safety Research Reactor (NSRR) in Japan. However, the majority of these experiments have taken place with heavily corroded Zircaloy claddings in test reactors with pulse widths that are narrower (5ms – 30ms full-width-at-half-maximum (FWHM)) than what would be likely in a commercial LWR (30ms – 80ms FWHM). Heavy waterside corrosion and narrow pulse widths are both known to increase the vulnerability of LWR fuel to PCMI. The HERA proposal is designed to (1) quantify the impact of pulse width on fuel performance, offering new insight into the applicability of existing data, (2) generate new data on high burn-up fuel under pulse conditions prototypic of LWRs, (3) quantify the additional margin provided by modern cladding alloys to PCMI failure limits, and (4) offer improved data for modellers using specially designed tests that eliminate key uncertainties in high-burn-up fuel tests.

The HERA project will be performed almost entirely at INL and therefore INL will operate as a central OA for the project. The HERA core group will be comprised of the U.S. Department of Energy (DOE),

Agreement on the OECD Nuclear Energy Agency Framework for Irradiation Experiments II (FIDES II)

the U.S. Nuclear Regulatory Commission (NRC), Westinghouse providing access to HBU material, the Institute de Radioprotection et de Sûreté Nucléaire (IRSN) and the Japan Atomic Energy Agency (JAEA). Additional input is expected from other FIDES II member organisations.

#### *Status of the HERA deliverables for the first triennial*

<b>Estimated Date</b>	<b>Description</b>
12/24	Completion of remaining three separate effects pulse tests
03/24	Completion of separate effects pulse test report with all technical data delivered
09/24	Completion of first Integral HBU Pulse Test
09/25	Completion of fourth Integral HBU Pulse Test
07/26	Completion of integral effects pulse test report with all technical data delivered

#### *Deliverables for HERA triennial 2 and associated targeted dates*

<b>Estimated Date</b>	<b>Description</b>
03/25	Completion of Posttransient Exams from first HERA Integral Pulse Test
12/25	Complete first fresh chrome coated ATF cladding test in NSRR
07/26	Completion of Posttransient Exams from fourth HERA Integral Pulse Test
09/26	Complete second fresh chrome coated ATF cladding test in NSRR
12/26	Completion of Posttransient Examination report on Integral HERA Tests

*Budget and Schedule for fresh ATF pulse tests in NSRR will be added when information is available.*

### **JEEP INCREASE: In-Core Real-Time Mechanical Testing of Structural Materials**

The INCREASE JEEP is focused on designing a reactor-agnostic capsule capable of housing mechanical testing instrumentation, allowing enhanced experiments for the material science community. INCREASE will generate high-priority, stress relaxation data for stainless-steel-based materials provided by EPRI and CEA. Stress relaxation is a major phenomenon that contributes to material degradation in nuclear reactor components. Currently, nuclear material stress relaxation is assessed both before and after irradiation, using complex and costly post-irradiation examination (PIE) activities. In situ data would support the development of precision modeling and simulation of this degradation phenomena and would provide validation and benchmarking for existing models. As part of the U.S. Department of Energy Advanced Sensor and Instrumentation program, INL has fabricated and tested out-of-core stress relaxation test instrumentation. This instrumentation was designed for easy adaptation to the irradiation capsule proposed under this JEEP and can be deployed to measure real-time stress relaxation under pressurized-water reactor (PWR) conditions. This initial effort will partially serve to replace the testing capabilities lost as a result of shutting down the Halden Boiling Water Reactor (HBWR). The project aims to provide these capabilities to the international community via a design that is easily adaptable to additional material test reactors. The design features will incorporate expansion to PWR and non-light-water reactor environments that will be developed in future work. Funding from the first triennial supports the design, testing and demonstration of the first capsule in a Massachusetts Institute of Technology Reactor (MITR) experiment, which will deliver stress relaxation data on four types of high priority stainless steel structural materials.

#### *Status of the INCREASE deliverables for the first triennial*

<b>Estimated Date</b>	<b>Description</b>
12/23	End of Calendar Year 1 Progress Report
03/24	Experiment Conceptual Design Complete
08/24	Instrument Verification Testing
12/24	End of Calendar Year 2 Progress Report



03/25	Experiment Ready to Insert (Fabrication and Assembly Complete)
07/25	Preliminary In-Core Data Summary
03/26	End of Project Report

#### *Deliverables for INCREASE triennial 2 and associated targeted dates*

Estimated Date	Description
03/26	Summary of In-Core Data-evalute continued irradiation
11/26	Preliminary report for stress-relaxation model
03/27	End of Project Report-modified date from original Phase 1 deliverable

### **JEEP INCREASE-HFR: In-Core Real-Time Mechanical Testing of Structural Materials-High Flux Reactor**

In the INCREASE-HFR JEEP, a stress relaxation test is planned in the HFR Petten, targeting the same sample temperature ( $340\pm 20$  °C) and applied load (80% of nominal yield strength at the test temperature) as the INCREASE JEEP. Partial overlap of sample matrix between the INCREASE JEEP (MITR) and INCREASE-HFR JEEP (HFR) will allow for direct comparison between results obtained in the two reactors. Until now, few studies have been devoted to determining the effect of neutron spectrum on the degradation of structural materials, and a lack of data in this field has been clearly identified within the Jules Horowitz Archive Material (JAM) initiative. In addition, INCREASE-HFR will expand the test matrix to additive manufactured versions of stainless steels, as referenced in the FIDES-II 10-year Strategic Program.

#### *Deliverables for INCREASE-HFR triennial 2 and associated targeted dates*

Estimated Date	Description
Q4/24	Consolidated sample matrix
Q3/26	Final Design Report

### **JEEP HITEC: High-Temperature Creep-Rupture Testing**

The High-Temperature Creep-Rupture Testing (HITEC) project is dedicated to addressing challenges in the development and safety assessment of advanced non-LWR NPPs (or ANLWRs), which operate at significantly higher temperatures (400-750°C) compared to traditional light-water reactors (LWRs). HITEC aims to qualify materials for high-temperature service under design codes like the American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME BPVC) and Règles de Conception et de Construction des matériels mécaniques des installations nucléaires hautes températures, expérimentales et de fusion (RCC-MRx).

The HITEC project is an outgrowth of the "INCREASE" JEEP and is proposed to commence in the second half of 2025. Where INCREASE focused on in-pile testing of stainless steels at LWR temperatures, HITEC proposes a high-temperature in-pile creep-rupture test in an inert gas on stainless steels and nickel alloys at 650°C and >5 dpa (displacements per atom). This data is essential to understand thermal creep and irradiation creep interactions, especially regarding helium accumulation at grain boundaries.

#### *Deliverables for HITEC triennial 2 and associated targeted dates*

Estimated Date	Description
Q2/24	Consolidated sample matrix
Q3/25	Final Design Report
Q1/26	Note on first feedback from in-pile measurements

## JEEP LOC-HBU: Loss-of-Coolant High Burnup

Loss-of-Coolant High Burnup (LOC-HBu) is dedicated to the understanding of LWR fuel performance at high burnup under loss-of-coolant accident (LOCA) conditions. LOC-HBu aims to support burnup extension needs by addressing identified research and development (R&D) priorities to achieve an improved understanding of fuel fragmentation, relocation, and dispersal (FFRD) of HBU fuel during LOCA events. The data produced from LOC-HBu will be used to further validate and confirm existing models and inform future R&D and model development.

*Deliverables for LOC-HBu triennial 2 and associated targeted dates*

Estimated Date	Description
09/24	Completion of LOC-HBu-1 Test
03/26	Completion of LOC-HBu-4 Test
12/26	Completion of LOC-HBu-1-4 final report on first four integral LOCA test results

## JEEP ATOMIC: Accelerated Testing of Materials in Capsules

Accelerated Testing of Materials in Capsules (AToMiC) is dedicated to the understanding of microstructural evolution of fuel materials for use in higher temperature, Generation IV (GenIV) type reactors (notionally referred to as advanced reactors). The GenIV reactor types of consideration include sodium cooled fast reactors (SFR), lead cooled fast reactors (LFR), gas-cooled fast reactors (GFR), very high-temperature reactor (VHTR), as well as modern design light-water reactors (LWR). The first phase of AToMiC experiments will utilize existing experimental methods at the Advanced Test Reactor (ATR) located at Idaho National Laboratory (INL). The drop-in capsule style of irradiation experiments has been successfully demonstrated through multiple fuel testing efforts from both Department of Energy (DOE) fuel programs and in collaboration with commercial partners. The AToMiC JEEP will utilize the Fission Accelerated Steady-state Testing (FAST) method where scaled fuel designs have been shown to achieve high burnups in fractions of the time of conventional fuel tests while still maintaining near-prototypic irradiation conditions and behaviors.

*Deliverables for ATOMIC triennial 2 and associated targeted dates*

Estimated Date	Description
04/24	Meeting report for the kickoff meeting
06/24	Conceptual design description of the irradiation
09/24	Report detailing the sourcing and schedule for fuel and cladding materials delivery
01/25	Report detailing the final design and test plan for the irradiation experiment
06/25	All quality assurance tags and a report detailing all as-built conditions
09/25	Memo signifying to the TAG and GB that the AToMiC experiments have been inserted into the reactor
TBD	Report with power histories on all tests
TBD	Final report with neutron radiography, gamma spectrometry, and profilometry data of irradiated specimens (as applicable)

## JEEP MCA-ATF: Material Cluster Assemblies Accident Tolerant Fuel

Material Cluster Assemblies Accident Tolerant Fuel (MCA-ATF) is dedicated to the study of the long-term irradiation behaviour of Cr-coated accident-tolerant cladding materials in the representative operating environment of a commercial nuclear reactor. The JEEP will generate highly irradiated material for further PIE studies of different accident-tolerant cladding concepts and advanced

materials. Two identical (twin) MCA-ATF assemblies will be irradiated for 14 and ~ 30 months in the core of Temelin NPP (2025-2028). The irradiated material will be removed from the NPP and transferred to hot cells in 2028 and 2030, respectively. PIE would be performed during the period from 2028 to 2032.

For the second triennial, MCA-ATF will include the detailed design and licencing of the material cluster assembly, sample pre-characterization, production and delivery of the experimental assembly to Temelin NPP and irradiation of the material cluster assembly in the reactor core.

*Deliverables for MCA-ATF triennial 2 and associated targeted dates*

<b>Estimated Date</b>	<b>Description</b>
03/25	Detailed design of MCA-ATF
09/24	Contracting
03/25	Characterization of material samples before and after manufacturing
06/25	Licensing
03/25	Manufacturing and delivery
09/25	Begin irradiation of MCA-ATF in the reactor core (MCA1 irradiation until 10/26; MCA2 irradiation until 06/28)

## **Data Preservation and Quality Assurance**

Storing experimental data in an organised manner is vital for effective collaboration within FIDES II. Moreover, trust in the data is equally, if not more important. Experience has shown that data preservation efforts are most successful if considered at an early stage when key expertise is available and able to supplement information, and identify and correct deficiencies. Discussions on the detailed approach of data preservation and quality assurance have started and will be continued in the course of the project.

## **Co-ordination with other NEA Joint Projects and Activities**

In order to avoid duplication of efforts and to co-ordinate the FIDES II activities with worldwide on-going endeavours relevant to the nuclear fuels and materials (F&M) testing, the NEA secretariat will establish, when relevant, co-operations between FIDES II and other research and development (R&D) programmes carried out under the auspices of the NEA or promoted by other stakeholders (such as other international organisations, research organisations, TSO). This approach will be implemented at different levels and consistently with the policies on information and data sharing established through this agreement:

- general information on the programme of work and outcomes will be shared with the NEA Standing Technical Committees (STCs), in particular with the Committee on the Safety of Nuclear Installations (CSNI) and the Nuclear Science Committee (NSC), and thus propagated through the NEA and the member countries institutions;
- specific aspects of the programme of work and outcomes will be discussed within the NEA subsidiary bodies as relevant and with the objective of collecting expert advice and feedbacks;
- specific technical co-operation may be set, as appropriate, with other joint undertakings co-ordinated by the NEA.

While each of the above-mentioned items are important, the quality of information hinges on the second and the third being executed within the programme of work. Feedback from technical experts within the NEA will improve the depth of analysis and interpretation of the data, whereas collaboration with related joint undertakings will allow alignment ensuring a consistent global F&M R&D strategy, avoiding duplicated efforts. In particular, beyond co-ordination with the HRP, CABRI International Project (CIP) and the Studsvik Cladding Integrity Project (SCIP), joint undertakings such as the



QUENCH-ATF programme, the TAF-ID<sup>1</sup>, and TCOFF<sup>2</sup>, are each devoted to various aspects of the nuclear materials science, and would be strengthened by interactions with the FIDES II programme with the aim to be established by the relevant steering bodies. The QUENCH-ATF programme, whose objective is to perform out-of-pile semi-integral bundle re-flood test on ATF claddings, adds another dimension to the LOCA tests that will be planned within FIDES II to address the behaviour of ATF claddings, thus broadening the spectra of investigated phenomena. TAF-ID may support the FIDES II programme through the thermodynamic interpretation of the observations arising from the PIE. Finally, TCOFF can contribute by providing supplementary expertise for the interpretation of the materials interaction phenomena occurring in accident conditions. FIDES-II will continuously follow the developments in existing and new activities and will initiate discussions on a possible cooperation, if feasible.

Co-ordination of the FIDES II PoW with the frontiers of nuclear science and the urgent needs of nuclear safety is of particular importance in the development of JEEPs and FIDES II. Aligning and leveraging the Agency's work is a *raison d'être* for undertaking FIDES II within the NEA. Despite restrictions on data, consistent with the FIDES II Agreement, information derived in JEEPs will be intertwined with the state-of-the-art reports produced in both the NSC and the CSNI. These reports influence domestic and international scientific priorities.

Efforts to ensure compatibility with other national and international requirements will be undertaken by the NEA secretariat including links to related science and safety activities that would ensure completeness of reported information and fill the gaps in fuel performance modelling and future needs in experimental work. Harmonisation of the needs in fuel performance modelling and the design of experiments is a central tenant in the FIDES II programme of work, and the NEA will work to ensure this alignment.

Costs associated with such NEA co-ordination efforts are charged to the FIDES II budget as part of the jointly financed FIDES II programme. All other activities involving NEA staff and other allocated resources will be considered as services to be rendered on a cost-reimbursement basis.

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<sup>1</sup> Thermodynamics of Advanced Fuels – International Database

<sup>2</sup> Thermodynamic Characterisation of Fuel Debris and Fission Products Based on Scenario Analysis of Severe Accident Progression at Fukushima-Daiichi Nuclear Power Station

**Table B1: Indicative JEEP Triennial Funding\*, EUR.**

<b>JEEPs, CCAs ↓ Year →</b>	<b>First Triennial</b>	<b>Second Triennial</b>	<b>Total</b>
JEEP P2M	2,385,000	3,768,000	6,153,000
JEEP INCA	1,534,175	2,660,571	4,194,746
JEEP HERA	3,487,000**	667,000**	4,154,000
JEEP INCREASE	2,075,000	485,000**	2,560,000
JEEP INCREASE-HFR		590,000	590,000
JEEP HITEC		465,000	465,000
JEEP LOC-HBU		2,858,000**	2,858,000
JEEP ATOMIC		2,643,000**	2,643,000
JEEP MCA-ATF		551,400	551,400
Emergency Reserve		200,000	200,000
Meetings and secretariat travel	50,692	120,000	170,692
Commitments from FIDES	525,450		525,450
NEA secretariat support and coordination	990,000	1,050,000	2,040,000
<b>Total</b>	<b>11,047,317</b>	<b>16,057,971</b>	<b>27,105,288</b>

\* The contributions from the Core Groups to the JEEPs are not reflected in the table.

\*\* Proposal value converted from US Dollars to Euro using 1.05USD:1Euro exchange rate and rounded. The values given in the table are indicative as payments might be made in USD with an exchange rate valid on that day.

## Appendix C

### CONTRIBUTIONS OF THE PARTIES

The Signatories agree to assign monetary funds (excluding in-kind contributions) to the Project apportioned as follows (all amounts in Euros):

MONETARY CONTRIBUTIONS OF THE PARTIES in EURO			
	1 <sup>st</sup> Triennial*	2 <sup>nd</sup> Triennial	Total for Agreement period
Belgian Nuclear Research Center (SCK CEN), <i>Belgium</i>	398,300	398,300	796,600
Research Centre Rez, Ltd. (CVŘ), <i>Czech Republic</i>	288,075	316,882.50	604,957.50
Nuclear Research Institute of the Czech Republic (ÚJV Řež, a. s.), <i>Czech Republic</i>			
ALVEL, a.s., <i>Czech Republic</i>	96,025	105,627.50	201,652.50
Ministry of Economic Affairs and Employment (MEAE), <i>Finland</i>	632,300	632,300	1,264,600
Électricité de France (EDF), <i>France</i>	1,450,000	1,450,000	2,900,000
Institut de Radioprotection Sûreté Nucléaire (IRSN), <i>France</i>	386,100	386,100	772,200
Commissariat à l'énergie atomique et aux énergies alternatives (CEA), <i>France</i>	245,900	270,490	516,390
Framatome SAS, <i>France</i>	460,900	460,900	921,800
Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH, <i>Germany</i>	600,300	600,300	1,200,600
Centre for Energy Research (EK), <i>Hungary</i>	334,300	334,300	668,600
Nuclear Regulation Authority (NRA), <i>Japan</i>	1,077,965	1,077,965	2,155,930
Japan Atomic Energy Agency (JAEA), <i>Japan</i>	113,470	113,470	226,940
Central Research Institute of Electric Power Industry (CRIEPI), <i>Japan</i>	964,495	964,495	1,928,990
Mitsubishi Heavy Industries, LTD. (MHI), <i>Japan</i>	113,470	113,470	226,940
Korea Hydro & Nuclear Power Co., Ltd. (KHNP), <i>Korea</i>	319,900	319,900	639,800
Korea Atomic Energy Research Institute (KAERI), <i>Korea</i>	35,000	35,000	70,000
KEPCO Nuclear Fuel CO., Ltd. (KNF), <i>Korea</i>	173,500	173,500	347,000
Nuclear Research and Consultancy Group (NRG), <i>the Netherlands</i>	355,600	391,160	746,760
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), <i>Spain</i>	611,700	305,850	917,550
Westinghouse Electric Sweden AB, <i>Sweden</i>	460,900	506,990	967,890
Eidgenössisches Nuklearsicherheitsinspektorat (ENSI), <i>Switzerland</i>	620,000	620,000	1,240,000
Paul Scherrer Institute (PSI), <i>Switzerland</i>			
National Nuclear Laboratory (NNL), <i>United Kingdom</i>	772,300	772,300	1,544,600
United States Nuclear Regulatory Commission (US NRC), <i>United States of America</i>	1,829,577	2,012,534.70	3,842,111.70
United States Department of Energy (US DOE), <i>United States of America</i>	500,000	550,000	1,050,000
Electric Power Research Institute (EPRI), <i>United States of America</i>	575,800	575,800	1,151,600
Joint Research Centre (JRC), <i>European Commission</i>	100,000	100,000	200,000
Total contributions	13,515,877	13,587,634.70	27,103,511.70

\*total amount expected from the Parties for the work programme which takes into account the Contributions already paid by the Parties under FIDES.

## *Appendix D*

### ACT OF ADHESION TEMPLATE

#### ACT OF ADHESION TO THE AGREEMENT ON THE OECD NUCLEAR ENERGY AGENCY (NEA) FRAMEWORK FOR IRRADIATION EXPERIMENTS II (FIDES II) PROJECT

The *[insert name of the new Party]* (hereinafter referred to as the “**Signatory**”);

CONSIDERING that, in accordance with Article 11(a) of the Agreement on the OECD Nuclear Energy Agency (NEA) Framework for Irradiation Experiments II (FIDES II) (the “**FIDES II Agreement**”), the Signatory was designated by *[insert name of the ministry/other governmental institution that designated the Signatory to participate in the FIDES II Agreement as a Party]* in a letter dated *[insert date]* to become a Party to the FIDES II Agreement;

CONSIDERING that on *[insert date]*, in accordance with Article 11(a) of the FIDES II Agreement, the Signatory subsequently submitted an application to the Governing Board to become a Party to the FIDES II Agreement;

CONSIDERING that the Governing Board of the FIDES II Agreement accepted by Unanimous Approval the Signatory’s application on *[insert date]*; and

CONSIDERING Article 11(b)(1) of the FIDES II Agreement:

#### *Article 1*

The Signatory hereby signs this Act of Adhesion to become a Party to the FIDES II Agreement and agrees to assume all rights and obligations of a Party under the FIDES II Agreement. *[Include the additional conditions determined by the Governing Board, if any]*

Done on *[insert date]*

**For the Signatory:**

Name:

Title:

Date:

Signature: