

MDEP

Common Position

CP-STC-01

Common Position addressing First-Plant-Only-Tests (FPOT)

Participation

Regulators involved in the MDEP STC discussions:	All MDEP members
Regulators which support the present report:	All MDEP members
Compatible with existing IAEA related documents:	Yes

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1 Introduction

The Multinational Design Evaluation Programme (MDEP) design specific working groups (DSWGs) are engaged in discussions on commissioning related issues as some of the member countries are entering commissioning phase of new build nuclear power plants. A number of workshops have been held by AP1000 and EPR working groups to address commissioning related issues for the eight AP1000 reactors and five EPR reactors being built in their respective member countries. One of the common topics identified in these workshops and other interactions is the concept of First-Plant-Only-Test (FPOT) proposed by the reactor vendors. An FPOT, if accepted by the applicants/licensee's and regulators, will allow a test performed on the very first reactor of a specific design to be credited for the subsequent units of similar design.

MDEP has prepared this document to provide a high-level guidance for applicants/licensees wishing to take credit for a test performed during the commissioning of the first unit of a similar type.

2 Definitions of First-Of-A-Kind (FOAK) tests and First-Plant-Only-Tests (FPOT)

A test is a FOAK test, if

- *it tests a new feature of the design or a new concept applied to the design, and*
- *the test has never been performed before (e.g. during Factory Acceptance Tests).*

A FOAK test is not necessarily an FPOT. A test that is a FOAK test on the first unit to be commissioned can be performed also on the other units to be commissioned later on, only then it would not be a FOAK test anymore.

An FPOT is a FOAK test that is performed only on the very first unit of a specific design to be commissioned. The test results from the first unit would then be credited for the subsequent units of similar design.

3 Examples of justifications for performing a test only on the first unit commissioned

The following are some of the examples of justification cited for performing a test only on the first commissioned unit:

- Test is complex to implement (e.g. requires specific instrumentation);
- Test causes severe loads to the plant structures/equipment;
- Test is time consuming (e.g. includes testing in various configurations).

The test results are valid on all subsequent units only if the test conclusions are not affected by design differences between the units or regulatory differences between countries.

4 MDEP Common Position on FPOTs

The licensee is responsible to assess the potential use of each FPOT results for its unit(s) and to conclude such FPOT results can be credited in the commissioning process before formally presenting the case to the regulator.

The obvious precondition for crediting FPOT results is that the design, implementation, and plant conditions are so similar that the possible existing differences do not affect the applicability of the results to the unit where the test will not be performed. In addition, the regulators of different countries have different requirements and review processes. The requirements may concern the acceptance criteria of the tests, the documentation, reporting of results, the processes of the licensee etc. Some regulators may also expect that a representative of the regulator witnesses the performance of the FPOT.

More detailed preconditions for crediting FPOT are presented in Appendix 1. If all preconditions listed in Appendix 1 are all fulfilled, tests performed on the very first specific reactor unit to be commissioned may be credited for the subsequent similar units in any member country of the applicable MDEP design-specific working group. It is important to note that a key concept throughout the work of the MDEP is that national regulators retain sovereign authority for all licensing and regulatory decisions.

It is also recommended that the licensee seeks early discussions with the regulator to leave the least room possible to interpretation of the guidance and to reach the best common understanding. Future nuclear power plant projects of similar design may wish to credit FPOTs that have been performed before the start of the project in question. In that case, it is obvious that preconditions 4.3 and 4.4 cannot be fulfilled. To compensate for that, special attention must be paid to the other preconditions, especially those concerning access to data and documenting the performance and results of the tests. The licensee's proposal should include appropriate mitigating arguments.

5 Practical arrangements for observing FPOTs (precondition 4.3)

Practical arrangements for observing FPOTs according to precondition 4.3 must be anticipated. The following is to be taken into account when planning the observation of future FPOTs:

Host licensee/regulator

- The host regulator should engage early with the host licensee to check if a specific “confidentiality agreement” is necessary between the host licensee and observing regulators;
- If an agreement is necessary, the signed version will be in English;
- *OECD Staff Regulations and Rules* prevent OECD/NEA officials from signing any “confidentiality agreement”; OECD/NEA officials must abide by the strictest confidentiality obligations in accordance with the *OECD Staff Regulations and Rules*, which set out their conditions of employment. Any violation of these obligations would constitute misconduct, and the official concerned would be liable to disciplinary measures decided by the OECD, including dismissal;

- Documentation should be provided in advance of the visit to allow an initial review by relevant subject matter experts and to facilitate a more effective engagement;
- Translator(s) should be available as appropriate.

Observing regulators

- MDEP Secretariat is responsible for co-ordinating the necessary logistical arrangements for the observing regulators to witness the FPOT;
- The visit should focus on the implementation of the FPOT, quality arrangements, etc. rather than the technical adequacy of the tests and the resulting data.

Observing licensees

- The MDEP Secretariat inform the OOG of the dates and planning of the FPOT witnessing;
- The host licensee is responsible for ensuring the necessary arrangements are in place (e.g. site access, confidentiality “agreements”, etc.) for the observing licensees to witness the FPOT.

APPENDIX 1: Preconditions for crediting FPOT

#	Precondition
Licensee’s responsibilities	
1.1	The licensee shall evaluate and assess the possibility to credit tests performed on another unit.
1.2	The licensee shall approve crediting the FPOT before submitting the application to regulator.
Justification and demonstration of the validity of the FPOT	
2.1	The reasons for conducting a FPOT (cost, time, technique, safety) shall be defined, and a cost benefit analysis for conducting a FPOT shall be made.
2.2	Similarity of the unit on which the test was conducted and the one which will credit the FPOT shall be assessed. It shall be demonstrated that possible differences in design, manufacture and installation of the FPOT component or system, in the environmental and operating conditions and practices, or the codes and standards applied, do not affect the validity of the FPOT results to other unit(s).
2.3	A statement shall be made (e.g. by vendor or by operating organization) on any potential adverse consequences of claiming that the FPOT characterises the performance or behaviour of a component or system whose design, manufacture or installation do not adequately replicate that for the component or system subjected to the FPOT.
2.4	In designing the test, it should be considered whether the data could be used to design and validate a less complex or alternative test that may be used during commissioning of follow-on units to characterise the performance or behaviour of the component or system and thus help validate application of the FPOT data.
2.5	Where FPOT data is demonstrating the ability of a component or system to fulfil a critical nuclear safety function, for example primary circuit integrity/inventory or reactivity control, an independent third party panel of experts shall be appointed by each licensee to oversee all aspects of the FPOT. Consideration could be given to licensees jointly appointing such a panel. The terms of reference of such a panel shall include the production of a report recording its judgement on the validity of applying the resulting data to follow on units including in another country. This report is to record any caveats or conditions which, in the view of the panel, may constrain or exclude application of the data. Test results from the first unit must be reliable to the extent that any subsequent test would be expected to produce similar results.
2.6	It is necessary for the licensees to ensure the adequacy of the quality assurance programme of tests for the FPOT unit, considering the quality assurance requirements of the unit where FPOT may be credited. This includes

#	Precondition
	ensuring the adequacy of the quality assurance programme for instrument calibration.
2.7	Any physical verification(s) that have been or will be performed to demonstrate the validity of FPOT shall be identified.
2.8	All the test critical parameters, calculations and verification methods used during the initial test programme shall be identified. For calculated values, this includes the calculated validation methodology, software verification and validation (when applicable), and the actual data inputs and outputs from the initial test results to support calculated values.
2.9	The controls that vendors will have in place during the initial test programme to ensure that work performed to another language procedures or instructions are correctly translated from the original language of the procedures or instructions shall be documented.
Data sharing	
3.1	The licensee shall have access to all necessary data for crediting the FPOT (including information relating to design, manufacture and installation) for a period of time consistent with the licensee's obligations under country regulation.
3.2	Justification for crediting the FPOT, documentation concerning the testing (e.g. testing programme, result report) and quality assurance programme of the FPOT shall be submitted to the regulator.
3.3	It shall be possible to share other relevant data and results with the regulator as necessary (material data of equipment/structures involved in the tests, data about manufacturing and installation, quality assurance actions taken during those phases, etc.).
Testing and testing programme	
4.1	Documentation of the FPOT must be included in the commissioning programme of the subsequent unit.
4.2	The testing programme for the FPOT must address coverage of the testing, the acceptance criteria, prerequisites to the tests, the management of deviations and the appraisal of uncertainties.
4.3	The licensee and the regulator shall be provided with possibility to witness the FPOT. Regulators can participate in a joint inspection with the regulator overseeing the FPOT unit. To do so, they have to be informed of the expected schedule and programme and must be informed of any changes in the schedule and programme with sufficient time.

#	Precondition
4.4	Tests that demonstrate the correctness of manufacturing and installation must always be performed on the equipment/unit in question.
Other	
5.1	Following completion of the FPOT, the vendor shall make a statement on the appropriateness to not repeat the test on future units, including discussion on the significance of the test results, any unexpected behaviour (notwithstanding that the acceptance criteria may have been met) and any implications for the safety case/operation of the plant (normal and/or abnormal conditions).
5.2	Like any other commissioning test, it must be ensured that the FPOT provides adequate basic data on the operational properties of structures, systems and equipment for use as a basis for assessing the results of periodic testing during operation and for the assessment of changes in the operability of components.
5.3	Educational aspects must be considered. Consideration should be given to the loss of the opportunity provided by conducting the FPOT for operators to gain experience and familiarity with the component or system.