IAEA
International Atomic Energy Agency

Technical Meeting on Design Extension Conditions for Storage Facilities for Power Reactor Spent Fuel

IAEA Headquarters
Vienna, Austria
Room C0454, C Building
Vienna International Centre

27 June–1 July 2016

Ref. No.: 651-T1-TM-52204

Information Sheet

A. Background

The Fukushima Daiichi accident has demonstrated that even extremely low probability concurrent events happen and that they have to be addressed — for instance, by considering design extension conditions (DECs).

The incidents at the wet and dry spent fuel storage (SFS) facilities at the Fukushima Daiichi nuclear power plant (NPP) have proven the robustness of the technologies deployed. However, the lack of adequate instrumentation to determine the water level at the spent fuel pools (SFPs) demonstrated the need for reliable instrumentation with improved robustness and supplied with a reliable source of emergency power, which has the capability to withstand severe accident conditions as prolonged station blackout scenarios.

It is worth noting that existing SFP instrumentation at most NPPs is typically narrow range and, therefore, only capable of monitoring normal and slightly off-normal conditions — a feature that could challenge its ability to provide available and reliable indications under severe accident conditions.

In this context, for the extension of storage licences and for future storage sites, more knowledge on the behaviour of SFS facilities under possible extreme situations is needed and it must be shown that

even in those cases the protection of the public and the environment can be maintained. Public confidence in the storage of spent fuel from power reactors depends on these new efforts.

Within the framework of activities undertaken by the International Atomic Energy Agency (IAEA) in response to the Fukushima Daiichi accident — in particular, the IAEA Action Plan on Nuclear Safety — it was decided to prepare, under the Subprogramme "Management of Spent Fuel from Nuclear Power Reactors", a technical report on design basis scenarios for fuel cycle facilities.

It is important to identify as many of such conditions that are applicable to SFS facilities regardless of design and technology (wet or dry), as appropriate for a particular site considering the long term, as defined in the Specific Safety Guide *Storage of Spent Nuclear Fuel* (IAEA Safety Standards Series No. SSG-15). In many instances, differences will arise between facility DECs, and for this reason is important to determine all conditions on a case-by-case basis (for instance, consideration of site specific or regional conditions). For example, for storage facilities remotely located from coastal zones the possible effects of a tsunami are practically null, so that an earthquake and tsunami occurring together can be ruled out as one of the DECs.

Furthermore, it is understood that design basis conditions are properly addressed by any licensed facility. However, lessons from the Fukushima Daiichi accident and feedback received from experts have stressed the need to assess additional accident scenarios for SFS facilities. These scenarios can be the result of internal and external (natural or man-made) initiating events that can occur concurrently or sequentially. These scenarios should not only be considered from a technical point of view but also in a way that encompasses factors or attributes associated with organizational, behavioural, cultural or time dependent parameters that are applicable to SFS facilities.

B. Objectives

The main purpose of this meeting is to share information on Member States' activities in relation to DECs as they apply to storage facilities for spent fuel from power reactors.

Design extension conditions as defined in the IAEA Specific Safety Requirements publication *Safety of Nuclear Power Plants: Design* (IAEA Safety Standards Series No. SSR-2/1) are beyond the design basis that cannot be practically eliminated. In some Member States, other terms such as 'beyond design basis scenario' and 'stress test' coexist with 'design extension conditions'.

Typical DECs to be analysed are: a gross and sudden leakage of water in a wet storage facility or the full coverage of a dry storage system beyond the postulated time, associated with unavailability of communication, monitoring, instrumentation, control or power.

The full range of storage facilities for spent fuel from power reactors is covered: wet or dry, at–reactor or away-from-reactor, inside the containment or outside the containment, and from underground to above-ground.

Specific objectives of the meeting are to share views and considerations on: design extension conditions; accident prevention and consequences; mitigation phases and measures for power reactor SFS facilities in operation or under design.

C. Target Audience

Representatives of owner/operator organizations, design organizations, vendors, research and development institutes, and technical support organizations, and regulators from Member States and organizations — the European Commission (EC), the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD/NEA), the World Association of Nuclear Operators (WANO) and the Nuclear Energy Institute (NEI), among others — with a technical understanding of these topics and who have been designated by the corresponding authority and submitted the answers to the attached **questionnaire** by **29 April 2016** will be officially invited to attend the meeting.

In order to be officially invited to deliver a presentation on the situation related to DECs for SFS facilities in their respective countries or organizations, participants have to include an **extended abstract** with the above mentioned documentation. The presentation to be delivered has to be based on their respective national-level or organization-level experience and views. The **extended abstract** has to be 700–1000 words long (without figures, pictures, tables, etc.), has to include name(s), job title(s), and organization(s) of the author(s) and has to be submitted to the Scientific Secretary (see Section J below) by **29 April 2016** so that it can be included in the agenda. There is a limited number of time slots for speakers on the agenda.

D. Working Language

The working language of the meeting will be English. All communications must be sent in English.

E. Output of the Meeting

The output of the meeting will be published as the IAEA's first technical document or technical report on DECs on storage facilities for power reactor spent fuel. The information could also be the starting point for setting up a database of site specific DECs.

F. Conditions of Participation

Each person wishing to participate in the meeting is requested to complete the attached **questionnaire** and **Form A**.

Each person wishing to participate and deliver a presentation is requested to complete the attached **questionnaire**, the **extended abstract** and the attached **Forms A and B**.

The designation of a participant will be accepted only when transmitted not later than **8 April 2016** through the Government of a Member State of the IAEA or by an Organization invited to participate.

G. Expenditures

In accordance with the established rules, governments, national authorities, private companies or individual sources are expected to bear the travel and other costs of designated participants in the meeting. Limited funds are, however, available to help cover the cost of participants from Member States eligible to receive technical assistance under the IAEA's technical cooperation programme. Such assistance can be offered, upon specific request, to one participant per country provided that, in the IAEA's view, this participant will make an important contribution to the meeting. The application for financial support should be made at the time of the designation of the participant.

The Secretariat wishes to state that compensation is not payable by the IAEA for any damage to or loss of the experts' personal property. However, for the period of their engagement with the IAEA, including travel between their residence and the duty station, the designated experts will be covered under the IAEA's insurance policy for permanent total disablement or death resulting from service-incurred accidents or illness up to a maximum of €100 000, for permanent partial disablement resulting from service-incurred accidents or illness up to a maximum of €100 000 and for medical expenses up to a maximum of €20 000 plus €10 000 for supplementary travel and accommodation expenses in case of illness or injury resulting from service-incurred accidents or illness, in accordance with the terms of the IAEA's relevant insurance policy. This insurance coverage only covers accidents and illnesses insofar as they clearly result from attendance at an IAEA meeting. The IAEA recommends that the expert also make arrangements for private insurance coverage on an individual basis.

H. Venue

The meeting will be held at the IAEA's Headquarters in Vienna, Austria, specifically in Room C0454, C Building, at the Vienna International Centre (VIC). Participants are advised to arrive one hour prior to the convening time of the meeting to allow for timely registration. Please note that you must present an official photo identification document in order to be admitted to the VIC premises.

The following web page can be accessed for more detailed information on Vienna and the VIC:

http://www-pub.iaea.org/iaeameetings/GeneralInfo/Guide/VIC

I. Visa Arrangements

Should you require a visa for entering Austria please contact the nearest consular representative of Austria as early as possible.

Please be aware that when applying for a visa you may be asked to show evidence of personal insurance coverage valid during your travel. It is your responsibility to make arrangements for health insurance coverage.

Austria is a Schengen State and therefore persons who require a visa will have to apply for a 'Schengen visa' at least four weeks before entry into Austria. In States where Austria has no diplomatic mission visas can be obtained from the consular authority of a Schengen Partner State

representing Austria in the country in question. [At present the 25 Schengen States are: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia Spain, Sweden and Switzerland.]

Only in exceptional cases is the IAEA able to assist participants who encounter difficulties in obtaining a visa. In this regard, all necessary information (date of birth, nationality, type of passport, passport number, issuance and validity of the passport, length of stay, arrival date, flight details and a short description of the problem encountered) should be sent to reach the IAEA at the latest four weeks before the meeting. After that date the IAEA will not be able to assist you due to Schengen regulations. **Please be aware that the validity of a Schengen visa cannot be extended once you are in a Schengen State**.

J. Organization

Scientific Secretary:

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AUSTRIA

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1400 VIENNA
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Fax: +43 1 26007
Email: M.Neuenhaus@iaea.org

Subsequent correspondence on scientific matters should be sent to the Scientific Secretary and correspondence on other matters related to the meeting to the Administrative Secretary.

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Form A
651-T1-TM-52204

Participation Form

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To be completed by the participant and sent to the competent official authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA), Vienna International Centre, PO Box 100, 1400 Vienna, Austria, either electronically by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

Deadline for receipt by IAEA through official channels: 8 April 2016

<table>
<tr><td>Family name:</td><td>Given name(s):</td><td>Mr/Ms</td></tr>
<tr><td colspan="3">Institution:</td></tr>
<tr><td colspan="3">Full address:</td></tr>
<tr><td>For urgent communications please indicate:</td><td colspan="2">Tel.:
Fax:
Email:</td></tr>
<tr><td>Nationality:</td><td colspan="2">Designating Government or organization:</td></tr>
<tr><td colspan="3">Mailing address (if different from address indicated above):</td></tr>
<tr><td colspan="3">Do you intend to present a paper? Yes ☐ No ☐
Title:
An abstract of my paper is attached? Yes ☐ No ☐</td></tr>
</table>

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Form B
651-T1-TM-52204

Form for Submission of a Paper

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<table>
<tr><td colspan="4">Title of the paper:</td></tr>
<tr><td colspan="2">Family name(s) and initial(s) of author(s)</td><td colspan="1">Scientific establishment(s) in which the work has been carried out</td><td>City/Country</td></tr>
<tr><td colspan="2">1.</td><td></td><td></td></tr>
<tr><td colspan="2">2.</td><td></td><td></td></tr>
<tr><td colspan="2">3.</td><td></td><td></td></tr>
<tr><td colspan="2">Family name of author who will present the paper</td><td colspan="2" rowspan="3">Mailing address:</td></tr>
<tr><td colspan="2">Initial(s):</td></tr>
<tr><td colspan="2">Mr/Ms</td></tr>
<tr><td colspan="4">For urgent communications please indicate Tel.:
Email: Fax:</td></tr>
<tr><td colspan="4">I hereby agree to assign to the International Atomic Energy Agency (IAEA):
☐ the copyright or
☐ the non-exclusive, royalty-free licence (this option is only for those authors whose parent institution does not allow them to transfer the copyright for work carried out in that institution) to publish the above-mentioned paper,
and certify that no other rights have been granted which could conflict with the right hereby given to the IAEA.
Date: Signature of main author:</td></tr>
</table>

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Grant Application Form

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To be completed by the applicant and sent to the competent official authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA), Vienna International Centre, PO Box 100, 1400 Vienna, Austria, either electronically by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed).

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Family name:	Given name(s):	Mr/Ms:
Mailing address:	Tel.:	
	Fax:	
	Email:	
Date of birth (yy/mm/dd):	Nationality:	

1. Education (post-secondary):

Name and place of institution	Field of study	Diploma or Degree	Years attended from	to

2. Recent employment record (Starting with your present post):

Name and place of employer/ organization	Title of your position	Type of work	Years worked from	to

3. Description of work performed over the last three years:

4. Institute's/Member State's programme in field of meeting:

Date: **Signature of applicant:** _____

Date: **Name, signature and stamp of responsible Government official:**

_____

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QUESTIONNAIRE (Deadline 29 April 2016)

If you are interested in attending, please send your responses to A.Bevilacqua@iaea.org

In the context of the note verbale announcing this meeting and its attached Information Sheet, we kindly ask you to provide the information requested below. Thank you very much!

Name and Location of NPP or Reprocessing Plant or Spent Fuel Storage Facility (specify): _____

_____

Owner or Operator (specify): _____

How do you call DECs when applied to storage facilities for spent fuel from power reactors? Beyond Design Basis ___ Stress Tests ___ Other (specify) _____

Under construction ___ In operation ___ Shut down ___ Other (specify): _____

SF type (mark all applicable) AGR ___ BWR ___ CANDU ___ MAGNOX ___ PWR ___

RBMK ___ SFR ___ VVER __ Other (specify): _____

Wet Storage

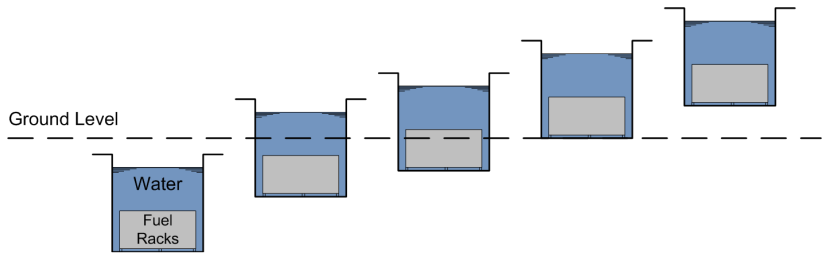
At reactor or reprocessing plant ___
Inside reactor or reprocessing plant containment ____
Outside reactor or reprocessing plant containment ____

Remote from reactor or reprocessing plant on rector or reprocessing plant site ___
Inside airplane crash (APC) containment ____
Outside APC containment ____

Off reactor or reprocessing plant site ___

Other (specify): _____

Spent Fuel Pool (water and rack) elevation relative to ground level (please check):



Dry Storage

On reactor or reprocessing plant ___

Off reactor or reprocessing plant site ___

Other (specify): _____

DECs being identified? YES NO Already reviewed by regulator? YES NO
Accident preventing actions being identified? YES NO Already reviewed by regulator? YES NO
Consequences mitigation being identified? YES NO Already reviewed by regulator? YES NO