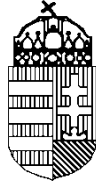


Hungarian Atomic Energy Authority



Guideline 1.25

Event reports of the nuclear power plant

Version:

4

2013 August

Issued by: Gyula Fichtinger director general of the HAEA
Budapest, 2013

The publication can be purchased from:
Hungarian Atomic Energy Authority
Budapest

PREAMBLE

Act CXVI of 1996 on Atomic Energy (the Atomic Act) establishes the highest level of regulation related to the safety and security of the peaceful use of atomic energy.

Govt. Decree 118/2011. (VII.11.) Korm. together with its Annexes, also known as the Nuclear Safety Code, determines the nuclear safety requirements for nuclear facilities and the related provisions for regulatory proceedings.

All those are obliged to meet the nuclear safety requirements and provisions who shall be under continuous regulatory oversight according to Subsection (2) of Section 9 of the Atomic Act, who pursue activities bound to regulatory license according to the Decree, who contributes to such an activity or who has submitted an application for such a license.

Besides the nuclear safety requirements and provisions, those individual authority requirements, conditions and obligations shall be met, which are determined by the nuclear safety authority in its resolutions regarding nuclear safety.

The Hungarian Atomic Energy Authority (HAEA) is authorized to develop guidance in the form of regulatory guidelines in order to facilitate the compliance with the requirements of the Nuclear Safety Code. These HAEA publishes the guidelines on its website.

Pursuant to Subsection (3) of Section 3 of Govt. Decree 118/2011. (VII.11.) Korm., if the requirements are met in line with regulatory guidelines, then the HAEA considers the applied method of meeting the nuclear safety requirements applicable to demonstrate the compliance and does not examine the adequacy of the applied method.

If methods different from those laid down in the regulatory guidelines are applied, then the authority shall conduct an in-depth examination to determine if the applied method is correct, adequate and full scope, which may entail a longer regulatory procedure, involvement of external experts and extra costs.

The guidelines are revised regularly as specified by the HAEA or out of turn if initiated by a licensee.

The regulations listed are supplemented by the internal regulations of the licensees and other organizations contributing to the use of atomic energy (designers, manufacturers etc.), which shall be developed and maintained according to their quality management systems.

Always make sure if the latest, valid version is considered before using a guideline. All valid guidelines can be downloaded from the website of the HAEA (www.haea.gov.hu).

TABLE OF CONTENTS

1. INTRODUCTION	5
1.1. Scope and objective of the guideline	5
1.2. Corresponding laws and regulations	5
2. DEFINITIONS	6
2.1. Definitions	6
3. GENERAL GUIDANCE ON EVENT REPORT	7
4. FULFILLMENT OF REPORTING OBLIGATIONS	8
4.1. Immediate notification	8
4.2. Non immediate notification	8
4.3. INES classification	9
4.4. Written notification	10
4.5. Event investigation report	10
Annex M1	13
EVENTS FALLING UNDER THE OBLIGATION OF IMMEDIATE NOTIFICATION	13
Annex M2	17
EVENTS FALLING UNDER REPORTING OBLIGATION (EVENTS WITH NON-IMMEDIATE NOTIFICATION)	17
Annex M3	23
SYSTEM CONFIGURATION OF NORMAL SERVICE AND SAFETY SYSTEMS AT THE OCCURANCE OF THE EVENT	24

1. INTRODUCTION

1.1. Scope and objective of the guideline

This guideline defines the scope of events to be reported and establishes the content requirements for event reports in the case of a nuclear power plant (NPP) being under commissioning or in service, in accordance with Chapters 1.7.4 and 4.15 of the Nuclear Safety Code (NSC).

The guideline does not discuss either the regular reports regarding the operation of the NPP (Chapter 1.7.2 of NSC) or the reports to be submitted to other authorities participating in the supervision of the safe operation of the plant. Additionally, the notification and communication in the case of a nuclear emergency, a natural or industrial catastrophe as described in Chapter 1.7.6 of the NSC neither fall under the scope of this guideline.

The objective of this guideline is to provide recommendations on the fulfilment of the reporting obligation and to further clarify the corresponding regulatory requirements.

1.2. 1.2. Corresponding laws and regulations

According to Para. 1.7.1.0100. of the Nuclear Safety Code issued according to Subsection (1) of Section 3 of Govt. Decree 118/2012 (VII.11.) Korm. on nuclear safety requirements for nuclear facilities and the related provisions for regulatory proceedings the nuclear power plant shall report the safety related events to the authority.

2. DEFINITIONS

2.1. Definitions

This section does not include the definitions described in Annex 10 of the Govt. Decree 118/2011. (VII.11.) Korm.

Nuclear Safety Officer on Duty (NSOD):

Such a nuclear safety inspector, who is authorized to receive immediate notifications on reportable events and to conduct the corresponding INES classification, and this authorization is described in his job description.

Operation under the effect of the Technical Specification (TS or operational limits and conditions - OLC):

An event entails operation under the effect of the TS, if a limitation of the TS is not fulfilled, but the actions prescribed for this situation in the TS are implemented. The time when the operation under the effect of the TS is started should be considered as the moment when such an operating state is recognized.

Violation of the Technical Specification:

Violation of the Technical Specification if an event entails operation under the effect of the TS, and

- a) the actions prescribed in the TS are not implemented or implemented but not within the defined deadline, or
- b) the actions prescribed in the TS are implemented, but the breach of a limitation occurs or occurred for a longer period than the defined time limit.

Unplanned inoperability:

An inoperability is unplanned if a failure does not cause loss of the concerned safety function, but immediate intervention is necessary to avoid the consequences and the conditions required during the repair causes loss of the safety function.

Planned inoperability:

An inoperability is planned if a failure does not cause loss of the concerned safety and the failure can be sustained during operation, but the repair is implemented in a scheduled, planned manner and the inoperability occurs due to that.

Unusual event:

Unanticipated occurrence, which is not postulated in the valid safety analyses, and which requires actions to be initiated to manage it.

3. GENERAL GUIDANCE ON EVENT REPORT

„In order to provide socially monitored use of atomic energy, the licensee shall prepare regular reports regarding nuclear safety related activities in each lifecycle phase of the nuclear facility, ad hoc reports regarding safety related events, furthermore reports assigned to condition during the construction of the nuclear facility, and submit these reports to the nuclear safety authority.” (NSC 1.7.1.0100.)

The reporting activity discussed in this guideline is the task of the licensee of the nuclear facilities; however it could be also fulfilled by the operator.

“The nuclear safety authority, in decisions made with regard to cases under its competence, may oblige the licensee to submit further reports in addition to those specified in Section 1.7.1.0100.” (NSC 1.7.1.0300.)

The authority may require the licensee to submit a report on an event that is not belong under the reporting obligation.

The reports to be submitted to the authority should be prepared with a depth and details that should make the authority able to assess the operator’s activity or to independently review and evaluate the safety related events.

The event report should be submitted on 1 hard copy and electronically, on a data carrier in a text editor platform agreed with the authority.

„A copy of reports submitted to the other authorities participating in the supervision of the nuclear facility, shall also be sent to the nuclear safety authority simultaneously with the submission” (NSC 1.7.1.0400.)

The licensee should develop and regulate in the internal documents the reporting system and process.

„The licensee shall organise and by means of the appropriate method assess the data and information included in its reports, and where the assessment reveals any deficiency, the licensee shall formulate corrective actions.” (NSC 1.7.1.0500.)

As part of operation of the reporting system, establishing its conditions, the licensee should provide for the capacity to carry out the event investigation and analysis tasks necessary to draw up the event investigation report to ensure the appropriate safety assessment of the event both for itself and the authority.

The licensee should provide all information that is necessary for understanding the safety relevance of the event by the authority.

The event taken place, depending on its severity, should require different level of investigation with different scope.

The authority, with advance notification, may conduct investigations beyond those conducted by the operator, may order the execution of such investigations or may involve expert to the investigations.

4. FULFILLMENT OF REPORTING OBLIGATIONS

4.1. Immediate notification

„The licensee shall fulfil its event reporting obligation according to the following:

a) an immediate reportable event shall be immediately reported by phone to the nuclear safety authority but not later than it occurred, or if the event was not detected at the time of occurrence within 2 hours from the detection, ” (NSC 1.7.4.0900. a))

The notification should be made orally to the Inspector on Duty (IoD) of the authority.

The immediate notification should include:

- a) name of the person giving the notification,
- b) denomination and identifier of the affected nuclear facility, unit, system(s), structure(s) and component(s),
- c) time of beginning and (if appropriate) end of the event, or of the first detection of its occurrence,
- d) denomination of the breached limitation (TS, other regulations, regulatory limits, etc.),
- e) brief description of the event,
- f) (assumed) cause of the event, not planned actuations and operations,
- g) temporary and/or permanent measures,
- h) planned further actions,
- i) list of notified persons, authorities.
- j) the reason of notification: the basis for reporting from the operation license (item in the annex of the license for the given unit) and exact denomination of reporting obligation from Annex M1 or M2 of this guideline.

If the IoD is not available, then the notification is received by another inspector authorized to fulfil duty service. Only the Shift Engineer on Duty, the advisor Shift Engineer on Duty, the duty officer of Safety Directorate and their supervisor are authorized to notify the authority.

The events falling under the obligation of immediate notification are listed in Annex M1.

4.2. Non immediate notification

„„The licensee shall fulfil its event reporting obligation according to the following:

...

b) an event that is not a immediate reportable event shall be reported by phone to the nuclear safety authority not later than 14 hours from its occurrence or, if the event was not detected at the time of occurrence within 14 hours from the detection, ... ” (NSC 1.7.4.0900. b))

The notification should be made orally to the Inspector on Duty (IoD) of the authority. with the conditions and content detailed in Section 4.1.

The events falling under the obligation of non-immediate notification are listed in Annex M2.

4.3. INES classification

The INES classification (qualification) means the categorization of events occurred in the nuclear power plant, in accordance with the International Nuclear Event Scale (hereinafter referred to as: INES). The INES classification of events should be made in accordance with the regulatory guideline 1.48 “*Guideline to perform the INES classification of nuclear and radiological events*”.

“All events shall receive INES classification. The licensee shall propose the rating and forward it to the nuclear safety authority via fax. The final classification is determined by the nuclear safety authority.” (NSC 1.7.4.0500.)

“The nuclear safety authority shall be notified of the INES classification of a reportable event within 16 hours the latest after the occurrence of the event, or if the event was detected later than it occurred after the detection of the event.” (NSC 1.7.4.0600.)

Those are authorized to perform the INES classification who have certificate about the passing of the course organized either by the IAEA or the MVM Paks NPP.

The filled classification sheet that is agreed with the authority should not be modified without consent of the authority, since the stamp of the authority and the signatures together mean formal approval.

“The International Atomic Energy Agency shall be notified within 24 hours from the occurrence or detection of the event of events rated to class 1 or higher. The notification is the responsibility of the nuclear safety authority. The licensee shall provide the necessary information and the English version of the INES event form to the nuclear safety authority within 20 hours following the event.” (NSC 1.7.4.0700.)

The public shall be notified of events of the 1. or higher category within 24 hours, of events rated 0 or below the public shall be informed regularly. The licensee is responsible for the notification after discussion with the authority. The licensee shall submit the text of the INES 1. category or higher event report to the nuclear safety authority within 20 hours from the occurrence or detection of the event, before the public is notified. (NSC 1.7.4.0800.)

The licensee should develop a process for the regular and appropriate public information.

The competent person of the nuclear facility should prepare the classification proposal in accordance with the INES classification template in Hungarian language (if the INES level is INES 1 or higher, then in English as well) and send it to the authority.

The IoD overviews the proposal of the competent person of the nuclear facility. If the IoD agrees (by taking account of all other available information and documentation) then sends the form back after signing and stamping it. Subsequently, if the event gets INES 1 or higher level classification, then the communication unit of the nuclear facility elaborates a press release in Hungarian and English language, and (at least 2 hours prior to its publication) sends the press release to the authority and notifies the IoD of it.

Event reports of the nuclear power plant

The INES-classification of an event can be reviewed because of previously unknown circumstances revealed during the investigation. The review should consider if the revealed facts significantly influence the nuclear safety situation or is strongly interesting for the public. Re-classification should be considered primarily for INES 1 or higher class events.

The INES classification of the event might be reviewed based on the circumstances revealed during the event investigation based on conditions not known before.

4.4. Written notification

„ The licensee shall fulfil its event reporting obligation according to the following:

...

d) the event is reported in writing to the nuclear safety authority within 16 hours from the occurrence of the event, ...” (NSC 1.7.4.0900.)

The licensee should notify the authority of all reportable events also in writing following the oral notification. The purpose of written notification is first of all the confirmation of the oral notification. The scope of reportable events is discussed in Annex M1 and M2 in line with the stipulations of the operating license.

The content of the notification report:

The written report according to item d) of Para 1.7.4.0900. shall include the short description of the event, the developed operational conditions, the executed and planned measures as well as their expected effectiveness and expected effects, and the preliminary safety evaluation of the event.” (NSC 1.7.4.1000.)

Consequently the content of the oral notification (see Section 4.1) should be repeated with the following supplementation:

- a) listing of important occurrences since the oral notification,
- b) evaluation of the effectiveness of the actions carried out and their expected effect,
- c) new information on the event.

If the notification is the first information communication of a process (parameter change), then the licensee should regularly report the data measured during the process to the authority as determined by the IoD (e.g. activity-concentration variation of the primary coolant indicating fuel element leakage). In this case no separate event investigation belongs to the particular notifications.

The IoD, in addition to the notification, can request information from the licensee in relation to the evolution of the event and elimination of its consequences. The licensee should provide the information via phone or, if so requested, in writing.

4.5. Event investigation report

“(1) The licensee shall commence the investigation of a reportable event simultaneously with notification of the event to the nuclear safety authority. As a result of the investigation, the licensee shall identify the causes of the event, including its root cause and consequences, and the licensee shall take measures in order to prevent any recurrence of such an event or the occurrence of similar events.

Event reports of the nuclear power plant

(2) A report about the investigation according to Subsection (1) and the results thereof shall be submitted to the nuclear safety authority by the licensee.” (Subsection 35 (1)-(2) of Govt. Decree 118/2011. Korm.)

„ The licensee shall fulfil its event reporting obligation according to the following: e) the event investigation report shall be submitted to the nuclear safety authority within 45 days following the occurrence or detection of the event.” (NSC 1.7.4.0900. e))

„ The deadline of the event investigation report according to item e) of Para 1.7.4.0900. may be extended on justified request by the nuclear safety authority. ” (NSC 1.7.4.1100.)

The licensee should request the extension of the deadline before the expiry of the investigation deadline.

„The licensee shall provide investigation and analysis tasks required for event assessment and event report preparation.” (NSC 4.14.1.1500.)

„In case of events of nuclear safety importance a preliminary investigation shall be carried out without delay, but within 5 days the latest, to determine whether immediate actions are required.” (NSC 4.14.1.1600.)

„The scheduling of event investigation shall be in compliance with the significance of the event.” (NSC 4.14.1.1700.)

The licensee should investigate each reportable event. The statements of the investigation report (if necessary) should be supported by documents collected during the investigation. Additionally, the authority may request for submitting any documentation, which may help the safety evaluation of the event.

The licensee should submit the investigation report both electronically and in paper form (including the filled Annex M3). The investigation report should get individual numbering for their identification and recording. The investigation report should include at least:

I. Basic data of the event:

- a) denomination of the event,
- b) number of the affected unit(s),
- c) time when the event started,
- d) INES classification of the event,
- e) denomination and identifier of limitation, regulation that was breached or affected during the event,
- f) concise summary of the event,
- g) process data characterizing the time-point when the event occurred, in accordance with Annex M3,

II. Time-line of the event, including:

- a) presentation of parameters characterizing the initial state of event,
- b) deviations from normal operating state when the event took place,

Event reports of the nuclear power plant

- c) activities and circumstances prior to the occurrence of the event,
- d) method and time of event detection,
- e) significant deviations and failures taken place during the event,
- f) Determination if the event is recurring one and comparative analysis with the events taken place formerly.
- g) Comparison of the event with former domestic and international events assessing the effectiveness of the corrective actions decided previously.

III. Evaluation of the event, within that:

- a) cause of the event, root cause analysis of the event,
- b) analysis of the safety effect of the event and the potential consequences (its safety significance, effect on safety functions, safety evaluation of operating states before, during and after the event),
- c) actions implemented during the evolution of the event, their effectiveness,
- d) evaluation of the activity of the personnel during the event,
- e) remarks with regard to written documents and procedures (e.g. evaluation of adequacy of emergency operating procedures, operational, maintenance rules),
- f) evaluation of further deviations of equipment, their operation or failure,
- g) evaluation of consequences and safety effect of the event.

IV. In relation to actions to avoid the occurrence of similar event:

- a) implemented and planned actions (assigned fully or partially with the deviation it is meant to correct),
- b) responsible persons for the actions,
- c) deadlines of execution of actions,
- d) time when the investigation was terminated and
- e) name of the person leading the investigation.

Annex M1

EVENTS FALLING UNDER THE OBLIGATION OF IMMEDIATE NOTIFICATION

The licensee should immediately notify the IoD in the following cases. The notification cases are based on stipulations of Version 5.2 of the TS (after its 196th amendment). The references to the given TS sections are behind the cases in brackets. The scope of immediately reportable events were primarily based on those stipulations of the TS, which requires the affected unit to be promptly download to operating state C or lower. The notification obligations related to the particular inoperability shall be performed in the operating state required by the TS. If the specific stipulation of the TS changes the operating license of the given unit and this guideline are authoritative until the authority does not declare its standpoint in the given issue.

0. An authorized manager on duty of the licensee's operating organization declares extraordinary operating state in the nuclear power plant. It is to be noted that in this case there is a prompt notification requirement according to Section 37 (4) of Govt. Decree 118/2011. Korm. instead of the two hours limit.
1. The nuclear power plant unit is or was operated in an operating state deviating from the regulatory approved operational limits and conditions; consequently TS violation occurred.
2. Such operational or accident conditions occurred which is not regulated by the existing procedures, so the operators started to bring the unit into subcritical state.
3. The physical barriers of the unit are jeopardized, because the parameters defined as operational limits and conditions for the fuel, primary circuit or the containment exceed the values specified in the operational limits and conditions according to the criteria below:
 - 3.1. The fuel:
 - a) Any of the reactivity coefficients (derived from the moderator temperature, boric acid, fuel temperature) is not in compliance with the TS. (3.2/2a-e).
 - b) Such an operation was carried out within the start-up range of the active core (M), which lead or might have lead to the unplanned increase of the core reactivity or to a core excursion. (6.3.2.2/2a)
 - c) The linear thermal power of the fuel element is higher than the value specified by the figure versus burnup in Annex 3.4.1.1.1. of the TS. (3.4.1/2a)
 - d) The temperature of the coolant at the outlet of fuel elements (sub-channel) exceeds the saturation temperature pertaining to the pressure above the active core (3.4.1/2b).
 - e) The emergency downward speed of the executor means of the control rods is outside the range of 20-25 cm/s, and thus the operators started to bring the reactor into operating state C. (5.3.1.2.2/b)

Event reports of the nuclear power plant

- f) The hot leg temperature of the loop in natural circulation reached 70 °C in the operating state G of the unit (down cooled, atmospheric pressure). (6.1.1.1/2b)
 - g) The total activity concentration of iodine isotopes (^{131}I , ^{132}I , ^{133}I , ^{134}I and ^{135}I) in the primary circuit reached value of $3.7 \times 10^7 \text{ Bq/dm}^3$, or the activity concentration of ^{131}I is higher than $4.6 \times 10^6 \text{ Bq/dm}^3$, and so the operators started to bring the reactor into operating state G. (5.5.2.1/2c)
 - h) The temperature of spent fuel pool reached the value of 60 °C. (6.2.2.4/2b)
- 3.2. The primary circuit:
- a) Pressure of the primary coolant reached 151 bar. (5.2.2.1/2e)
 - b) Both safety valve sets of the pressurizer are inoperable and so the operators started to bring the reactor into operating state C. (5.2.3.3/2a)
 - c) The relief valves meant to ensure protection against brittle fracture are inoperable so the operators start to bring the reactor into operating state G. (5.2.3.3/2b)
 - d) The pressure exceeds 4.4 bar inside the weld protection chamber of the SG primary collectors, or the humidity of the nitrogen sample taken from the weld protection chamber is higher than 10 g/l, so the operators started to bring the reactor into operating state G. (5.2.7.2/2a)
 - e) Both sealing ring of the SG primary collector head is leaking so the operators started to bring the reactor into operating state G. (5.2.7.2/2b)
 - f) Leakage of primary coolant to SG secondary side reached the value of 5 dm³/h, so the operators started to bring the reactor into operating state G. (5.5.2.3/2a)
 - g) In the blow-down water of the SG the sum of γ activity concentration of ^{42}K and ^{24}Na is higher than 4000 Bq/dm³, or the maximum total concentration of a particular isotope exceeded the value specified in Annex 5.5.2.3.1. of the TS, so the operators started to bring the reactor into operating state G. (5.5.2.3/2b)
 - h) The concentration of radioactive noble gases exceeded the value of $3.7 \times 10^7 \text{ Bq/m}^3$ inside the containment or in the non-serviceable compartments. (5.5.2.2/2)
- 3.3. Containment:
- a) With respect to its total volume the leakage of the hermetic zone reached 14.7- δ L %/day value in operating states defined by the operational limits and conditions. (5.6.4.1/2a)
 - b) Three out of three or two out of two of the isolations valves on the pipelines of the same system are inoperable, so the operators start to bring the reactor into operating state F. (5.6.4.3/2.)
4. Two safety valves of the SG are inoperable including inadequate set values. (5.2.7.4/2a)
5. The event actuated a system that fulfils a basic safety function (bringing the reactor to and maintaining it in subcritical state, decay heat removal, avoidance of radioactive release to the environment) (the protection actuated for real signal, in the case of unreal signal the event should be reported according to Annex M2), so one the below protections was actuated:

Event reports of the nuclear power plant

- a) automatic or button-actuated scram (ÜV1: ÜV101÷ÜV121), or power download by more than 10% (ÜV3: ÜV301÷312) (according to Annex 4.1.1.1.1 of the TS),
 - b) ECCS protection (according to Annex 4.1.1.1.2. of the TS),
 - c) SG protection (in case of GFDP, GFL, RRL2 and GFINH signal) (according to Annex 4.1.1.1.3. of the TS),
 - d) total loss of power and sequential start up (in case of total loss of power, sequential starting programme (SSP), G315, G325, G335 and test SSP signal) (according to Annex 4.1.1.1.4. of the TS),
 - e) primary circuit overpressure protection (according to Annex MÜSZ 4.1.1.1.5. of the TS).
6. If the TS limitation is reached but automatic or button-actuated ÜV1 or ÜV3 or automatic relief actuated by reactor protection (ECCS, SSP, TSSP, SG) supposed during the design either has not taken place at all or has not taken place according to the design.
7. The requirement of single failure cannot be complied with (operability required by the TS for the given redundant system for the given operating state is not provided) according to the following:
- a) two set out of three from the RVR VT, or NF, or TS, or MSI-Y(X,W), or STC-Y(X,W) devices have become inoperable in an unplanned manner, and so the operators start to bring the unit into operating state F. (5.6.1.1/2a)
 - b) Two out of the three CCWS trains have become inoperable in an unplanned manner, and so the operators start to bring the unit into operating state F. (5.6.1.5/2a,c)
 - c) In E4, F, G operating state one out of the two CCWS trains have become inoperable in a planned manner. (5.6.1.5/2b)
 - d) Pressure in the hydroaccumulator is outside the range of $34 \text{ bar} \leq p \leq 39 \text{ bar}$, and so the operators start to bring the unit into operating state E4. (5.6.3.2/2a)
 - e) The TS limitations specified in Section 5.6.4.2/4a are not satisfied for one or two trays of the bubble condenser, and so the operators start to bring the unit into operating state F. (5.6.4.2/2a)
 - f) The blow down valve of less than eight of the bubble condenser trays is inoperable, and so the operators start to bring the unit into operating state G. (5.6.4.2/2b)
 - g) In A, B, C, D, E1, E2, E3 operating state two out of three Diesel generator or the vital in-house emergency electric power supply system pertaining to the Diesel generator are inoperable, and so the operators start to bring the unit into “lower” operating state. (5.6.5.2/2a,c)
 - h) Emergency supply of two out of three safety uninterrupted in-house electric power supply system are inoperable, and so the operators start to bring the unit into operating state F. (5.6.5.3/2a)
 - i) The equipment of the safety system are not able to satisfy the operability requirements of Annex 5.6.1.2.1. of the TS (in case of $n=2$ or $n=3$), so 3/2, 3/3, or 2/2 have become inoperable in an unplanned manner. (m5.6.1.2.1.)

Event reports of the nuclear power plant

8. An earthquake stronger than operational basis earthquake occurs. (5.2.1.2/2b)

Annex M2

EVENTS FALLING UNDER REPORTING OBLIGATION (EVENTS WITH NON-IMMEDIATE NOTIFICATION)

The scope of events with non-immediate notification was created typically based on those requirements of Version 5.2. of the TS (after amendment 196), after complying with which and after the duration specified also by the TS unit shall be brought to operating state C or lower. The reporting obligations related to the particular inoperability of the process systems should be executed in the operating state specified by the TS. If the specific stipulation of the TS changes the operating license of the given unit and this guideline are authoritative for the reporting obligation until the authority does not declare its standpoint in the given issue.

1. Actuation of a safety function:
 - a) The event cause real actuation of a system fulfilling safety function in safety class 1 and 2 (including the actuation because of unreal signal). Exceptions are the events with immediate notification obligation.
 - b) Real ÜV-1 signal is generated in the reactor protection system in any operating state of the unit. Exceptions are the events with immediate notification obligation (including the actuation because of unreal signal).
 - c) For any reason in any operating state of the unit a real ECCS, SSP (sequential starting programme), (test sequential starting programme), or SG protection signal is generated (including the actuation because of unreal signal). Exceptions are the events with immediate notification obligation.
2. Event of human factor:
 - a) Minimum shift personnel composition according to Annex 7.2.1.1. of the TS is not met for at least two hours in the plant or in any unit 2. (7.2.1.)
 - b) A safety class component become unable to fulfil its function due to human failure (personal, management), and the failure can be recognized at or 14 hours within its occurrence.
3. The physical barriers of the unit are jeopardized, because the parameters defined as operational limits and conditions for the fuel, primary circuit or the containment exceed the values specified in the operational limits and conditions.
 - 3.1. The fuel:
 - a) An event that has taken place during fuel assembly management, which has lead or might have lead to damage of fuel element, and all such events during which the integrity of the fuel elements has been jeopardized.
 - b) The total activity concentration of corrosion products in the primary coolant exceeds the value of 6.0×10^5 Bq/dm³ for more than 72 hours, and so the operators start to bring the reactor into operating state G. (5.5.2.1/2a)
 - c) The total activity concentration of ¹³⁷Cs and ¹³⁴Cs in the coolant of the spent fuel pool is higher than 2×10^6 Bq/dm³, or total activity concentration of ⁵¹Cr, ⁵⁹Fe, ⁵⁴Mn, ⁵⁸Co and ⁶⁰Co is higher than 8×10^5 Bq/dm³. (6.2.1.5/2a)

Event reports of the nuclear power plant

3.2. Main circulation loop:

- a) Unorganized leakage of the primary circuit exceeds 4 t/h for 24 hours. (5.2.2.2/2a)
- b) A non-correctable deterioration has occurred in the primary circuit water quality (see the limits in Annex MÜSZ of the TS), and so the operators start to bring the reactor into operating state F. (5.2.4.1.)
- c) The total beta activity concentration of the main condensate exceeds 10 Bq/dm³, or its tritium activity concentration is higher than 1000 Bq/dm³. (5.5.2.3/2c)
- d) The total beta activity concentration in the SG is higher than 10 Bq/dm³. (5.5.2.3/2e)

3.3. Containment:

- a) In an unplanned manner the depression decreased under 1.5 mbar in that compartments of the containment which are designed for overpressure, and so the operators start to bring the reactor into operating state F. (5.4.3.4/2a)
- b) The air temperature in the containment is higher than 60 °C, and so the operators start to bring the reactor into operating state F. (5.4.3.4/2b)
- c) Cooling of reactor cavity has stopped for more than 90 minutes, and so the operators start to bring the reactor into operating state F. (5.4.3.4/2c).

4. Process events:

- a) A recurring failure has occurred at a primary component of a safety system that caused inoperability despite the corrective action(s) implemented based on a former event investigation, and the recurring character can be determined at the occurrence/detection or within 14 hours following that.
- b) Two safety valve sets of the pressurizer has been inoperable for more than 24 hours in an unplanned manner, and so the operators start to bring the reactor into operating state G. (5.2.3.3/2a)
- c) At least one of the control rods has reached a lower mechanical end position, and from that time more than two MCPs has been operating over 30 minutes, and so the operators start to bring the reactor into operating state D by ÜV3. (5.2.6.1/2b)
- d) One of the sealing rings of the SG primary collector heads has been leaking and one of the conditions specified in 5.2.7.2/4/b of the TS has been violated for more than 70 hours, and so the operators start to bring the reactor into operating state G. (5.2.7.2/2b)
- e) One pressure relief system of the SG has been inoperable for more than 24 hours /including the case of inappropriate set values/. (5.2.7.4/2b)
- f) Two of the TF02D001,002,003 pumps of the intermediate cooling circuit of the MCP have been inoperable for more than 72 hours, and so the operators start to cool down the unit, or both TF39W001,002 heat exchangers or all the TF02D001,002,003 pumps have become inoperable, and so the operators start to shut down the MCPs and bring the reactor into subcritical state. (5.4.1.1/2a,b)
- g) One out of the core outlet temperature measurements of the severe accident measurement chain has been inoperable for more than 168 hours or all of them

Event reports of the nuclear power plant

beyond 8 hours, and so the operators start to bring the reactor into operating state G. (5.4.5.2/2g)

- h) Both accident dose rate measurement systems have been inoperable for more than 24 hours, and so the operators start to bring the reactor into operating state G. (5.5.2.4/2a)
- i) Only one set of the O₂-H₂-T measurement circuits of the severe accident management system has been operable for more the 168 hours or none of the O₂-H₂-T measurement circuit sets are operable for more than 24 hours, and so the operators start to bring the reactor into operating state G. (5.6.4.1/2d)
- j) Deficiency (due to inoperability of a primary component), an operating mode deviant from the TS (operability required by the TS for the given operating state in relation to the redundant system) or failure has been revealed according to what follows in one of the three redundant systems, or two, or one out off two that hinders the fulfilment of the safety function:
 - j1) two of the three TK41-42D001,2,3 make-up pump machine group has been inoperable for more than 48 hours, and so the operators start to bring the reactor into operating state G. (5.3.2.3/2a)
 - j2) One of the three protections sets of the devices RVR VT, or NF, or TS, or MSI-Y(X,W), or STC-Y(X,W) has become inoperable for more than 24 hours, or one digital or one analogous input parameter has become inoperable, or the MCR panel, or 2 temperature measurement has failed in each of three different loops and the failure has existed for more than 4 hours and so the operators start to bring the reactor into operating state F.
 - j3) One of the two sets within the reactor protection system, or the BER in the BV or in the TV has become inoperable in an unplanned manner. (5.6.1.1/2b)
 - j4) The shut down unit state cannot be established in the reactor protection system. (5.6.1.1/2c)
 - j5) One of the three trains of the CCWS has been inoperable for more than 24 hours and so the operators start to bring the reactor into operating state F. (5.6.1.5/2a)
 - j6) One of the three SSP functions of the safety system or one of two has become inoperable in an unplanned manner. (5.6.5.1/2a,b)
 - j7) One of the three Diesel generators or the emergency power supply of a vital in-house electric power supply system assigned to any of the Diesels has become inoperable in an unplanned manner. (5.6.5.2/2a)
 - j8) In E4, F, G, G1 operating state two Diesel generators or the emergency power supply of a vital in-house electric power supply system assigned to the Diesel has become inoperable in an unplanned manner. (5.6.5.2/2b,d)
 - j9) Emergency supply of one of three for more than 24 hours or one of two or two of two safety uninterrupted in-house electric power supply system have become inoperable in an unplanned manner. (5.6.5.3/2a,b)

Event reports of the nuclear power plant

- j) The safety system components do not satisfy the operability requirements of Annex 5.6.1.2.1. of the TS (in case of $n=1$), that is 3/1 or 2/1 system component has become inoperable in an unplanned manner, and so the operators start to bring the unit into lower operating state. (m5.6.1.2.1.)
 - k) Clean condensate or boric acid of inadequate concentration reached the primary circuit in an uncontrolled manner. (6.1.1.2/2a,b)
 - l) The unit has been taken to higher operating state from G or F state in such a way that previously the conditions of continuous start-up had not been provided or the prescribed start-up sequence of the unit had not been followed. (6.3.1.1/2a)
 - m) The unit has gone into a lower operating state and then it has been taken to a higher operating state in such a way that the reason of the event has not been unambiguously determined or has not been completely eliminated despite it has jeopardized the safety of the unit during bringing into higher operating state. (6.3.3.1/2a)
 - n) During an emergency or emergency response the TS limitations have been violated but the unit has been restarted without confirming the applicability of the main equipment for further safe operation. (6.3.3.1/2b)
 - o) Non-compliance of the requirements for systems, structures and components important to safety in the case when the system or its (primary) components become inapplicable to fulfil their safety function during carrying out the instructions of the TS, operating or maintenance instructions. (7.6.)
5. Deficiencies revealed in safety analyses.
- b) A deficiency was revealed in the safety analysis of the unit, in the applied method or initial data thereof, or in the assumptions considered during the elaboration of the operational limits and conditions; consequently it can be assumed that the operation of the unit is not as safe as it was postulated earlier.
 - a) The multiplication factor of the reactor differs with more than 1% from the postulated value, and potential non-designed criticality is identified in relation to the fuel being in the reactor or stored outside
6. Radiation safety or release related events:
- a) Unplanned release of radioactive materials into the rooms of the controlled zone, as a result of which the activity concentration of radioactive material in the air, the surface contamination or the dose rate increased to a level two magnitude higher than the limits specified in the effective regulations.
 - b) Uncontrolled discharge of radioactive materials into the free zone of the nuclear power plant, as a result of which the radiation level in the free zone exceeds the limit defined in the current regulations (1 $\mu\text{Sv/h}$).
 - c) Exceedance of dose approved on the dosimetry permit, unplanned extraordinary radiation exposure or exceedance of the annual dose constraint (20 mSv) at any member of the operating personnel. At any member of the operating personnel the cumulated annual radiation exposure exceeds 3/10 of the dose limit of any organ.
 - d) The magnitude of the release cannot be decreased for 24 hours and so the amount of radioactive releases for any isotope exceeds the limit calculated for one day

Event reports of the nuclear power plant

from the annual allowed limit, and so the operators start to bring the reactor into operating state F. (5.5.1.1/2a)

- e) In the closed section portion of the warm coolant canal, from plant release, the activity concentration exceeded the 85 Bq/dm³ value, or the activity concentration at the unified open surface section of the canal reached the 10 Bq/dm³ value, and so the operator start to shut down the unit. (5.5.1.1/2d)
7. External events:
- a) A natural blow exceeding the design basis (flood, ebb, wind, precipitation, extreme temperature, lightning), direct danger from flight traffic, war situation or other external threat, which is get known by the operator from credible source.
 - b) All such fire, explosion, which take place at the rigorously guarded operation al area.
 - c) Such failure of fire alarm or fire extinguishing systems and components, which hinders for more than 24 hours for more than 24 hours the inspection of at least one fire section in the secured service area, or makes the extinguishing of a fire within such a fire section impossible.
8. Transport, management and storage of nuclear fuel:
- a) Revelation of fuel assembly or lack of fuel element, or assumed disappearance (if the lack can be interrelated to nuclear security or any sabotage affecting the physical protection system or a behaviour or activity aimed at unauthorized removal, then it is an immediately reportable event according to Section 33 (1) of Govt. Decree 190/2011. (IX.19) Korm).
 - b) Revelation of lack of other radioactive materials if the lack can be interrelated to nuclear security or any sabotage affecting the physical protection system or a behaviour or activity aimed at unauthorized removal, then it is an immediately reportable event according to Section 33 (1) of Govt. Decree 190/2011. (IX.19) Korm).
 - c) Events occurred during transport of fuel assemblies or load that jeopardize the integrity of a safety class system component.
 - d) Fuel damage of fuel assembly, damage during transportation within the site, failure of the transport means, which caused unplanned radiation exposure or the transport was interrupted due to the event, because such a failure occurred in the transport means or in the transport structure, which could have caused unplanned radiation exposure, and needs reparation.
 - e) Such a new fuel assembly entered the reactor which is not in correct scale. (6.2.2.2/2a)
 - f) The relative humidity of the air in the storage place of the new fuel assemblies exceeded 85 %, or the temperature of the compartment is less than 5 °C. (6.2.2.2/2b)
 - g) Such a new fuel assembly entered the reactor which was not clean or free from foreign material. (6.2.2.2/2c)

Event reports of the nuclear power plant

- h) The manipulation of fuel assemblies has been or being performed with inoperable instruments or they have not been used as designed. (6.2.2.2/2d)
 - i) It can be assumed that the infinite multiplication factor for the fuel stored in the new fuel storage compartment was higher than 0.95. (6.2.2.2/2e)
 - j) The maximum coolant temperature of the C30 fuel transportation container, after lifting from the shaft number 1, exceeds 100 °C, or the difference between the measured temperature of the coolant and temperature in the vicinity of the container is more than 55 °C, or the internal pressure of the container is higher than 7 bar, and so the operators started to return the contained into shaft number 1. (6.2.2.3/2a)
 - k) Radiation level is higher than 10 mSv/hour on the surface of the transport container or it is higher than 2 mSv/hour on the surface of the transport carriage, or it is higher than 0.1 mSv/hour at 2m from the surface of the transport carriage. (6.2.2.3/2b)
 - l) Total exchange of coolant in the C30 container could not be performed within 5 hours, since the temperature of the water in the container is $T \geq 47$ °C, and so analysis of the water exchange process has been decided. (6.2.2.3/2d)
 - m) Activity concentration of any of the marker isotopes in the water of the C30 container containing spent fuel assemblies is as follows: ^3H is higher than 1×10^6 Bq/dm³, ^{60}Co is higher than 1×10^5 Bq/dm³, ^{137}Cs is higher than 1×10^4 Bq/dm³, and the limit breaches cannot be resolved by water exchange. (6.2.2.3/2e)
 - n) Spent fuel assemblies has been stored in the C30 container before transport to the SFISF for more than 10 days or before transport between units for more than five days, and so the return of the fuel elements to the spent fuel pool has been commenced, or a separate licensing procedure has been launched. (6.2.2.3/2f)
9. Events regarding pressure vessels and pipelines
- Those following events are reportable in relation to pressure vessels and pipelines, and to the connecting valves, which concerns safety class 1-2 pressure vessels and pipelines and the connected valves, spent fuel pools, shaft number 1 or the TC and TW tanks:
- a) were operated with parameters exceeding the permitted values,
 - b) foreign material or materials were detected therein.
10. Other events

Such unusual events, which would not be reportable due to other criteria of this guideline, but due to their character, or if evolved further, could directly or indirectly endanger the fulfilment of basic safety functions (reactivity control, core cooling and heat removal, prevention of radioactive releases).

Annex M3

SYSTEM CONFIGURATION OF NORMAL SERVICE AND SAFETY SYSTEMS AT THE OCCURANCE OF THE EVENT

The enclosed tables should be filled (the filling of the tables is simple, + sign should be put in the relevant cells) in if an event occurs during operation at rated power of Paks NPP units as follows:

- events resulting in transient (PSA initiating event) in normal operation of the plant,
- events caused by component failure or component inoperability (PSA configuration changing event),

ANNEX TO THE EVENT REPORTING TEMPLATE

CONFIGURATION OF NORMAL SERVICE SYSTEMS AT THE OCCURANCE OF THE EVENT						Event identifier::	STATE OF MAIN SAFETY SYSTEMS DURING SSP EXECUTED AFTER THE EVENT			
System	System component	In service	Selected as reserve	Not selected as reserve	Out of service, under maintenance	System	System component	Functional during SSP	Disfunctional during SSP	
Make-up water	TK42D001 (Y)					SSP logics	(Y)			
	TK42D002 (X)						(X)			
	TK42D003 (W)						(W)			
Concentrated boron	TR17D001 (W)					Diesel-generator	QD (Y)			
	TR17D002 (X)						QD (X)			
	TR17D003 (Y)						QD (W)			
Component cooling water *	VY01D001					HP ECCS	TH (Y)			
	VX01D001						TH (X)			
	VW01D001						TH (W)			
	VY02D001					LP ECCS	TJ (Y)			
	VX02D001						TJ (X)			
	VW02D001						TJ (W)			
MCP intermediate circuit	TF02D001 (Y)					Ventilation of ECCS room	TL07 (Y)			
	TF02D002 (X)						TL07 (X)			
	TF02D003 (W)						TL07 (W)			
Demineralized water	RV06D001 (X)					ECCS intermediate circuit	TF (Y)			
	RV07D001 (W)						TF (X)			
	RV08D001 (Y)						TF (W)			
SSP TESTS EXECUTED AFTER THE EVENT **						EFW, AEFW.	RR11			
SSP		TSSP					RR12			
Y	X	W	Y	X	W		RR02			
						Demineralized water	RV (Y)			
							RV (X)			
:						Component cooling water *	BHVR-01 (Y)			
Notes							BHVR-01 (X)			
* At the CWCS the configuration of both the concerned and the twin unit should be given							BHVR-01 (W)			
** Relates to both planned and extraordinary SSPs.							BHVR-02 (Y)			
							BHVR-02 (X)			
							BHVR-02 (W)			