

## ANNEX 2 IAEA safety recommendations fulfillment status

### Safety issues solution status for the NPPs with VVER-440/213 in the Dukovany NPP

IDENT.	NAME OF THE SAFETY FINDINGS	CAT.	STATE
<b>G</b>	<b>GENERAL PROBLEMS</b>		
G 01	Equipment classification	II	4
G 02	Equipment qualification	III	3
G 03	Class 1 and 2 safety systems reliability analyses	II	4
<b>RC</b>	<b>CORE</b>		
RC 01	Prevention of uncontrolled H <sub>3</sub> BO <sub>3</sub> dilution	II	4
<b>CI</b>	<b>COMPONENTS INTEGRITY</b>		
CI 01	TNR brittle fracture and TNR condition checks	II	4
CI 02	Non-destructive checks	III	4
CI 03	Primary piping swing limiters	II	3
CI 04	SG primary collector integrity	II	4
CI 05	SG pipes integrity	II	4
CI 06	Feedwater inlet piping in the SG	I	4
<b>S</b>	<b>SYSTEMS</b>		
S 01	Primary circuit protection against cold pressurizing	II	4
S 02	Measures for the SG primary collector break solution	II	4
S 03	Main coolant pump packing cooling system	II	3
S 04	Qualification of PVKO and OVKO for work with water media	II	4
S 05	SAOZ suction wells blocking risk	III	4
S 06	SAOZ suction line integrity	II	4
S 07	SAOZ shower exchanger integrity	II	4
S 08	RCA in the SAOZ discharge lines	I	4
S 09	Qualification of PVPG and PSA in the steam lines for work with water media	II	4
S 10	PVPG operation on low-pressure steam lines	II	3
S 11	Control valves for the SG level control	I	4
S 12	Regulations for fast super-emergency feed water delivery	I	4
S 13	Feedwater piping vulnerability	III	4
S 14	Main control room ventilation system	II	3
S 15	Post-emergency hydrogen recombination system	II	4
S 16	Primary circuit de-aeration under emergency conditions	II	3
S 17	Important service water system	II	3
<b>I&amp;C</b>	<b>I&amp;C</b>		
I&C 01	I&C reliability	II	3
I&C 02	Safety systems design	I	3

<b>IDENT.</b>	<b>NAME OF THE SAFETY FINDINGS</b>	<b>CAT.</b>	<b>STATE</b>
I&C 03	Reactor trip initiation signals check	II	4
I&C 04	Control rooms design from the human factor viewpoint	II	3
I&C 05	Physical and functional separation between the main and emergency control room	II	3
I&C 06	Enginery condition monitoring	I	3
I&C 07	Primary circuit diagnostic system	II	4
I&C 08	Monitoring of releases from reactor cover	II	4
I&C 09	Equipment for emergency monitoring	II	3
I&C 10	Technical support center	II	3
I&C 11	Chemical water regime check (PO and SO)	I	4
<b>EL</b>	<b><i>ELECTRIC POWER SUPPLY</i></b>		
EL 01	Emergency DG starting logic	I	4
EL 02	Diesel generators reliability	I	4
EL 03	DG protection signals	I	4
EL 04	Power supply system in case of emergency and emergency regulations	II	4
EL 05	Emergency accumulator batteries discharge time	II	4
<b>C</b>	<b><i>CONTAINMENT</i></b>		
C 01	Force stress of the pressure relief condenser (max. overpressure) under LOCA conditions	III	4
C 02	Thermodynamic behavior of the pressure relief condenser	II	4
C 03	Value of releases from the hermetic zone	II	4
C 04	Maximum pressure difference across the walls of the hermetic boxes rooms	II	4
C 05	Pressure peak in the containment and occurrence of underpressure after the spraying	I	4
<b>IH</b>	<b><i>INTERNAL RISKS</i></b>		
IH 01	Fire risk systematic analyses	II	4
IH 02	Fire prevention	III	4
IH 03	Detection and fire-extinguishing systems	II	3
IH 04	Fire consequences mitigation	II	3
IH 05	Flood systematic analyses	I	4
IH 06	Flying objects initiated by the turbine	I	3
IH 07	Internal risk due to VT piping break	III	3
IH 08	Falling of heavy objects	I	4
<b>EH</b>	<b><i>EXTERNAL RISK</i></b>		
EH 01	Seismic design	III	3
EH 02	Analyses of specific external natural conditions	I	4
EH 03	External events caused by man	II	4
<b>AA</b>	<b><i>EMERGENCY ANALYSES</i></b>		
AA 01	Scope and methodology of emergency analyses	II	3
AA 02	Securing the quality of NPP data used in the emergency analyses	I	4
AA 03	Validation of the calculation codes and NPP model	II	4
AA 04	Availability of the emergency analyses results for the NPP operation support	I	4

<b>IDENT.</b>	<b>NAME OF THE SAFETY FINDINGS</b>	<b>CAT.</b>	<b>STATE</b>
AA 05	Main steam lines break emergency analyses	I	4
AA 06	Transients leading to undercooling in relation to p-t shocks	II	3
AA 07	Primary SG collector break analyses	II	4
AA 08	Accident at low power and in the tripped state	II	4
AA 09	Severe accidents	I	4
AA 10	Probabilistic safety assessment	I	4
AA 11	Accident with boric acid dilution	I	4
AA 12	Accident with the drop of spent fuel assemblies	I	4
AA 13	ATWS	I	4
AA 14	Total blackout	I	4
AA 15	Total loss of residual heat removal	I	4

**Safety issues solution status for the NPPs with VVER-1000  
in the Temelín NPP**

<b>IDENT.</b>	<b>NAME OF THE SAFETY FINDINGS</b>	<b>CAT.</b>	<b>STATE</b>
<b><i>G</i></b>	<b><i>GENERAL</i></b>		
G 01	Components classification	II	4
G 02	Equipment qualification	III	3
G 03	Class 1 and 2 safety systems reliability analyses	II	4
<b><i>RC</i></b>	<b><i>CORE</i></b>		
RC 01	Prevention of uncontrolled boron dilution	II	4
RC 02	Control rods insertion reliability /fuel assembly deformation	III	4
RC 03	Sub-criticality monitoring during the reactor outage	II	4
<b><i>CI</i></b>	<b><i>COMPONENTS INTEGRITY</i></b>		
CI 01	TNR embrittlement and its monitoring	III	4
CI 02	Non-destructive checking	III	3
CI 03	Primary piping swing limiter	II	3
CI 04	Steam generator collector integrity	III	4
CI 05	Steam generator pipes integrity	II	4
CI 06	Steam and feed piping integrity	III	4
<b><i>S</i></b>	<b><i>SYSTEMS</i></b>		
S 01	Primary circuit protection against cold pre-pressurizing	II	4
S 02	Steam generator primary collector break mitigation	II	4
S 03	Main coolant pump packing system	II	4
S 04	Qualification of pressurizer safety and relief valves for water flow	II	4
S 05	Emergency core cooling wells grids blocking	III	4
S 06	Water reservoir and emergency cooling system intake piping integrity	II	4
S 07	Emergency cooling system exchanger integrity	II	4
S 08	Power control of the valves in the emergency cooling system intake	I	4
S 09	Qualification of safety and relief valves for water flow	III	4
S 10	Operation of steam generator safety valves at low pressure	II	4
S 11	Steam generator valves for level control	I	4
S 12	Regulations for feed water emergency make-up	I	4
S 13	Steam generator emergency feeding by cold water	I	4
S 14	Main control room ventilation system	II	4
S 15	Hydrogen recombination system	II	4

<b>IDENT.</b>	<b>NAME OF THE SAFETY FINDINGS</b>	<b>CAT.</b>	<b>STATE</b>
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<b>I&amp;C</b>	<b><i>INSTRUMENTATION AND CONTROL</i></b>		
I&C 01	Instrumentation and control system reliability	II	4
I&C 02	Safety system start-up project	I	4
I&C 03	Automatic reactor protection for power distribution and DNB	I	4
I&C 04	Min control room working engineering	II	4
I&C 05	Power distribution monitoring and control in the load follow mode	II	4
I&C 06	Monitoring conditions for mechanical equipment	I	4
I&C 07	Primary circuit diagnostic system	II	4
I&C 08	Monitoring system of releases from reactor vessel cover	III	4
I&C 09	Emergency monitoring instrumentation	II	4
I&C 10	Technical support center	II	4
I&C 11	Chemical regime control and monitoring (primary and secondary circuits)	I	4
<b>EL</b>	<b><i>ELECTRICAL SYSTEMS</i></b>		
EI 01	External power supply through start-up transformers	I	4
EI 02	Diesel generators reliability	I	4
EI 03	Diesel generators protection signals	I	4
EI 04	Local power supply for failures and emergency control	II	4
EI 05	Emergency batteries discharge time	III	4
EI 06	DC circuits earthing failure	I	4
<b>CONT</b>	<b><i>CONTAINMENT</i></b>		
Cont 01	Containment by-pass	II	4
<b>IH</b>	<b><i>INTERNAL RISK</i></b>		
IH 01	Fire risk systematic analysis	II	4
IH 02	Fire prevention	III	4
IH 03	Fire annunciation detection	II	4
IH 04	Fire effects mitigation	II	4
IH 05	Flood systematic analysis	I	4
IH 06	Protection against emergency power distribution panels flooding	II	4
IH 07	Protection against dynamic effects of main steam and feeding piping break	II	4
IH 08	Polar crane blocking	II	4
<b>EH</b>	<b><i>EXTERNAL QUALITY</i></b>		
EH 01	Seismic design	II	4
EH 02	Analysis of plant specific external effects	I	4
EH 03	External events caused by man	II	4
<b>AA</b>	<b><i>EMERGENCY ANALYSES</i></b>		
AA 01	Emergency analyses scope and methodology	II	4
AA 02	Securing the quality of NPP data used in the emergency analyses	I	4
AA 03	Calculation programs and plant model validation	I	4

AA 04	Availability of the emergency analyses results for the NPP operation support	I	4
AA 05	Main steam line break emergency analyses	I	4
AA 06	Transients leading to undercooling in relation to pressure-temperature shocks	II	3
AA 07	Steam generator collector break analysis	II	4
AA 08	Accident at low power or outages	II	4
AA 09	Severe accidents	I	4
AA 10	Probabilistic safety evaluation	I	4
AA 11	Accident with boron dilution	I	4
AA 12	Accidents caused by the drop of spent fuel container	I	4
AA 13	Expected transients without shut-down (ATWS)	II	4
AA 14	Total blackout	II	4
AA 15	Total loss of heat removal	II	4

**Category:**

**I** Deviation from recognized international procedures. It is suitable to include them as a part of activities for the solution of safety issues with higher priority.

**II** Safety relevant. Defense in depth is degraded. An intervention is required to solve the issue.

**III** Highly safety relevant. Defense in depth is insufficient. Immediate corrective interventions are necessary. Provisional measures may be also necessary.

**IV** The most relevant safety problem. Defense in depth is unacceptable. Immediate intervention is required. Compensation measures must be defined before the solution of the safety problem.

**State:**

**1** – not yet decided

**2** – project preparation

**3** – project implementation

**4** - completed