MINUTES No. 13
WANO-MC VVER Plants Regional Crisis Center Working Group Meeting

Moscow, Russia 15 March 2017

The thirteenth meeting of the VVER Regional Crisis Center Working Group was jointly organized by the WANO Moscow Center and JSC Rosenergoatom (Russia). The meeting was attended by the working group members representing the operators and plants from Armenia, Belarus, Bulgaria, China, Czech Republic, Finland, Hungary, Iran, Russia, Slovakia, Ukraine, WANO MC and VNIIAES personnel. Kudankulam NPP (India) could not take part in the working group meeting. Meeting participants are listed in Attachment 1.

DISCUSSIONS:

The program of the Meeting was fully implemented. The program (including the titles of the presentations) of the Meeting is attached in the Appendix 2.

DECISIONS:

1. RCC members shall continue the information exchange within the RCC according to Appendix G, Regulations on Information Exchange.
2. WANO- MC shall prepare a final version of the Regulations on WANO-MC RCC to include RBMK, BN and EGP reactor plants in the information exchange within the RCC framework, and submit it to the WANO-MC Governing Board meeting in Helsinki on 25-26 April 2017 for approval.
3. The Working Group (WG) members shall provide information on the possibility of RCC/REA VTC tests before 14.04.2017.
4. Based on the implementation of item 3 of these minutes, WANO-MC shall forward, in the second quarter of 2017, a request to REA about regular RCC/REA VTC tests.
5. WANO-MC shall plan for the Armenian plant in 2018 a TSM on satellite communication with the RCC.
6. The RCC shall participate in additional full-scope exercises at the Dukovany plant (Czech Republic) on 15 May 2017.
7. When preparing a new version of the Regulations on RCC information exchange, the RCC WG shall define main and backup channels of exchange as follows: main channel – e-mail, backup channel – fax.
8. Slovenske Elektrarne shall submit to WANO-MC before 30.06.2017 a proposal to update their agreement with the RCC to include a new liaison officer.
9. The WG members shall prepare and submit as appropriate to WANO-MC before 01.12.2017 a plant information package to include modernization efforts, including introduced “post-Fukushima” equipment. An example of information package is given in Appendix 3 to these minutes.
10. WANO-MC and Kudankulam NPP (NPCIL) shall continue their efforts in 2017 to conclude a bilateral agreement on cooperation with the RCC.

11. Before 10.04.2017, the WANO-MC RCC WG shall supplement the emergency exercise feedback procedure with the results of the self-assessment made by a plant/utility that underwent exercise/drill.
12. Before 01.04.2017 WANO MC shall send to WG members RCC emergency exercise assessment criteria. Plants/utilities shall consider them and share their proposals on RCC emergency exercise assessment criteria before 01.05.2017.
13. Before 01.05.2017, plants/utilities shall inform the RCC of dates of emergency exercises/drills in collaboration with the RCC in 2017 and (if any) additional emergency exercises/drills in collaboration with the RCC.
14. In order to prepare a Report on RCC activities in 2017 in a timely manner, before 01.12.2017, plants/utilities shall inform the RCC about exercises and drills conducted with/without the RCC.
15. For the purpose of practicing during RCC exercises/drills:
    - Plants/utilities shall, if possible, send expert/technical support requests to the RCC.
    - Plants/utilities shall, if possible, use VTC communication.
16. In 2017-2018, the RCC shall participate exercises with non-announced (secret) dates.
17. Taking into account the lessons learnt from the Flamanville plant event
    - During information exchange on plant safety significant events, plants/utilities shall provide the RCC with additional event details to inform the RCC members.
    - WANO-MC shall submit a proposal to the LO to reduce the timeframes for event reporting/notification during information exchange within the WPG-15 framework.
18. In the second quarter of 2017, the Belarus plant shall approve a list of process and radiological parameters to be submitted by the Belarus plant (appendix 4) to the WANO-MC RCC via a secured channel as defined by the project, complying with the specified frequency and ensuring information security as prescribed by the laws of the Republic of Belarus and Russian Federation.
19. The RCC members will extend their deep thanks to Peter Tuominen, WG member representing Fortum (Finland), for his significant contribution to the foundation and improvement of the RCC over a five-year period.
20. WG members are to send propositions on topics of interest to be discussed at the meeting by 1 July 2017.
21. The next WG meeting shall be conducted in 2018. The WG members will be notified about the meeting venue in due course.

Working Group Manager,
Chairman of the Meeting **V.E. Khlebtsevich**

Deputy Working Group Manager **S.V. Vybornov**

Secretary of the Meeting **A.I. Lukyanenko**

Attachment 1

List of participants

WG meeting on VVER Regional Crisis Center, Moscow, March 14-15, 2017

№	Name	Organization, country
1.	**KHLEBTSEVICH** Vladimir	JSC Rosenergoatom, Russia
2.	**GOLUBKIN** Vladimir	JSC Rosenergoatom, Russia
3.	**PLAKSIN** Igor	JSC Rosenergoatom, Russia
4.	**LUKYANOVA** Vera	JSC Rosenergoatom, Russia
5.	**YEMELYANAU Valery**	Belorussian NPP, Republic of Belarus
6.	**ARUSTAMYAN** Maksim	Armenian NPP, Armenia
7.	**MARINOV** Vladimir	Kozloduy NPP, Bulgaria
8.	**HERMAN** Attila	Paks NPP Ltd., Hungary
9.	**GALLUS** Petr	CEZ, a.s., Czech Republic
10.	**HOFMANN** Ervín	CEZ, a.s., Czech Republic
11.	**MRÁZ** Radovan	Slovenské elektrárne, Slovak Republic
12.	**TUOMINEN** Peter	Fortum Power and Heat Oy, Finland
13.	**EMAMJOMEH** Ehsan	Nuclear Power Production and Development Co, Iran
14.	**SHEN** Dawei	Jiangsu Nuclear Power Corporation, Ltd, Tianwan NPP
15.	**NAUMENKO** Georgy	NNEGC “Energoatom”, Ukraine
16.	**KOSOV** Aleksei	JSC VNIIAES, Russia
17.	**OREHOV Aleksandr**	JSC VNIIAES, Russia
18.	**ABUTALIPOV Roman**	JSC VNIIAES, Russia
19.	**VYBORNOV** Sergey	WANO-MC
20.	**LUKYANENKO** Andrey	WANO-MC
21.	**LOKTIONOV** Sergey	WANO-MC
22.	**SABIROVA Indira**	WANO-MC
23.	**GRINEVICH** Olga	WANO-MC
24.	**SPITSYNA** Viktoria	WANO-MC

Attachment 2

The agenda of the Working Group meeting of WANO Moscow Centre Regional Crisis Center, 14-15 March 2017, Moscow, Russia

TUESDAY, THE 14TH OF MARCH		
TIME	ACTIVITY	PARTICIPANTS
9:00 9:30	Greetings and opening of the meeting Participants introduction	KHLEBTSEVICH Vladimir, Head of the working group on RCC VYBORNOV Sergey, WANO-MC All participants
09:30 10:10	Presentation on RCC action plan-2016&2017 status, RCC Minutes No12 status	LUKYANENKO Andrey, LOKTIONOV Sergey, WANO-MC
10:10 10:40	"Report on activities of WANO Moscow Center Regional Crisis Center in 2016".	ABUTALIPOV Roman, JSC VNIIAES, Russia All participants
10:40 11:00	Coffee break	All participants
11:00 11:40	Action plan to involve RBMK, BN and EGP plants in information exchange in frames of WANO MC RCC	LOKTIONOV Sergey, WANO-MC, All participants
11:40 12:10	Presentation on the WANO post-Fukushima project «Emergency Response Support» achievements in 2016	LOKTIONOV Sergey, WANO-MC
12:10 12:50	Presentation on the exercises/drills in frames of RCC	KOSOV Aleksei, JSC VNIIAES, Russia All participants
12:50 13:50	Lunch	All participants
13:50 14:30	Rosenergoatom presentation on: • Minutes No12 status • RCC action plan-2016, plan-2017 status • RCC information exchange results in 2016-2017	GOLUBKIN Vladimir, JSC Concern «Rosenergoatom», Russia
14:30 15:10	OO/NPPs presentation on: • Minutes No12 status	TUOMINEN Peter, Fortum, Finland
15:10 15:50	• RCC action plan-2016, plan-2017 status	HERMANN Attila, Paks NPP, Hungary
15:50 16:10	Coffee break	All participants
16:10 16:50	OO/NPPs presentation on: • Minutes No12 status	GALLUS Petr, HOFMANN Ervin CEZ company, Czech republic
16:50 17:30	• RCC action plan-2016, plan-2017 status	EMAMJOMEH Ehsan, Nuclear Power Production and Development Co, Iran
18:00	Dinner	All participants

19:30		
WEDNESDAY, THE 15TH OF MARCH		
TIME	ACTIVITY	PARTICIPANTS
8:30	Transfer from “MOSUZCENTR” Hotel to WANO-MC	All participants
09:00 09:40	Presentation on organizing communication and data transmission between RCC and Armenian, Belorussian NPPs	PLAKSIN Igor, JSC Concern «Rosenergoatom», Russia
09:40 10:20	OO/NPPs presentation on: • Minutes No12 status • RCC action plan-2016, plan-2017 status	ARUSTAMYAN Maksim, AAEK, Armenia
10:20 11:00	Belarussian NPP Presentation	YEMELYANAU Valery, Belarussian NPP, Belarus
11:00 11:20	Coffee break	All participants
11:20 12:00	OO/NPPs presentation on: • Minutes No12 status • RCC action plan-2016, plan-2017 status	Vladimir Marinov, Kozloduy NPP, Bulgaria
12:00 12:40		SHEN Dawei, Jiangsu Nuclear Power Corporation, Ltd, Tianwan NPP, China
12:40 13:40	Lunch	All participants
13:40 14:20	OO/NPPs presentation on: • Minutes No12 status • RCC action plan-2016, plan-2017 status	NAUMENKO Georgiy, State Company NAEK “Energoatom”, Ukraine
14:20 15:00		MRAZ Radovan, Slovenské elektrárne, Slovak Republic
15:00 15:20	Coffee break	All participants
15:20 16:30	Discussion and approval of the final record of the meeting	All participants
16:30 17:20	Workshop for the RCC on-duty staff, OO/NPP staff in charge of the interaction with the RCC: • Filling in the RCC forms • RCC documentation (regulations, procedures)	LOKTIONOV Sergey, WANO-MC, All participants
17:30	Transfer to «MOSUZCENTR» Hotel	All participants

Attachment 3

Minimal content of Information Package

I. Presentation. NPP Overview. Description of the differences between units

II. Schematic diagrams:

1. Primary circuit - volumes and elevations
2. Primary circuit and auxiliary systems
3. Primary circuit and safety systems
4. Primary circuit, overpressure protection and depressurization system
5. Reactor coolant pump and sealing water system
6. High pressure safety injection system
7. Emergency core cooling system
8. Primary drainage systems
9. Primary vent systems
10. Emergency core cooling systems and essential service water system
11. Steam generator blow-down system
12. Secondary circuit - heat removal systems
13. Main steam lines
14. Turbine bypass system
15. Main feed water system
16. Emergency feed water system
17. Backup feed water supply system
18. Auxiliary emergency feed water system
19. Residual heat removal system
20. Auxiliary residual heat removal system
21. Service water system
22. Switchyard
23. Power supply systems - main diagram
24. CRDM power supply system
25. SAM power supply system
26. Emergency power supply. SA uninterruptible power supply
27. Fire water system
28. Containment spray system
29. Containment external spray system
30. Containment hydrogen treatment system

Attachment 4

List of process and radiological parameters
communicated by Belarus NPP to WANO-MC Regional Crisis Centre

№	Parameters
1.	On-load operation time (“effective time”)
2.	Reactor thermal power
3.	Turbine generator output (electrical power)
4.	Core neutron power
5.	Disposition of control rod banks
6.	Boron acid concentration in primary coolant
7.	Primary circuit pressure
8.	Cold legs temperature
9.	Hot legs temperature
10.	Fuel assembly exit temperature (maximum)
11.	Maximum heat up in fuel assembly
12.	Saturation temperature margin in primary coolant
13.	Coolant flow rate in main circulation loops
14.	Pressure gradient across main circulation pump
15.	Power consumption by main circulation pump
16.	Pressurizer level
17.	Pressurizer pressure
18.	Pressurizer water temperature
19.	Pressurizer metal temperature, top/bottom
20.	Status of pressurizer injection valves
21.	Status of pressurizer pilot safety valve
22.	Bubbler water temperature
23.	Primary circuit make-up flow
24.	Primary circuit blowdown flow
25.	Make-up deaerator level
26.	Pressure inside containment (UJA – reactor building)
27.	Temperature inside containment (UJA – reactor building)
28.	Steam generator pressure
29.	Steam generator level
30.	ECCS tank level
31.	ECCS tank pressure
32.	Level in spent fuel pool
33.	Flow rate of spent fuel pool cooling system pump
34.	Outlet pressure of spent fuel pool cooling system pump
35.	Level in reactor internals inspection cavity
36.	Temperature in reactor internals inspection cavity
37.	Flow rate of emergency / normal cooldown pumps
38.	Outlet pressure of emergency / normal cooldown pumps
39.	Level in emergency boron tanks
40.	Flow rate of emergency boron supply / injection pumps
41.	Position of control valves in passive SG heat removal system
42.	Flow rate of emergency feedwater motor pumps
43.	Level in demineralised water tanks
44.	Level in feedwater deaerator
45.	Steam generator feedwater flow rate
46.	Steam generator feedwater temperature
47.	Feedwater flow rate downstream of feedwater pump

48.	Feedwater flow rate downstream of emergency feedwater pump
49.	Status of steam generator safety valve
50.	Status of main steam isolation valve
51.	Status of quick-acting atmospheric relief valve (BRU-A)
52.	Status of quick-acting turbine bypass valve (BRU-K)
53.	Status of quick-acting in-house header relief valve
54.	Status of turbine generator stop valves
55.	Generator frequency
56.	Voltage at auxiliary sections
57.	Voltage at uninterrupted power supply sections
58.	Status of diesel generators
59.	Status of emergency protection systems
60.	Generator breaker status
61.	Operation mode of reactor power controller
62.	Level in diesel fuel tanks of emergency diesel generators
63.	Primary coolant activity
64.	Activity of steam generator blowdown water
65.	Activity of steam generator steam
66.	Dose rate of ionising radiation on the site
67.	Dose rate of ionising radiation in buffer zone
68.	Dose rate of ionising radiation in surveillance zone