

MEMORANDUM

Operator/Operations Fundamentals Workshop

Minsk, Republic of Belarus

26-27 February 2019

Workshop objective:

The workshop objective was to improve the application of operator fundamentals to enhance the quality of operator and other personnel performance.

Background

Various significant events have occurred in the industry worldwide over the past decade that highlight weaknesses in the knowledge, skills, behaviours and practices essential for operators to operate the plant safely, reliably and effectively.

In some cases, individuals did not mitigate the effects of operational transients, while in other cases, individuals did not ensure effective monitoring of reactor power variations, nor did they take prompt actions to bring the reactor to the safe condition. The most frequently encountered behavioral weaknesses identified during these events include cases where operators did not effectively use procedures, nor did they sufficiently focus on monitoring important parameters, or work effectively as a team to ensure a conservative decision making is in place when bringing the reactor into the safe condition. Lessons learned from the previous operating experience were not well incorporated at some nuclear power plants.

WANO PO&Cs 2013 (OP.1) and SOER 2013-1, *Operator Fundamentals Weaknesses*, include **five operator or operations fundamentals such as the following:**

1. Monitor plant indications and conditions closely.
2. Control plant evolutions precisely.
3. Establish a bias for a conservative approach to plant operations.
4. Work effectively as a team, especially in case of abnormal or emergency situations.
5. Have a detailed/solid understanding of plant design, system and component interactions and applicable theoretical or engineering principles.

An analysis of events, areas for improvement identified from peer reviews, including pre-startup peer reviews (PSUR) and crew performance observations (CPO), and industry input identified several underlying reasons for weaknesses in operator fundamentals, including the following:

- Operator fundamentals were not clearly defined.
- Operators are not sufficiently focused on understanding the technical aspects of the task to complement the use of human performance techniques.
- Operators' initial and continuing training was not sufficiently focused on operator fundamentals. It is particularly relevant to new builds, which face such challenges as inexperienced personnel and lower performing vendors.
- An overreliance on processes and procedures promoted a compliance-based approach to a task and a "checklist mentality".
- Risk recognition and mitigation are not effectively used to supplement the requirement to follow approved processes and procedures.

- Because plants are operating more reliably, operators have fewer opportunities to experience large plant transients and complex evolutions, such as reactor trips and reactor startups.

Industry efforts to improve operator fundamentals resulted in **short-term reductions** in the number of significant events and reactor trips caused or complicated by weaknesses in operator fundamental performance. However, **these efforts were not sustainable** because the actions taken and lessons learned were not well incorporated into operational standards, training, and management systems. As a result, events caused by weaknesses in the use of operator fundamentals continue to occur too frequently.

Appropriate use of operator fundamentals, combined with the proper use of operating procedures and human performance techniques, could have prevented or mitigated the impact of events.

Strict adherence to operator fundamentals, combined with the high level of proficiency, skills, awareness and motivation are a key to success.

WANO main documents addressing operator fundamentals include the following:

- PO&C 2013 (OP.1)
- SOER 2013-1, '*Operator Fundamentals Weaknesses*'
- WANO IGRD 002, '*Self-Assessment Guide to Operator Fundamentals*'
- WANO IGRD 003, '*Your Role in Operator Fundamentals*'
- WANO GL 2001-02, '*Guidelines for the Conduct of Operations at Nuclear Power Plants*'

Participants:

The workshop was organized under a WANO MC initiative. 30 operations and training managers/supervisors from nuclear power plants, Atomflot and operating organizations of nine countries, including Armenia, Belarus, Bulgaria, Hungary, Iran, China, Russia, Slovakia and Ukraine, participated in the workshop. The list of participants is enclosed herewith.

Topics for discussion:

The workshop designed to address SOER 2013-1, *Operator Fundamentals Weaknesses*, covered the following topics:

1. Last peer review results in the area of operator fundamentals
2. Challenges in implementing the SOER 2013-1 recommendations.
3. Exchange of experience on how to support operators in the effective application of operator fundamentals.
4. Plant self-assessment results, common weaknesses in the area of operator fundamentals, proposals on how to improve approaches/tools to resolve identified weaknesses/issues.
5. Self-assessment of training programmes and operator fundamentals as practiced.
6. Challenges in understanding SOER 2013-1 recommendations, self-assessment of operator fundamentals using the '*Self-Assessment Guide to Operator Fundamentals*' and '*Your Role in Operator Fundamentals*' documents.
7. Actions taken to address operator fundamentals weaknesses identified during the self-assessment.
8. Using corrective actions, performance indicators and self-assessments to identify, track and trend the effective application of operator fundamentals.

Workshop Agenda

WANO MC Deputy Director Sergey Vybornov opened the workshop and highlighted that such international workshops are necessary because they serve as a means to support effective exchange of experience to improve the quality of plant operator and other personnel performance.

The workshop sessions included the following presentations and discussions:

Presentation Title	Presenter Name, Organization/Country
WANO's 30-year anniversary	Sergey VYBORNOV WANO MC, Ukraine All participants
SOER 2013-1, Operator (Operations) Fundamentals	Andrey LUKYANENKO WANO MC, Ukraine
Analysis of SOER 2013-1 and PO&C Recommendation Implementation	Diana DIMITROVA WANO MC, Bulgaria
Using the ' <i>Your Role in Operator Fundamentals</i> ' and ' <i>Main Principles for Assessing Training Effectiveness in Addressing Operator Fundamentals</i> ' Documents	Sergey KEZIN WANO MC, Russia
Analysis of WANO MC Targeted Observation to Review Implementation of SOER 2013-1, <i>Operator Fundamentals Weaknesses</i> , Recommendations	Sergey KUZIN WANO MC, Russia
Carousel Sessions 1. Leadership Behaviours to Reinforce Operator Fundamentals – What's Really Important? 2. Assessing Training Effectiveness in Addressing Operator Fundamentals. 3. How Do You Ensure Sustainability of Your Operator Fundamentals Actions?	Facilitators from WANO: Session 1 Sergey VYBORNOV Dmitrii YABLOKOV Session 2 Sergey KEZIN Diana DIMITROVA Session 3 Andrey LUKYANENKO Anna TATARINOVA All participants
Recap of Day 1 Breakout Sessions	Facilitators: Sergey VYBORNOV, Sergey KEZIN, Andrey LUKYANENKO All participants
1) Reinforcing Operator Fundamentals	Oleg AIDEMIROV Deputy Director for NPP Operations Department JSC CONCERN ROSENERGOATOM, RUSSIA
2) Summary of the SOER 2013-1 Recommendation Implementation Self-assessment	Ivan BABICH Manager, Phase I Process Control Department LENINGRAD NPP, RUSSIA
Self-Assessment of Operator Fundamentals Training Programmes in Ukraine	Ruslan IARYZHKO, Deputy Director for Production NNEGC Energoatom, UKRAINE
Summary of the SOER 2013-1 Recommendation Implementation Self-Assessment	Miroslav ŽATKO Nuclear Training Specialist MOCHOVCE NPP, BOHUNICE NPP SLOVAK REPUBLIC
Summary of the SOER 2013-1 Recommendation Implementation Self-Assessment	Chun Shan LV Training Instructor TIANWAN NPP, CHINA

Summary of the SOER 2013-1 Recommendation Implementation Self-Assessment	Károly VIGH Head of Turbine Operations Section MVM PAKS, HUNGARY
Summary of the SOER 2013-1 Recommendation Implementation Self-Assessment	Hunan HUNANYAN Deputy Chief Engineer for Personnel ARMENIAN NPP, ARMENIA
Summary of the SOER 2013-1 Recommendation Implementation Self-Assessment	Yadollah SHAMANI Deputy Director for Production BUSHEHR NPP, IRAN
Summary of the SOER 2013-1 Recommendation Implementation Self-Assessment	Oleg ZHENOV Manager, Operations Training Department BELARUS NPP, BELARUS
Summary of the SOER 2013-1 Recommendation Implementation Self-Assessment	Alexander KULIKOV Head of Department FSUE ATOMFLOT, RUSSIA
Summary of the SOER 2013-1 Recommendation Implementation Self-Assessment. Strategies to Reduce Human Errors.	Rumen HRLSTOV Chief Technologist KOZLODUY NPP, BULGARIA

Information presented during the workshop was shared with the participants.

Summary of breakout session results: recommendations and current status

Session 1. Leadership Behaviours to Reinforce Operator Fundamentals – What’s Really Important? What Should a Leader/Manager Do?

1. Clearly define and explain operator fundamentals expectations to the operations personnel.
2. Monitor and observe operators’ actions and behaviours, including task understanding, encourage personnel to think about their behaviours and learn lessons.
3. Ensure reinforcement and coaching, discuss operator fundamentals, documentation and work performance techniques.
4. Promote, reinforce and reward operators exhibiting proper behaviours and set them as an example to follow.
5. Demonstrate appropriate manager’s actions and behaviours.
6. Ensure that information on operators’ actions and behaviours is collected and analyzed to learn lessons.
7. Ensure a good mix of new and experienced operators on each crew.
8. Develop a system to monitor the effective application of operator fundamentals.
9. Ensure high quality operating documentation, including technical descriptions and manuals.
10. Create an atmosphere of trust and openness, questioning attitude to the quality of task implementation essential to nuclear safety and plant reliability.

Session 2. Assessing Training Effectiveness in Addressing Operator Fundamentals.

1. The following criteria could be used to assess the effectiveness of operator fundamentals: improving performance indicators, combined with the reduced number of human performance events and decreasing equipment failures and industrial safety accidents; analysis of low-level events and near-misses to identify positive trends in the area of operator fundamentals.
2. Assess operator’s teamwork skills as practiced to gauge an operator’s knowledge and understanding of operator fundamentals.
3. Provide operator fundamentals training and monitor its effectiveness for all operators’ groups.
4. Create a common conceptual framework for the entire plant workforce in the area of operator fundamentals.
5. Select operators with due account of their commitment to operator fundamentals.

6. Utilize training, administrative and psychophysiological resources to ensure an objective selection process for operators committed to operator fundamentals.

Session 3. How Do You Ensure Sustainability of Your Operator Fundamentals Actions?

1. WANO MC on-site representatives shall regularly participate in the assessment of the effective use of operator/operations fundamentals during simulator training.
2. WANO shall develop a document explaining how to identify, analyze and track the effective use of operator fundamentals. This document shall become an integral part of the whole plant lifecycle (with due account of new build specifics).
3. Efforts shall be initiated to explore the need for setting up a plant level standing functional group under the operations manager leadership to include plant/unit shift supervisors, training managers and operating experience staff with a mandate to promote the learning and improvement of operator fundamentals across the plant.

Proposals:

- 1) Update/establish management expectations on operator fundamentals as a single system of operations fundamentals focusing on strict adherence to these fundamentals.
- 2) Set up plant level standing teams/groups to assess the effectiveness of operator fundamentals.
- 3) Create a separate system to account for operator fundamentals weaknesses and develop clear-cut criteria and indicators for each of the five fundamentals to identify, analyze and track the effectiveness of operator fundamentals.
- 4) Engage operations personnel in the operator fundamentals monitoring process and ensure they share their feedback.
- 5) Conduct a self-assessment of operator training programmes and operator fundamentals as practiced for the entire operations workforce.
- 6) Operator's role may change during plant operation but it shall never be substituted.
- 7) Ensure a thorough analysis by plant senior management, training managers and psychologists before changing the operator's role in specific processes.
- 8) Ensure that operator fundamentals constitute an independent training programme to verify that these fundamentals have been clearly communicated to, internalized and effectively used by the operators in their daily activities (criteria: reduced number of human performance errors and events, low-level events and near-misses caused by operator fundamentals weaknesses).
- 9) Ensure that operator fundamentals are internalized and effectively applied by operations managers across all levels. Operators and their supervisors should have the same level of understanding the importance of operator fundamentals.
- 10) WANO MC will monitor peer review reports to address areas for improvement (AFI) related to the operator fundamentals and implementation of the SOER 2013-1 recommendations, as well as pertinent event reports, in order to identify operator fundamentals trends. Following the monitoring results, WANO MC will forward a report to WANO MC membership in the year 2021 to update on the situation in this area.

SERGEY VYBORNOV

WANO MC DEPUTY DIRECTOR

Sergey KEZIN

WANO MC PA Programme Manager

Andrey LUKYANENKO

WANO MC T&D Programme Manager

Attachment

List of Participants

WANO MC Regional Operator/Operations Fundamentals Workshop

Minsk, Republic of Belarus, 26 – 27 February 2019

No.	NAME	COMPANY/COUNTRY	JOB POSITION
1.	OLEG AIDEMIROV	JSC CONCERN ROSENERGOATOM, RUSSIA	DEPUTY DIRECTOR FOR NPP OPERATIONS AND FUEL MANAGEMENT DEPARTMENT
2.	ALEKSEI NEOBERDIN	KALININ NPP, RUSSIA	TURBINE DEPARTMENT DEPUTY HEAD
3.	DMITRY RENEV	SMOLENSK NPP, RUSSIA	UNIT SHIFT SUPERVISOR
4.	SERGEY POLUIAKTOV	BELOYARSK NPP, RUSSIA	DEPUTY CHIEF ENGINEER FOR OPERATIONS
5.	IVAN BABICH	LENINGRAD NPP, RUSSIA	HEAD OF PHASE I PROCESS CONTROL DEPARTMENT
6.	KONSTANTIN KHARCHENKO	NOVOVORONEZH NPP, RUSSIA	TEAM LEADER, LEAD INSTRUCTOR
7.	VIKTOR SEREDNEV	BALAKOVO NPP, RUSSIA	HEAD OF TRAINING CENTRE GROUP
8.	SERGEY SAVITSKIY	KOLA NPP, RUSSIA	REACTOR DEPARTMENT DEPUTY HEAD
9.	ANDREY FILIPPOV	ROSTOV NPP, RUSSIA	DEPUTY HEAD OF THE TRAINING CENTRE
10.	ALEXANDER KULIKOV	FSUE ATOMFLOT, RUSSIA	HEAD OF DEPARTMENT
11.	RUSLAN VOLODKO	FSUE ATOMFLOT, RUSSIA	HR MANAGER
12.	RUSLAN IARYZHKO	NNEGC ENERGOATOM, UKRAINE	DEPUTY DIRECTOR FOR PRODUCTION
13.	MYKOLA RYBAKOV	SOUTH-UKRAINE NPP, UKRAINE	SHIFT SUPERVISOR
14.	OLEKSANDR BOROMENSKIY	ROVNO NPP, UKRAINE	LEAD INSTRUCTOR, TRAINING CENTER
15.	DMYTRO VERBYTSKIY	ZAPOROZHYYE NPP, UKRAINE	CHIEF SPECIALIST OF UNIT OPERATIONS – UNIT SUPERVISOR
16.	VALERY ZADOROZHNYI	KURSK NPP, RUSSIA	UNIT SHIFT SUPERVISOR
17.	OLEKSANDR KHOMYCH	KHMELNITSKY NPP, UKRAINE	UNIT SHIFT SUPERVISOR
18.	HUI HAN	TIANWAN NPP, CHINA	DEPUTY HEAD OF FIRST OPERATIONS BRANCH
19.	CHUN SHAN LV	TIANWAN NPP, CHINA	TRAINING INSTRUCTOR
20.	ALEH ZHENAU	BELARUSIAN NPP, BELARUS	HEAD OF OPERATIONS TRAINING DEPARTMENT
21.	ALEXANDER ERIN	BELARUSIAN NPP, BELARUS	DEPUTY HEAD OF THE TRAINING CENTER
22.	YADOLLAH SHAMANI	BUSHEHR NPP, IRAN	DEPUTY DIRECTOR FOR PRODUCTION
23.	HOSSEIN KHAMSE	BUSHEHR NPP, IRAN	SIMULATOR TRAINING INSTRUCTOR
24.	RUMEN HRLSTOV	KOZLODUY NPP, BULGARIA	CHIEF TECHNOLOGIST, ORGANIZATION OF OPERATIONS

No.	NAME	COMPANY/COUNTRY	JOB POSITION
25.	KÁROLY VIGH	MVM PAKS, HUNGARY	HEAD OF TURBINE OPERATIONS SECTION
26.	SÁNDOR FÁBIÁN	MVM PAKS, HUNGARY	CHIEF TECHNOLOGIST
27.	HUNAN HUNANYAN	ARMENIAN NPP, ARMENIA	DEPUTY CHIEF ENGINEER FOR PERSONNEL
28.	MIROSLAV ŽÁTKO	BOHUNICE NPP, SLOVAK REPUBLIC	NUCLEAR TRAINING SPECIALIST
29.	PATRIK KAŠO	MOCHOVCE NPP, SLOVAK REPUBLIC	OPERATIONS TRAINING MANAGER
30.	PETER FARKAŠ	MOCHOVCE NPP, SLOVAK REPUBLIC	NUCLEAR TRAINING MANAGER
31.	SERGEY VYBORNOV	WANO MC, UKRAINE	DEPUTY DIRECTOR, WANO MC
32.	SERGEY KEZIN	WANO MC, RUSSIA	PA PROGRAMME MANAGER, WANO MC
33.	ANDREY LUKYANENKO	WANO MC, UKRAINE	T&D PROGRAMME MANAGER, WANO MC
34.	SERGEY KUZIN	WANO MC, RUSSIA	WANO MC ON-SITE REPRESENTATIVE, KOLA NPP
35.	RADOVAN MRÁZ	BOHUNICE NPP, SLOVAK REPUBLIC	WANO MC ON-SITE REPRESENTATIVE, BOHUNICE NPP
36.	DIANA DIMITROVA	WANO MC, BULGARIA	ADVISOR, WANO MC
37.	DMITRIY YABLOKOV	WANO MC, RUSSIA	ADVISOR, WANO MC
38.	ANNA TATARINOVA	WANO MC, RUSSIA	ADMINISTRATOR, WANO MC
39.	INDIRA SABIROVA	WANO MC, RUSSIA	INTERPRETER, WANO MC
40.	VYACHESLAV BUZHINSKY	WANO MC, RUSSIA	INTERPRETER, WANO MC
41.	MARINA KOROVKINA	WANO MC, RUSSIA	INTERPRETER, WANO MC