



2015 Year-End Highlights Report

Vision

WANO and its members will be worldwide leaders in pursuing excellence in operational nuclear safety for commercial nuclear power.

Mission

To maximise the safety and reliability of nuclear power plants worldwide by working together to assess, benchmark and improve performance through mutual support, exchange of information and emulation of best practices.

W A N O

Foreword

2015: A Year of Transition

“... it became clear that how WANO conducted that mission needed to evolve and grow based upon changes in the worldwide nuclear industry, marking 2015 as a year of transition.”



The mission of the World Association of Nuclear Operators (WANO) to “maximise the safety and reliability of nuclear power plants worldwide” has been consistent throughout the organisation’s history. However, in 2015 it became clear that how WANO conducted that mission needed to evolve and grow based upon changes in the worldwide nuclear industry, marking 2015 as a year of transition.

Since the Post-Fukushima Commission (PFC) report was published in 2011, the focus of WANO has been on implementing initiatives necessary to respond to the findings. Study

and planning became implementation in 2014 and carried through into 2015. This progress culminated in a report to the WANO membership at the 2015 Biennial General Meeting (BGM) held in Toronto, that 10 of the 12 PFC projects were transitioning from project status to the core work of WANO.

Great pride can be taken in the implementation of the PFC projects and the maturing of WANO reflected in those changes. The members have demonstrated a trust to support fundamental changes that allow WANO teams to dig deeper into

plant performance and report about their observations more openly. This trust is truly valued and ensures the continued strength of our Association.

In 2015, WANO reinforced its commitment that the lessons learned from the nuclear industry of the past need to be carried forward effectively to the nuclear industry of the future.

The growing nuclear industry in Asia and the reduction in other parts of the world signalled a shift in the centre of gravity of the nuclear industry. WANO needed

to adjust to recognise and engage this shift. Traditional members were shutting plants down and new members – with new designs, operating organisations, and operators – were starting up plants at a pace not seen since the early days of the nuclear industry.

To align the focus of WANO to the challenges resulting from the rapid growth of the industry, the organisation’s leadership drafted a new long-term strategy titled Compass to establish the vision and direction for the organisation in the post-Fukushima world. The strategy

recognises the need to continue robust support to legacy plants and drive improvement through our traditional programmes, while also acknowledging the need to expand our focus to help shape the development of the new workforce, facilitate early engagement with new entrants, and assist operating units that are designated for decommissioning.

Changes in national policies associated with export controls had a growing impact on WANO's ability to conduct activities in several countries. A recent change to the Nuclear Suppliers Group (NSG) guidelines which were intended to strengthen nuclear non-proliferation controls have, in some cases, been implemented in such a way to encompass WANO activities that focus on safety and reliability. The result has been to impede some experts from WANO members from assisting other members in some parts of the world. The guidelines, which target technical knowledge as well as dual-use technologies, are not intended to impede the peaceful uses of nuclear energy. Productive engagement has started with both the NSG and with the involved governments to mitigate the impact on WANO activities and to ultimately find a solution to this problem.

Health and security issues throughout the world also impacted some WANO activities in 2015. Screening conducted by WANO regional centres, supported by members and host governments, proved effective in mitigating risks and protecting WANO teams in the

field. In all cases where the concern was for health and safety, activities were rescheduled and completed without incident.

Finally, in 2015 the economic stress associated with low electrical power prices in many parts of the world had a growing and significant impact on WANO members. This has resulted in a renewed commitment to use member resources effectively in conducting all WANO activities and serious consideration by the Governing Boards before embarking upon new commitments.

"... the organisation's leadership drafted a new long-term strategy titled Compass to establish the vision and direction for the organisation in the post-Fukushima world."



Seok Cho
President



Jacques Régaldo
Chairman



Peter Prozesky
Chief Executive Officer

WANO Programmes

To achieve its mission, WANO offers members a series of high-quality products and services through five programmes



1. Peer Review

Peer reviews help members compare their operational performance against standards of excellence through an in-depth, objective review of their operations by an independent team from outside their organisation.

During 2015, WANO conducted 65 operating plant peer reviews in 20 countries/areas. It also conducted 30 follow-up reviews in 19 countries/areas focusing on the progress made in addressing areas for improvement. Since 1992, WANO has conducted 683 operating station peer reviews in 32 countries/areas, including at least one at every WANO member station.

Efforts continue to ensure each plant receives a peer review every six years or more frequently. WANO plans to move to peer reviews every four years such that between October 2015 and October 2019 every operating unit will receive a peer review.

65
OPERATING
PLANT PEER
REVIEWS
CONDUCTED

Eight pre-startup peer reviews were conducted in 2015 at plants preparing for initial operation, compared to ten such reviews in 2014. Eleven corporate peer reviews took place in 2015, as well as five corporate peer review follow-ups. All members have agreed to receive a corporate peer review by the end of 2017.

The WANO Assessment process was established in 2014 and is working effectively with assessments being conducted following each peer review. In 2015, Since starting in September 2014, approximately 55 assessments were completed, representing approximately 20% of the industry.



2. Operating Experience

The Operating Experience programme informs members about incidents at other plants so they can take corrective actions to prevent similar occurrences at their own plant. Its success stems from the willingness of WANO members to openly share their operating experience for the benefit of other operators throughout the world.

In 2015, 3,083 operating experience reports were provided by members, a 31% increase over reporting in 2014. This brings the number of event reports available in the operating experience database to approximately 19,510. This heightened reporting level reflects an increase in transparency by WANO members and not a negative trend in overall industry performance.

The Operating Experience team issued two Significant Operating Experience Reports and one new Significant Event Report in 2015,

3,083
OPERATING
EXPERIENCE
REPORTS
PROVIDED

as well as one CEO Update, three Hot Topics and three Analysis Reports; providing important lessons for the industry.

Twelve existing Just-In-Time (JIT) briefing sheets were revised. JIT sheets provide workers at nuclear power plants with practical, timely operating experience for pre-job briefings.

The Operating Experience Central Team continues to issue monthly summaries of all events reported to WANO. This summary is posted on the WANO member website to highlight events of potential significance to other members that may provide meaningful lessons learned.



3. Technical Support & Exchange

In 2015, 206 technical support missions (TSMs) were conducted, comparing to 213 in 2014. TSMs are planned and conducted by WANO regional centres using an experienced team of knowledgeable experts who review difficult issues and identify potential solutions.

The New Unit Assistance (NUA) project was initiated in April 2014 and has shown good progress in 2015, with 27 TSMs being conducted at plants with new units. The focus of NUA is to develop a framework that will be helpful for WANO TSM managers to plan, develop and conduct special assistance missions for new entrants in the nuclear industry. A founding principle for NUA is that early intervention with new units will significantly help them in their preparation towards operation.

All regional centres continue to focus TSMs on helping members resolve areas for improvement (AFIs) identified during peer reviews.

206
TECHNICAL
SUPPORT
MISSIONS
CONDUCTED

A target was established for 60% of TSMs to be focused on resolving peer review AFIs, ensuring resources were concentrated on issues with the most relevance to safety and reliability. The average performance measured for TSMs across WANO in 2015 was 66%, varying between 62% and 69%.

WANO performance indicators (PI) support the exchange of operating experience information by collecting, trending and disseminating nuclear plant performance data. Industry and individual unit performance against the targets saw little change from 2014 results in PI target areas, with stability or modest progress in most areas.

In addition, 12 Good Practices, one Guideline and one Principle were published, and one Guideline was revised. The most prevalent topics of good practices were Radiological Protection and Radiological Safety.



4. Professional & Technical Development

One way to prevent accidents is to help staff increase their skills and knowledge so they can deal with safety issues before they become problems.

In 2015, the regional centres organised 48 WANO-specific events with this ideal in mind, including 28 workshops, 15 seminars, one expert meeting and two training courses, covering topics such as leadership, digital control systems and operating experience. This exceeded the WANO goal of 25 such activities per year.

Paris Centre, with support of the London and Hong Kong Offices, conducted a Pre-Startup Conference in Guangzhou, China in July 2015.

48
WANO
WORKSHOPS,
SEMINARS
& EXPERT
MEETINGS

The purpose of the conference was to share experience related to the commissioning, start-up and first period of operations of new nuclear power plants.

In September, the WANO Biennial General Meeting (BGM) was conducted in Toronto, Canada with the theme of Shaping the Future of the Nuclear Industry. Feedback from the participants was positive with 85% stating that it met or exceeded their expectations.

Planning also began for the 2016 Site Vice Presidents' & Plant Managers' Conference, which will be held in Budapest, Hungary, with the theme, Back to Basics.



5. Communications

In 2015, the WANO Communications Group successfully carried out a globally integrated communications campaign introducing Compass, WANO's new long-term plan for 2015-2019, to the WANO staff, regional governing boards, members and the wider industry.

The Communications team was involved in the new WANO Member Website project, including working closely with the IS team to contract a designer and developer, creating the 'vision' for the new site, and approving the look and feel. The project continues into 2016 when the website will be rolled out and promoted to the staff and membership.

@ WANO MEMBER WEBSITE PROJECT BEGAN

The Communications team was also involved in the planning and execution of the WANO Biennial General Meeting (BGM). Due to the increase in the Communications staff and its capabilities, the team was able to take on additional activities to add value to the event and produce significant amounts of material in-house.

Other notable publications that the programme team created in 2015 include the Traits of a Healthy Nuclear Safety Culture pocketbooks, This is WANO information leaflet, updated WANO Member World Map and WANO Review.

Governance & Structure

WANO consists of a main governing board, a central office in London and regional centres in Atlanta, Moscow, Paris and Tokyo, each with their own regional governing boards



Ken Ellis, Jacques Régaldo & Duncan Hawthorne

The leadership of WANO saw some changes in 2015. In July, WANO Chief Executive Officer (CEO) Ken Ellis announced his intent to retire, and in November Peter Prozesky of EDF was selected by the WANO Governing Board as WANO CEO effective 1 January 2016. Additionally, in October, Dr Seok Cho of Korea Hydro and Nuclear Power Co Ltd (KHNP) was elected to succeed Duncan Hawthorne of Bruce Power as WANO President. Jacques Régaldo of EDF continued in the position of WANO Chairman.

In February 2015, Vasily Aksenov was elected by the Moscow Regional Centre Governing Board to succeed Mikhail Chudakov as the Moscow Centre Director.

Four new governors joined the WANO Governing Board in 2015. Jean-Bernard Lévy replaced Henri

4 NEW MEMBERS OF WANO'S GOVERNING BOARD

Proglio, both of EDF, and Andrey Petrov of Concern Rosenergoatom replaced Evgeny Romanov. William Johnson of Tennessee Valley Authority succeeded Thomas Mitchell as Chairman of the Atlanta Centre Regional Governing Board while János Tóth of MVM succeeded Sándor Nagy as Chairman of the Moscow Centre Regional Governing Board.

In April, the WANO Governing Board approved Compass, WANO's long-term plan 2015-2019. This new strategic plan is intended to guide the organisation through the next five years in a manner that supports WANO's existing activities while paving the way for the organisation to become more effective in key areas such as new build and end-of-life, life extensions and decommissioning of plants.



NEW LONG-TERM PLAN, COMPASS, IS PUBLISHED

Membership

WANO: Growing to meet the needs of an expanding industry



128
WANO MEMBERS

At the end of 2015, there were 128 members in WANO's four membership categories.

Membership changes in 2015 reflected broader trends in the nuclear industry. In July, the WANO governors approved two new applications for membership. A Category 1 membership application was submitted by the

Republican Unitary Enterprise Belarusian Nuclear Power Plant. MVM Hungarian Electricity Private Ltd Company, the corporate organisation MVM Hungarian Electricity, applied for Category 3 membership in addition to the existing Category 1 membership of MVM Paks Nuclear Power Plant.

In October, governors approved the application for Category 1 membership for Paks II Nuclear Power Plant Development Ltd. The application was made by the new build in preparation for construction. A membership application was also approved for CANDU Owners Group Inc (COG) for Category 3 membership.

WANO Members*

* Member data as of 31 December 2015



Koeberg Nuclear Power Station

Atlanta Centre

Ameren Missouri	Duke Energy Corporation	Luminant	Southern Nuclear Operating Company
American Electric Power	Energy Northwest	Nebraska Public Power District	State Nuclear Power Demonstration Plant
Atomic Energy of Canada Limited	Entergy Nuclear	New Brunswick Power	State Nuclear Power Technology Corporation (SNPTC)
Bruce Power	Eskom Holdings SOC Limited	NextEra Energy, Inc.	STP Nuclear Operating Company
CANDU Owners Group	Exelon Corporation	Omaha Public Power District	Tennessee Valley Authority
Centrala Nuclearelectrica Cernavoda	FirstEnergy Corp.	Ontario Power Generation	Wolf Creek Generating Station
China Huaneng Group	Horizon Nuclear Power Limited	PG&E Corporation	Xcel Energy Inc.
China Power Investment Corporation	Huaneng Shandong Shidao Bay Nuclear Power Co., Ltd	Pinnacle West Capital Corporation	Emirates Nuclear Energy Corporation (S)
Comision Federal de Electricidad	Hydro-Quebec	PPL Corporation	WANO Atlanta Centre
Dominion	Institute of Nuclear Power Operations	Public Service Enterprise Group, Inc.	
DTE Energy Corporation		SCANA Corporation	

WANO Members*

* Member data as of 31 December 2015



Novovoronezh Nuclear Power Plant

Moscow Centre

Haykakan Atomayin Electrakayan CJSC
CEZ, a.s.

Concern Rosenergoatom

Federal State Unitary Enterprise of
Atomic Fleet (FSUE Atomflot)

Fortum Power and Heat Oy

Ignalina Nuclear Power Plant

Jiangsu Nuclear Power Corporation

JSC Atomenergoremont

JSC Atomtechenergo

JSC Atomtechexport

JSC OKB Hidropress

Kozloduy NPP Plc

MVM Hungarian Electricity Private Limited
Company

MVM Paks II. Nuclear Power Plant
Development Private Company Limited by
Shares

MVM Paks Nuclear Power Plant Ltd

NNEGC Energoatom

Nuclear Power Corporation of India
Limited

Nuclear Power Production and
Development Company of Iran

Republican Unitary Enterprise Belarusian
Nuclear Power Plant

Slovenské elektrárne, a.s.

State Specialized Enterprise Chernobyl
Nuclear Power Plant

VNIIAES

WANO Moscow Centre

WANO Members*

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Embalse Nuclear Power Station

Paris Centre

AREVA	EDF Energy	Liaoning Hongyanhe Nuclear Power Co., Ltd	Swedish Nuclear Fuel and Waste Management co. SKB
Asociación Nuclear Ascó - Vandellós II, A.I.E. (ANAV)	Electrabel	Magnox Ltd	Swissnuclear
Axpo AG	EnBW Kernkraft GmbH	N.V. elektriciteits - Produktiemaatschappij Zuid - Nederland (EPZ)	Taishan Nuclear Power Joint Venture Co. Ltd
BKW Energie AG	Forsmarks Kraftgrupp AB	Nuclear Decommissioning Authority	Teollisuuden Voima Oyj (TVO)
CC.NN. Almaraz-Trillo, A.I.E.	Fujian Ningde Nuclear Power Co.	Nuclenor, S.A.	Vattenfall AB
China General Nuclear Power Corporation (CGN)	Gas Natural	Nucleoeléctrica Argentina S.A. (NA-SA)	VGB PowerTech e.V.
Daya Bay Nuclear Power Operations and Management Co., Ltd	Guangxi Fangchenggang Nuclear Power Co., Ltd (FCGNP)	Nuklearna Elektrarna Krško	Yangjiang Nuclear Power Co., Ltd (YJNP)
E.ON Kernkraft GmbH	IBERDROLA Generación Nuclear, S.A.	Ringhals AB	Eletróbrás Termonuclear - Eletronuclear S.A. (S)
EDF	Kernkraftwerk Gösgen-Däniken AG	RWE Power AG	WANO Paris Centre
	Kernkraftwerk Leibstadt AG	Sellafield Ltd	

WANO Members*

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Tomari Nuclear Power Plant

Tokyo Centre

China National Nuclear Corporation

Chubu Electric Power Company, Inc

Electric Power Development Co., Ltd

Fujian Fuqing Nuclear Power Company Ltd

Hainan Nuclear Power Co., Ltd

Hokkaido Electric Power Company Inc.

Hokuriku Electric Power Company Inc

Japan Atomic Energy Agency

Japan Nuclear Safety Institute

Japanese Nuclear Operators (JNO)

Korea Hydro & Nuclear Power Co., Ltd.
Kyushu Electric Power Company, Inc

Nuclear Power Corporation of India
Limited

Nuclear Power Qinshan J.V.C., Ltd

Pakistan Atomic Energy Commission

Qinshan Nuclear Power Company Ltd

Sanmen Nuclear Power Company Ltd

Shikoku Electric Power Company, Inc.

Taiwan Power Company

The Chugoku Electric Power Company,
Inc.

The Japan Atomic Power Company, Inc

The Kansai Electric Power Company, Inc.

Third Qinshan Nuclear Power Company,
Ltd

Tohoku Electric Power Company,
Incorporated

Tokyo Electric Power Company Holdings, Inc.

WANO Tokyo Centre



ATLANTA
LONDON & HONG KONG
MOSCOW
PARIS
TOKYO