

**巾核武汉核电运行技术股份有限公司 CHINA NUCLEAR POWER OPERATION TECHNOLOGY CORPORATION, LTD.** 

# International Conferenceon Enhancing the **Operational Safety of Nuclear Power Plants**

# Practice of Root Cause Analysis

Gao Shunlong China Nuclear Power Operation Technology Corporation, Ltd. Abstract ID Number: #68

In its capacity as the technical support company for operation experience feedback of China National Nuclear Power Co., Ltd. (hereinafter referred to as "CNNP"), China Nuclear Power Operation Technology Corporation, Ltd. (hereinafter referred to as "CNPO") has consistently prioritized the precision of root cause analysis pertaining to nuclear power plant events, especially those related to nuclear safety, and completed a variety of responsibilities, including theoretical and methodological research, technical support, and information technology advancement in the field of root cause analysis.

## Advanced Design and Organization of Root Cause Analysis Training

CNPO has developed an advanced root cause analysis training course based on case analysis and provides annual training for all CNNP' s subsidiary nuclear power plants to consistently retain advanced root cause analysis specialists and maintain a high level of root cause analysis capability. This training has significantly enhanced the trainees' comprehension of root cause analysis technology and optimally optimized the efficiency of the root cause analysis for events through group competition, simulated investigation and role play of specific cases, comments and experience sharing by industry root cause analysis experts.

Quantitative Assessment and Trend Monitoring of Root Cause Analysis Report Quality

CNPO undertakes the event root cause analysis report quality assessment of all CNNP's subsidiary nuclear power plants. It has developed quantitative assessment criteria for root cause analysis report of the event and ensured





Guidance and Recommendation for Investigation and Analysis of Significant Events

CNPO provides the guidance of the investigation and analysis of significant events going at CNNP's subsidiary nuclear power plants. CNPO serves as data and technical foundation for guaranteeing the quality of event root cause analysis and provides guidance and recommendations for the investigation and analysis direction of events at CNNP's subsidiary nuclear power plants by analyzing simi-lar historical events, utilizing the knowledge and insights of technical experts, and following the direction guidance of root cause analysis experts. Furthermore, CNPO continues to gather and categorize reports of root cause analysis for events from CNNP's subsidiary nuclear power plants. CNPO is also constructing a database that correlates events-failures-root causes, and employs big data and artificial intelligence to generate intelligent recommendations for event in-

vestigation and analysis.



from multiple fields of the industry, special topic video conference review of CNNP' s fleet of nuclear power plants, quality scoring of root cause analysis reports, etc. The quantitative assessment and trend monitoring of the events root cause analysis quality have been realized.

### Development and Application of Root Cause Analysis Software

The software and database developed by CNPO for the investigation and analysis of nuclear power plant events can significantly enhance the accuracy and effectiveness of such processes by aiding in-



vestigators in identifying the root causes via problem selection, investigation guidance, and level-by-level analysis. Moreover, CNPO continues to optimize the software with the aid of big data and artificial intelligence in order to conduct intelligent analysis of event root causes.

### Achievement

With the support and assis- 30 tance of CNPO, the operation <sup>25</sup> experience feedback value of 20 nuclear power plant events has effectively utilized, the quantity of events for unplanned turbine trip or re



中国核电WANO综合指数满分机组数量(2019-2023)

actor shutdown of all CNNP's subsidiary nuclear power units has significantly decreased since 2018, which has promoted the continued growth of the World Association of Nuclear Operators (WANO) performance indicators such as WANO Composite Index-Average and WANO Full Scale Unit Quantity, and operating performance of the nuclear power plants has steadily improved.