



Flow measurements in Nuclear Power Plants Work Shop Programme

Tuesday May 20 (Embassy of Sweden, 1-10-3-100, Roppongi, Tokyo)

09:15 Registration and tea/coffee

10:00 Welcome
Swedish ambassador and NISA, Japan

10:15 Introduction
Anders Andersson - SP, Sweden

10:30 Measurements and regulations: the feed water example
Kristina Johansson - SKI, Sweden

11:15 Coffee/tea

11:45 The issue of flow measurement and its impact on reactor power measurement: EDF's strategy for reliable monitoring, detection and correction for its PWR fleet
Dr Jean-Méline Favennec - EDF, France, J. Zornoza, J. Veau (EDF R&D, O. Piedfer (Nuclear Generation Branch)

12:30 Traceability and calibration
Dr M. Takamoto - NMIJ, Japan

13:00 Lunch

14:00 Experimental and Numerical Investigation of the Discharge Coefficient of Flow Nozzles
Hiroshi Ikeda, Toshiaki Suzuki, Kenji Arai and Masaaki Matsumoto - Toshiba Corporation

14:45 The evaluation of the Ultrasonic Flowmeter for Power uprating in Japan
Prof. K. Okamoto - University of Tokyo, Japan

15:30 Measurement Uncertainty - standardised calculation and methods
Dr P. Lau - SP, Sweden

16:15 Development of a New Doppler Ultrasonic Flowmeter for Feed Water Measurement at Nuclear Power Plants
Dr. M. Mori - R & D Center of Tokyo Electric Power Co., Japan
- 17:00 (approx)

18:30 Exhibition & Coctail Party
at ANA Intercontinental Hotel (Banquet hall GLORY)
- 20:30 (approx)

Wednesday May 21

Technical visit to NMIJ flow laboratory in Tsukuba

We will travel by bus to Tsukuba, located about 100 km north-west of Tokyo. After arrival we will first listen to a presentation and then have a tour of the laboratory and especially its new facilities for calibration and test of feed water flow meters. During the day we will also learn more about Reynolds number simulation and temperature effect on flow meters. We will be back in Tokyo at about 17:00, depending on traffic conditions.

9:00 Departing the Hotel in Tokyo by bus

10:30 Arriving at AIST Main Site, Headquarter Building (Central No.2)

10:45 Welcome Greetings from AIST, NMIJ at Conference room

11:10 Introduction to NMIJ Flow laboratory in Tsukuba
Noriyuki Furuichi - NMIJ, Japan

11:40 Calculation of flow rate from differential pressure according to standards
Dr P. Lau - SP, Sweden

12:20 Lunch in the conference room (Sandwich and drink bar)

13:10 Departure to North Site of AIST

13:50 Arriving at North Site, Technical visit in 3 groups

14:50 Questions and discussions

15:20 Leaving for Tokyo

17:00 Arriving at Hotel in Tokyo

Thursday May 22

09:30 Flow metering techniques - general principles

Anders Andersson - SP, Sweden

10:00 Ultrasonic type flow meters

Calvin Hastings - Cameron/Caldon, USA

10:45 Tea/coffee

11:15 Orifice and Venturi type flow meters

Henrik Lisberg - EMCO Controls, Denmark

12:00 New Developments in Ultrasonic Flowmeters for Feedwater Applications

André Boer - KROHNE, the Netherlands

12:45 Tracer measurement technique and its application to on-site feed water calibration and performance analysis of nuclear power plants

Dr. Naoki Yamada and Dr Gunnar Lindberg - ALSTOM, Switzerland

13:30 Lunch

14:30 Field experience of measuring Feedwater Flow using an externally mounted Cross-Correlation Ultrasonic Flow Meter

Dr Yuri Gurevich - AMAG, Canada

15:15 A quality control system for all measurements and their estimated uncertainties

Magnus Langenstein - BTB Jansky, Germany

16:00 Can data monitoring reduce uncertainty?

Thomas Lederer - PTB, Germany

16:45 Coffee/tea

17:00 Summary and discussion

- 17:30 (approx)

Friday May 23

Technical visit to Tokyo Electric Power Co. power plant in Kashiwazaki

Today we will visit Tokyo Electric Power Co. power plant in Kashiwazaki, the biggest power stations in the world with a production capacity of more than 8 GW. In this station there are feed water lines with serial connected instruments of different working principles, and we will learn more about experience and results from such installations. Since the reactors are closed due to earthquake damage, it will be possible for us to enter the buildings to see meter installations and other details. We will also be able to see how the security system could protect the power plant during the earthquake. To enter restricted areas everyone has to use special protection clothes and the tour will be guided in groups of 10. Kashiwazaki is situated about 220 km north east of Tokyo and we will travel by Shinkansen bullet-train. Time schedule below is approximate.

9:00 Departing from Hotel in Tokyo by Subway

10:12 Departing from Tokyo St. by Shinkansen Super Express 317

11:56 Arriving at Nagaoka St.

12:00 Departing from Nagaoka St. by bus ("pic-nic lunch" in bus)

12:40 Arriving at Kashiwazaki TEPCO NPP

13:00 Technical Visit (about 3 hours)

16:00 Leaving from Kashiwazaki TEPCO NPP by bus

16:40 Arriving at Nagaoka St.

17:07 Leaving from Nagaoka St. by Shinkansen Super Express 338

19:00 Arriving at Tokyo Station

May 19 - Pre Start Tour / Visit to Kamakura

Already on Monday we plan to make a pre-start of the work shop with a sightseeing tour for those arriving to Tokyo early and interested in a small piece of Japanese culture. The plans are preliminary; please check our website www.sp.se/event for further information.