



International Workshop on External Flooding Hazards at Nuclear Power Plant Sites

Jointly Organized by:
Atomic Energy Regulatory Board of India,
Nuclear Power Corporation of India Ltd., and
International Atomic Energy Agency

29 August - 2 September 2005
Kalpakkam, Tamil Nadu, India.

WORKSHOP PROGRAMME

Monday, 29th August 2005	
INAUGURAL SESSION	
08:30-09:00	Registration
09:00-10:30	Inaugural Session
10:30-11:00	Tea/Coffee Break
Session 1:	OPENING ADDRESS
	Chairmen: Mr. S. K. Sharma and Mr. S A Bhardwaj /India
11:00-11:10	Introduction of participants and Workshop Programme
1. 11:10-11:50 (40')	Opening address: " <i>Oceanographic expedition to study the post-tsunami impact in the Bay of Bengal and in the Andaman and Nicobar Islands</i> ", by K.S.R. Murthy, National Institute of Oceanography (NIO), India.
2. 11:50-12:30 (40')	Opening address: " <i>IAEA Safety Standards on flooding hazards including site evaluation and design aspects</i> ", Antonio R. Godoy, IAEA/NSNI/ESS.
3. 12:30-13:10 (40')	Opening address: " <i>An Outline of Japanese safety examination of a NPP on the Anti-Tsunami Design</i> ," Yuichi Uchiyama, Japan Nuclear Energy Safety Organization, (JNES), Japan.
13:10-14:30	Lunch Break



Monday, 29th August 2005

Session 2: 2. EXPERIENCES AND CASE STUDIES ON EXTERNAL FLOODING HAZARDS

Session Chairmen: Mr. Antonio Godoy/IAEA and Mr. H. S. Kushwaha /India.

4. 14:30-15:00 *“The destruction impact of tsunami event in Aceh, December 2004 - A field experience and mitigation techniques”*, by Berny A Subki, Ministry of Marine Affairs and Fisheries, Indonesia.
5. 15:00-15:30 *“Mapping ‘Flood Inundation Patterns’ in and around Kalpakkam NPP site using ‘Geoinformatics’ techniques”*, S.K. Pathan, R.J. Bhanderi and Vinoth Kumar, Space Applications Centre (ISRO), Ahmedabad, P. Sasidhar and S.K. Chande, AERB, India
6. 15:30-16:00 *“Severe storm resulting in partial plant flooding in Le Blayais Nuclear Power Plant”*, by Eric Vial and Vincent Rebour, Institut de Radioprotection et de Sûreté Nucléaire (IRSN), and Bernard Perrin (EdF), France.

16:00-16:30 Tea/Coffee Break

Session 3: 2. EXPERIENCES AND CASE STUDIES ON EXTERNAL FLOODING HAZARDS

Session Chairmen: Mr. Ki-Sig Kang/IAEA and Mr. S.C.Chetal/India.

7. 16:30-17:00 *“Establishment of safety related site characteristics based on consideration of external sources of flooding at NPP sites in the USA”*, by Dr. Rajiv Prasad, Pacific Northwest National Laboratory, USA.
8. 17:00-17:30 *“Flooding incident of Kakrapar Atomic Power Station in June 1994”*, Giridhar Kota, Samota Arun, Hajela Sameer, U.S.P. Verma, Bharadwaj S.A., NPCIL, India.
9. 17:30-18:00 *“Need for coastal protection against tsunami”*, Kudale M.D. and Poonawala I. J., Central Water and Power Research Station, India.

20:00 • **Official Dinner**

Chairmen: Mr. U. S. P. Verma and Mr. Prabir C. Basu /India



Tuesday, 30th August 2005

Session 4: 2. EXPERIENCES AND CASE STUDIES ON EXTERNAL FLOODING HAZARDS

Session Chairmen: Mr. Kenji Satake/Japan and Mr. R. Prabhakar/India.

10. 08:30-09:00 *“Seismic and flood hazard analysis in periodic safety review of Angra 1 NPP”*, by Prates Martins, Carlos L, Eletrobras Termonuclear S/A-Eletronuclear, Brazil.
11. 09:00-09:30 *“Tsunami flood protection adopted in Vandellós II Spanish NPP”*, José Sánchez-Cabañero, Nuclear Safety Council, Spain.
12. 09:30-10:00 *“Simulation analyses of tsunami caused by Chilean and Nihon-kai Chubu earthquakes at NPP Sites in Japan”*, by Kazunari Mori, (JNES), Japan.
13. 10:00-10:30 *“Safety review of design against external flooding of QNPC”*, by Jian Cao, Qinshan Nuclear Power Co., China.
14. 10:30-11:00 *“The introduction of flooding hazards defence design in Qinshan Phase II NPP”*, by Jianhua Qin, Nuclear Power Qinshan JVC Ltd., China.

11:00-11:30 Tea/Coffee Break

Session 5: 2. EXPERIENCES AND CASE STUDIES ON EXTERNAL FLOODING HAZARDS

Session Chairmen: Mr. Prabhat Kumar/India and Mr. Antonio Godoy/IAEA.

15. 11:30-12:00 *“Tsunami Motions with soliton fission and tsunami wave forces on breakwater”*, by Tsutomu Sakakiyama, Central Research Institute of Electric Power Industry, Japan.
16. 12:00-12:30 *“Sea flood evaluation for the North-western coast of Egypt”*, by Elsady, Farhat Gmma Farha, Nuclear Power Plant Authority, Egypt.
17. 12:30-13:00 *“Hydrological hazard for NPP siting: Indonesian Case”*, by, Arnold Soetrisnanto, National Nuclear Energy Agency, Indonesia.
18. 13:00-13:30 *“Geology of Andaman, Nicobar and Sumatra, Seismicity, Tsunamigenic Potential”*, by V. Balachandran, M. Raiu and B.K. Bhandaru, Geological Survey of India, India.

13:30-15:00 Lunch Break

15:00- > (18:00) Technical Tour: Visit to Kalpakkam Nuclear Facilities
(to be adjusted to the final programme)
Session Chairmen: Mr. Prabir C. Basu and Mr. U. S. P. Verma/India.
(detailed programme of the visit to be confirmed during the workshop)



Wednesday, 31st August 2005

Session 6: 3. CURRENT METHODOLOGIES AND TECHNIQUES FOR TSUNAMI FLOODING HAZARD ASSESSMENT (ANALYTICAL AND EXPERIMENTAL).

Session Chairmen: Mr. Goutam Bagchi/USA and Mr. A. Jimenez Juan/Spain.

19. 08:30-09:30 **Keynote lecture** “*Numerical simulation for tsunami generation, propagation and coastal behaviours*”, by Kenji Satake, Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology, Japan
20. 09:30-10:00 “*Tsunami modelling in the Mediterranean Sea: a review and perspectives*”, by Prof. Fabio Romanelli, International Centre for Theoretical Physics (ICTP), Italy.
21. 10:00-10:30 “*Numerical simulation of tsunami: a Case Study*”, by P. K. Sharma, B. Ghosh, R. K. Singh, A. K. Ghosh, H. S. Kushwaha, Bhabha Atomic Research Centre, India.

10:30-11:00 Tea/Coffee Break

Session 7: 3. CURRENT METHODOLOGIES AND TECHNIQUES FOR TSUNAMI FLOODING HAZARD ASSESSMENT (ANALYTICAL AND EXPERIMENTAL).

Session Chairmen: Mr. Jose Sanchez Cabañero/Spain and Mr. Goutam Bagchi/USA.

22. 11:00-11:30 “*Flood risk due to tsunami and tropical cyclones and the effects of tsunami excitation on tsunami propagations*”, by Deepak Vatvani, Marine and Coastal Management WL, Netherlands.
23. 11:30-12:00 “*Probabilistic tsunami hazard analysis in Japan*”, by Tadashi Annaka, Tokyo Electric Power Service Co., Japan.
24. 12:30-13:00 “*PSA Integrated Program in Spain: External Flooding Hazards and Other External Events at NPP Sites*”, by Antonio Jimenez Juan, Nuclear Safety Council, Spain.

13:00-14:30 Lunch Break



Wednesday, 31st August 2005

Session 8: 3. CURRENT METHODOLOGIES AND TECHNIQUES FOR TSUNAMI FLOODING HAZARD ASSESSMENT (ANALYTICAL AND EXPERIMENTAL).

Session Chairmen: Dr. A. K. Ghosh/India and Mr. Gernot Thuma/Germany.

25. 14:30-15:00 *“Tsunami Evaluation Method for NPP Site in Japan”*, by Toshiaki Sakai, Tokyo Electric Power Company (TEPCO), Japan.
26. 15:00-15:30 *“Safety assessment for tsunami hazards at Tomari NPP”*, Yo Sakamoto, Hokkaido Electric Power Co., Japan
27. 15:30-16:00 *“Safety assessment for tsunami hazards at Onagawa NPP”*, by Masanori Kobayashi, Tohoku Electric Power Co. Japan.
28. 16:00-16:30 *“Geodynamic and geophysical factor controlling the intensity of tsunamigenic ways and resulting on coastal damage”*, by S. K. Verma, National Geophysical Research Institute, India.

16:30-17:00 Tea/Coffee Break

Session 9: 3. CURRENT METHODOLOGIES AND TECHNIQUES FOR TSUNAMI FLOODING HAZARD ASSESSMENT (ANALYTICAL AND EXPERIMENTAL).

17:00 – 18:00 Panel Discussions: “Methodologies and Techniques for tsunami hazard assessment”

Moderators: Antonio R Godoy/IAEA and P. Basu/India

Panel: Kenji Satake/Japan, Fabio Romanelli/Italy, Toshiaki Sakai/Japan, Deepak Vatvani/Netherlands, A. K. Ghosh/India, F. Schindele/France and A. Jiménez Juan/Spain.



Thursday, 1st September 2005

Session 10: 4. WARNING SYSTEMS AND EMERGENCY PLANNING AND PREPAREDNESS IN RELATION TO OPERATIONAL ASPECTS.

Session Chairmen: Mr. Kenji Satake/Japan and Dr. P. C. Basu/India.

29. 08:30-09:30 **Keynote lecture** “*UNESCO/IOC Tsunami warning and mitigation programs*”, by Francois Schindele, Commissariat a l’Energie Atomique (CEA) and ICG/ITSU, France.
30. 09:30-10:00 “*Tsunami Warning System in Japan*”, by Yuichi Uchiyama, Japan Nuclear Energy Safety Organization (JNES), Japan.
31. 10:00-10:30 “*A real time seismic monitoring and tsunami alert system*”, by Falguni Roy and G.J. Nair, Bhabha Atomic Research Centre, India.

10:30-10:45 Tea/Coffee Break

Session 11: 4. WARNING SYSTEMS AND EMERGENCY PLANNING AND PREPAREDNESS IN RELATION TO OPERATIONAL ASPECTS.

Session Chairmen: Dr. G. J. Nair/India and Mr. Kenji Satake/Japan.

32. 10:45-11:15 “*Earthquake Notification System*”, K. Sriramchandr, S.A.V Satya Murty, S. Athinarayanan, P. Swaminathan, Dr. Baldevraj, Indira Gandhi Center for Atomic Research, India.
33. 11:15-11:45 “*Flood hazard assessment for Loviisa NPP*”, Pentti E. Varpasuo, Fortum Nuclear Services Ltd., Finland.
34. 11:45-12:10 “*IAEA’s Contribution on Plant Life Management of Nuclear Power Plants*”, by Ki-Sig Kang, IAEA/NE.

12:10-13:30 Panel Discussions: “Tsunami Warning Systems and NPP operational safety”

Moderators: Dr. P. C. Basu/India and Antonio R Godoy/IAEA

Panel: Eric Vial/France, Falguni Roy/India, Kenji Satake/Japan, Yuichi Uchiyama/Japan, Goutam Bagchi/USA, Francois Schindele/France,

13:30-14:30 Lunch Break

14:30 - > Workshop Social Event:

- **Visit to Mammallapuram.**

Chairmen: Mr. U. S. P. Verma and Mr. Prabir C. Basu /India.



Friday, 2nd September 2005

Session 12: 5. REGULATORY REQUIREMENTS IN MEMBER STATES

Session Chairmen: Mr. Vincent Rebour/France, and So Beam Jin/Korea.

35. 08:30-09:00 *“Regulatory aspects for safety of Indian NPP against external flooding hazards”*, P.C. Basu, L.R. Bishnoi, Sanjay Patel, Atomic Energy Regulatory Body (AERB), India.
36. 09:00-09:30 *“U.S. Regulatory criteria on NPP protection against external flooding”*, by Goutam Bagchi, Nuclear Regulatory Commission (NRC), USA.
37. 09:30-10:00 *“Flood protection at German NPP sites – Regulatory aspects and operating experiences”*, by Gernot Thuma, GRS, Germany.

10:00-10:30 Tea/Coffee Break

Session 13: 5. REGULATORY REQUIREMENTS IN MEMBER STATES

Session Chairmen: Mr. So Beam Jin/Korea, and Vincent Rebour/France.

38. 10:30-11:00 *“Flood hazards and design basis flood for coastal, estuary and river NPP sites in France”*, by Vincent Rebour and Patricia Dupuy (IRSN) and Celine Cheviet, (EdF), France.
39. 11:00-11:30 *“Reassessment of the protection of French NPPs against external flooding in the light of the lessons learned during the flooding of Le Blayais site in 1999”*, Patricia Dupuy and E. Vial, (IRSN), and L. Gollion (EdF), France.
40. 11:30-12:00 *“Regulatory requirements on external flooding hazards for NPP in Korea”*, by So Beam Jin, Korea Institute of Nuclear Safety (KINS), Korea.

12:00-13:30 Lunch Break

Session 14: 6. WRAP UP SESSION

Session Chairmen: Mr. Antonio Godoy and Mr. Ki-Sig Kang/IAEA.

- 13:30-16:00**
- **Sessions summary:** Report by each Session Chairmen.
 - **Recommendations to IAEA.**
 - **Identification of areas for future research.**
 - **Overall conclusions.**

Session 15: CLOSING SESSION

16:00-18:00 Closing Remarks:

- **Mr. Ken Brockman, IAEA/NSNI Director**
- **(India authority)**