It is my pleasure to present the Annual report of NPL for the year 2003-2004. It presents the work done by NPL during the period.

As per the NPL charter and as provided under the Legislations of Weights and Measures Act 1956, reissued in 1998 under the 1976 Act of the Parliament, NPL has the statutory responsibility of maintaining and upgrading the standards of physical measurements. As such NPL is recognized as the National Metrology Institute of India. It is the signatory of International Bureau of Weights and Measures (BIPM) and of the Mutual Recognition Agreement (MRA). It has to therefore maintain international equivalence of its measurement standards by participating in international comparisons. The important significance of this MRA to the country is that calibration certificates issued by NPL would automatically get recognition by all such countries wherein NPL provides traceability. The laboratory also carries out advance research in measurement standards, engineering materials, electronic materials, materials characterization, radio and atmospheric sciences, and superconductivity & cryogenics.

During the year measurement capabilities of NPL in fields of mass, volume, and density, optical radiations, pressure, Josephson Voltage, DC Voltage current & resistance, AC power and energy LF impedance, LF Voltage and current, RF voltage and power, RF attenuation and Impedence were peer reviewed by international technical experts for their inclusion in Appendix C of BIPM -MRA. NPL also participated in international intercomparison of measurement standards for pressure and vacuum, temperature and mass.

During the year NPL upgraded its standards and calibration facilities. Quantum Hall Resistance Standard was established and new automatic guage block interferometer was added at length and dimension standard, upgrading thereby the measurement capability for interferometric calibration of Gauge Blocks up to 305 mm. NPL provided services to various organizations in form of calibration testing, material characterization and technical consultancy. NPL provided technical support to BIS and NABL and TRAI (through participation of its scientists in their technical committees, technical assessments etc). NPL also coordinated proficiency testing programme funded by NABL and DST for NABL accredited laboratories.

NPL continued its efforts in developing special materials for various sectors. Spray formed blocks of Mg – Alloy with Yttrium were supplied to VSSC for testing and evaluation. NPL signed MoU with General Motors (USA) for development of Extrusion Technology for Mg Alloy.

NPL has developed a modified PbZrO₃ material (NPLZT-5H) possessing high dielectric permittivity and charge constant for detector and receiver applications. It also designed and developed an acoustic emission sensors, NPL AE, in stainless steel casing.

NPL participated in first of its kind nationwide road campaign for study of aerosols levels contributed by traffic on national highways. Besides, some very interesting results have been obtained from magnetic storm studies based on data received from SROSS-C2 and AE-series Satellites. A PC based system was designed and developed for automatic measurement of temperature and humidity vertical profiles for fog studies.
NPL contributed to human resource development in various areas by providing facilities to students for project work and training. During the year several students from reputed academic institutions carried out their project work for B.Tech./M.Sc./M.Tech. programmes, and some of the students worked for their Ph.D programme/Postgraduate programme. Training courses were organized for participants from industry and various others organizations.

The laboratory erected a new entrance gate for regulating entry to its premises from Dr K.S. Krishnan Marg. The new gate has an imposing structure especially designed to meeting its functionally requirements.

The laboratory published a total of 175 papers of which majority were in SCI-Indexed Journals. Besides 234 papers were presented at various national and international conferences. The list at Appendix-1 includes those papers published in conference proceedings. Emphasis was also given to present scientific papers in Hindi. A total of 6 patents were filed in India and abroad. 4 patent filed abroad during previous years were granted in this year. The laboratory took up 16 new sponsored projects and generated a sum of Rs. 253.74 lakhs.

It gives me pleasure to acknowledge the contributions of NPL scientists, engineers, and of staff from administration, finance, accounts, stores and purchase, of the supporting staff and the infrastructure services staff for making several notable contributions and achievements. I also acknowledge with great pleasure the contributions made by the publication committees and publication group in bringing out this report. In particular the efforts made in this regard by Dr S. M. Dhawan, Sh. S. K. Chakladar, Dr. S. K. Gupta, Dr. M. K. Goel, Dr. Ravi Mehrotra, Dr. V. N. Ojha, Dr.(Ms.) P.L. Upadhyay, Dr. T. D. Senguttuvan, Dr. (Mrs.) Rina Sharma, Dr.(Mrs.) S. Sharma and group, Sh. Sudhanshu Dwivedi, Sh. N.K. Wadhwa and Sh. V. D. Arora are highly appreciated.

(Vikram Kumar)
Director