While the diagnosis of power apparatus is an important research area to prevent failures due to the degradation of electrical insulation in advance, there are still unknown phenomena to be investigated on the degradation mechanism.

The following activities have been achieved by the Committee:

(1) Investigation on relationship between the fundamental degradation phenomena such as partial discharge, electrical and water trees, and various electrical signals due to the degradation.
(2) Investigation on present criteria for determination of the existence of degradation for power apparatus.

3 ~ 33 kV distribution power equipment was investigated including rotating machines, cables, transformers, capacitors, and switch gears.

The Committee has held 5 meetings and discussed on 58 submitted reports as of June 25, 1996. It has also asked the members from colleges lecturing on the degradation phenomena of power apparatus. Three lectures have been completed.

The Committee plans to actively participate in domestic conferences and symposiums in the field of dielectric and insulation materials. In addition, nine papers have been submitted by the Committee to Japan-China Joint Conference (AICDEI 96) to be held in October 1996.

The Committee will terminate in December 1998.

Digest Report on the Investigation Committee of the Root Principles of Electro-Optic Conversion Functions and their New Application Fields

K. Hidaka (The University of Tokyo)
T. Takada (Musashi Institute of Technology)
Y. Murooka (Musashi Institute of Technology)
T. Maeno (Ministry of Posts and Telecommunications, Comm. Res. Lab.)
N. Inoue (Mitsubishi Cables Co., Ltd.)

The plan of this investigation committee has been drawn up by Y. Murooka, T. Takada and K. Hidaka. This committee started in April, 1996 after two years discussion among DEI technical committee members and will be continued until March, 1999. The purpose of it is to review the fundamental functions and the physical properties of electro-optic conversion, to understand the essentials of the electro-optic conversion functions and to propose new engineering applications. Optical measurement techniques using the electro-optic conversion such as electro-optic effect have been developed since 1970's, and some optical devices have been incorporated into electric power systems and also have been implemented to obtain a better physical understanding of dielectric and electrical-discharge phenomena. Typical examples characterizing the electro-optic conversion functions are: Pockels effect, Kerr effect, Faraday effect, electro-gyration effect, magnetic Kerr effect, opto-magnetic effect, optical anisotropy of liquid crystal and so on. As each effect has been independently applied to some engineering fields, many useful effects will be systematically reviewed and discussed in this committee.

The items of survey are

(1) Physical root principle of electro-optic conversion functions (electro-optic effect, magneto-optic effect, opto-elastic effect, nonlinear optic effect, optical phase conjugate effect, optical anisotropy),
(2) Application technology of electro-optic conversion functions (sensors, energy conversion technology, optical telecommunication),
(3) Essential components for application of electro-optic conversion functions (light sources, optical fibers, optical crystals, photodetectors, signal processing, image processing), and
(4) Feasibility of new application of electro-optic conversion functions.

This committee consists of a chairperson (K. Hidaka), two secretaries (T. Maeno and S. Inoue) and 26 members from 11 universities and 15 companies. Six technical meetings are scheduled to be held in a