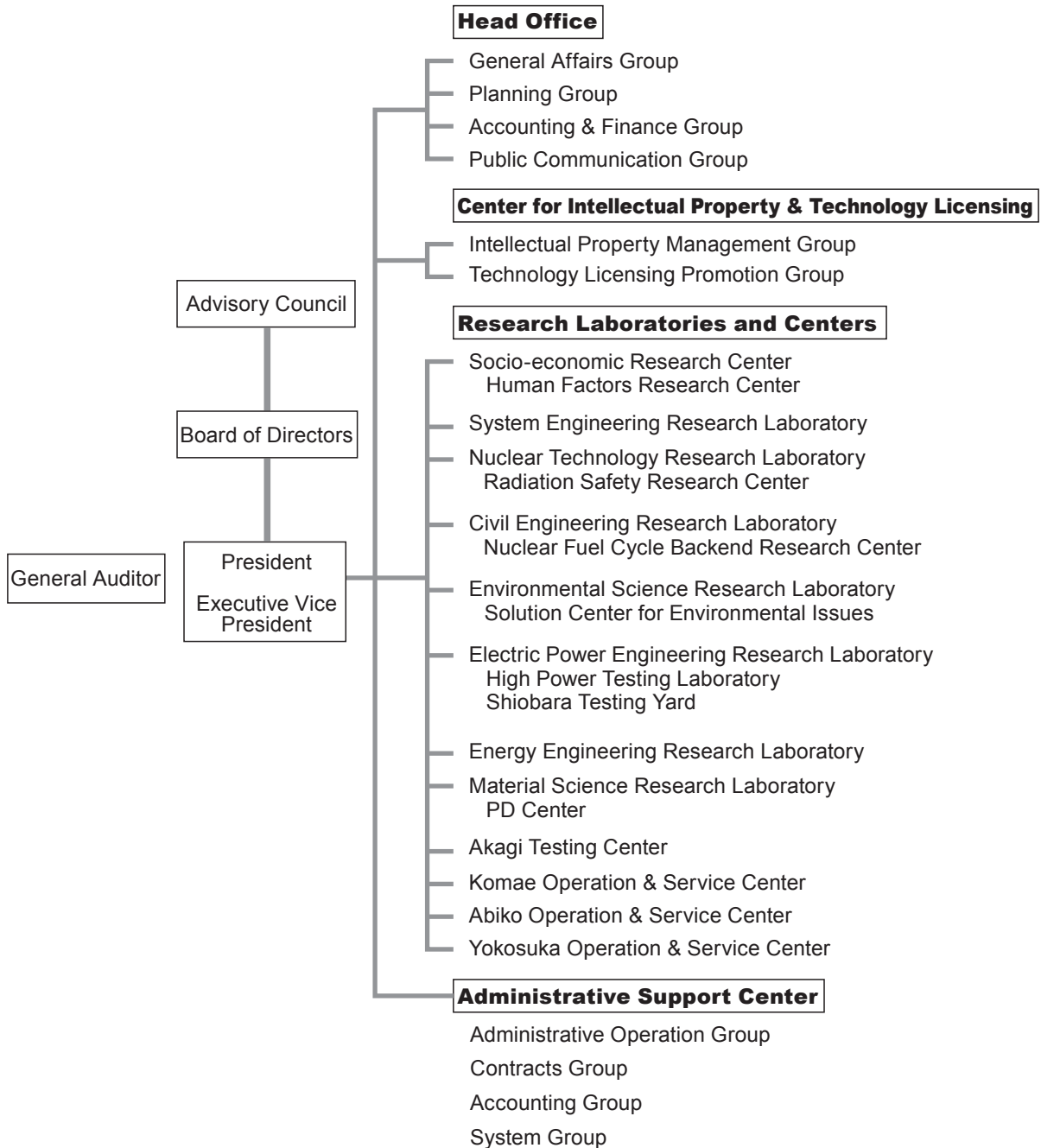


Organization of the Central Research Institute of Electric Power Industry



Central Research Institute of Electric Power Industry

Annual Research Report

Fiscal Year 2009

Contents

Contents	ii
1. Outline of Research Activities	1
1. Outline of Research Activities	2
CRIEPI's R&D Portfolio in FY2009	3
2. Principal Research Results	5
Project Subjects	
Nuclear Technology	
Irradiation Embrittlement and Structural Integrity of Reactor Pressure Vessel	6
Stress Corrosion Cracking in Light Water Reactors	8
Pipe Wall Thinning Evaluation & Seismic Evaluation of Thinned Pipeline	10
Deterioration Diagnosis of Instrumentation and Electrical Equipment	12
Transport and Storage for Recyclable Nuclear Fuel	14
High-Level Radioactive Waste Management	16
Low Level Radio Active Waste Disposal	18
Seismic Margin Evaluation of Civil-engineered Structures at Nuclear Power Plants	20
Development of Metal Fuel Cycle Technology for Practical Application	22
Elucidation of the Mechanisms of Low Dose Radiation Effects	24
Rational Radiation Safety Technology	26
Stable Power Supply Technology	
Diagnosis and Operation of Aged Transmission and Distribution Facilities	28
Evaluation of Damage to Electric Transmission Facilities Caused by Wind, Snow and Salt	30
Development of a Simple PCB Removal Method for Contaminated Transformers and Rapid PCB Measurement Method	32
Strategic Disaster Restoration Support Technology for Electric Power Distribution and Substation Equipment	34
Lightning Protection for an ICT Oriented Society	36
Disaster Prevention and Maintenance for Hydropower Facilities	38
Integrated Maintenance Technology for Inspection, Prediction and Monitoring	40
Expansion of fuel types and improvement of efficiency in IGCC	42
Utilization of Low Grade Fuels	44
Advanced Utilization Technology of Biomass and Waste	46
Thermal Power Generation Systems with CO ₂ Capture	48
CO ₂ Storage Technology	50
Environment and Energy Utilization Technology	
Long-term Global Warming Projection and Support for Adaptation	52
Severe Storm Prediction and Impact Assessment of Electric Facilities Under Global Warming	54
Design Support for Electric Kitchens	56

Highly-Efficiency Heat Pump	58
Low-loss Power Semiconductors	60
Low-loss Compact Inverter Applied Equipment	62
Secondary Battery Utilization Technology	64
R&D for Safe and Reliable Solvent-free Lithium-Ion Polymer Batteries	66
Integrated Operation and Control Techniques of Supply and Demand Sides in Autonomous Demand Area Power System	68
Next-Generation Communication Network System	70
Evaluation of Demand Response Programs	72
Trunk Power System Planning and Operation Under Large Penetration of Intermittent Generations	74
Next Generation Electric Power Equipment for Distribution System	76
Energy Technology Strategy	78
Base Technology Subjects	
Socio-economic Research Center	80
System Engineering Research Laboratory	82
Nuclear Technology Research Laboratory	84
Civil Engineering Research Laboratory	86
Environmental Science Research Laboratory	88
Electric Power Engineering Research Laboratory	90
Energy Engineering Research Laboratory	92
Materials Science Research Laboratory	94
3. Principal New Research Facilities	97
4. Activities	103
Activities	104

Important Notice

The Annual Research Report of the Central Research Institute of Electric Power Industry (CRIEPI) has historically featured the achievements of some 50 research themes selected from a large number of ongoing research themes for the fiscal year concerned as its main contents. Because of the growing popularity of our website services, the configuration of the Annual Research Report has been reviewed and it has been decided that the Annual Report will introduce the overall picture of the achievements of each research subjects pursued by the CRIEPI. One emphasis is placed on project subjects, each of which is now given two facing pages. Following this review, the part of the title indicating the year of reporting is given as “FY 2009” to refer to the fiscal year in which the reported research achievements were made instead of the previously used calendar year in which the Report is published.