

# Table of Contents

	PAGE
PART I—TORT LIABILITY AND RADIATION INJURIES .....	
INJURIES .....	2
CHAPTER I. ORIGIN AND TYPES OF RADIATION INJURIES..	3
CHAPTER II. THE GENERAL IMPACT OF ATOMIC ENERGY ON TORT LAW .....	45
CHAPTER III. NEGLIGENCE .....	83
CHAPTER IV. STRICT LIABILITY FOR RADIATION INJURIES..	635
CHAPTER V. ENTERPRISE LIABILITY IN ATOMIC ENERGY..	725
PART II—WORKMEN'S COMPENSATION AND RADIATION INJURIES .....	
	783
PART III—STATE REGULATION OF ATOMIC ENERGY	
CHAPTER I. INTRODUCTION .....	849
CHAPTER II. PUBLIC UTILITY REGULATION .....	851
CHAPTER III. HEALTH AND SAFETY REGULATION.....	880
CHAPTER IV. MISCELLANEOUS REGULATION .....	913
CHAPTER V. RECENT STATE ATOMIC ENERGY LEGISLATION AND REGULATION .....	952
CHAPTER VI. FUTURE STATE REGULATION OF ATOMIC ENERGY: A SUGGESTED STATE ACT.....	1075
APPENDIX A .....	1111
APPENDIX B .....	1193
PART IV—FEDERAL REGULATORY AND ADMINISTRATIVE LIMITATIONS UPON ATOMIC ACTIVITIES .....	
	1207
PART V—INTERNATIONAL CONTROL OF ATOMIC ENERGY .....	
	1361
CHAPTER I. ATOMS FOR PEACE—THE NEW INTERNATIONAL ATOMIC AGENCY .....	1361
CHAPTER II. SOVIET RUSSIA'S ROLE IN INTERNATIONAL COOPERATION FOR PEACEFUL USE OF ATOMIC ENERGY.....	1405
APPENDIX A .....	1457
APPENDIX B .....	1490

# Analytical Table of Contents

## PART I—TORT LIABILITY AND RADIATION INJURIES

	PAGE
CHAPTER I. ORIGIN AND TYPES OF RADIATION INJURIES.....	3
A. Introduction .....	3
B. The Scientific Background.....	4
1. Atomic Structure .....	4
2. Atomic Radiation .....	6
C. Radiation Injuries .....	8
1. Historical Background .....	8
2. Ionization .....	10
3. Measurements of Radioactivity.....	18
4. Personal Injuries .....	21
a. Radiosensitivity .....	21
b. Whole Body Exposure.....	22
c. Cumulative Effect .....	23
d. External and Internal Radiation Hazards.....	24
(1) External Sources .....	24
(2) Internal Radiation .....	26
e. Specific Personal Injuries.....	28
(1) Genetic Damage .....	28
(2) Sterility .....	30
(3) Fetal Damage .....	31
(4) Cancer .....	31
(5) Leukemia .....	32
(6) Leukopenia .....	33
(7) Damage to Bone Marrow.....	33
(8) Cataract .....	34
(9) Epilation .....	34
(10) Other Injuries .....	35
f. Conclusions .....	35
5. Property Damage .....	36
D. Sources of Radiation.....	38
1. Particle Accelerators .....	38
2. The Fission Process.....	39
3. The Fusion Process.....	41
4. Natural Radiation .....	42
E. Conclusion .....	44

	PAGE
CHAPTER II. THE GENERAL IMPACT OF ATOMIC ENERGY ON TORT LAW .....	45
A. Peaceful Uses of Atomic Energy.....	45
1. Reactors and Their Hazards.....	45
2. Radiation Sources and Their Hazards.....	60
3. Radioactive Tracers and Their Hazards.....	69
B. General Tort Liability Problems.....	75
CHAPTER III. NEGLIGENCE	
A. Introduction .....	83
1. Limitations of Discussion.....	83
2. Typical Negligence Analysis.....	84
3. Legally Significant Peculiarities of Atomic Energy Activities .....	84
4. Typical Atomic Energy Operations and Tort Liability..	87
B. The Application of Negligence Principles to Atomic Energy Cases .....	90
1. Duty—Foreseeability and Proximate Cause.....	90
2. Breach of the Duty to Use Due Care.....	99
a. General Principles Concerning the Standard of Conduct .....	100
(1) Specific Standard Not to be Found in the Cases.	101
(2) Some General Cautions to Observe.....	104
(a) An Obligation to Keep Abreast of Technological Developments—Use of Experts..	105
(b) Duty to Reduce Hazard After Accident—Obligation to Warn and Treat.....	109
(c) Duty to Use New Radiation Techniques..	110
b. Effect of Statutory or Administrative Rulings.....	114
(1) Failure to Comply.....	116
(2) Compliance as Proof of Non-Negligent Conduct	124
c. The Care Owed to Licensees and Others.....	130
d. Decided Radiation Cases and the Standard of Conduct .....	138
(1) Medical Malpractice Cases.....	138
(2) Radiation Injuries Not Involving Medical Malpractice .....	148
(3) The Use of Expert Testimony.....	155
(4) Conclusions .....	162
3. Vicarious Liability for Negligence of Independent Contractors .....	163
a. Introduction and Limitations of Discussion.....	163
b. Liability of Owner or Occupier of Property.....	164

	PAGE
(1) For Operations Performed on the Premises . . . .	167
(2) For Operations Performed off the Premises . . . .	174
(a) Decided Cases . . . . .	176
(i) Transportation . . . . .	176
(ii) Other Cases Involving Off-Site Ac- tivities . . . . .	181
(iii) Waste Disposal Operations . . . . .	186
(b) Conclusions Concerning Off-Site Opera- tions . . . . .	192
4. Damages—Interests Protected . . . . .	199
a. Introduction—Limitations on Discussion—General Theory of Compensation . . . . .	199
b. Prenatal Injuries—Post-Conception and Genetic . . . .	202
(1) Injury to the Embryo or Foetus . . . . .	204
(a) Rights of the Child . . . . .	204
(b) Rights of Next of Kin under Death Stat- utes . . . . .	214
(c) Rights of Parents Other than under Death Statutes . . . . .	215
(d) Radiation Cases . . . . .	219
(2) Genetic Damage . . . . .	221
(3) Some Suggestions Toward a Solution . . . . .	227
(a) Post-Conception Injuries . . . . .	228
(i) Recovery by Child . . . . .	228
(ii) Recovery by Next of Kin under Death Statutes . . . . .	230
(iii) Rights of Parents . . . . .	231
(iv) Conclusions . . . . .	232
(b) Pre-Conception Injuries . . . . .	232
(c) Common Problems . . . . .	233
Table of Cases—Prenatal Injuries . . . . .	236
c. Sterility and Related Injuries Involving Loss of Chil- dren . . . . .	242
(1) Decided Sterility Cases . . . . .	242
(2) Cases Denying Recovery for Mental Suffering from Loss of Child . . . . .	247
(3) Claims under Death Statutes for Grief, Loss of Society, and Comfort . . . . .	250
(4) Some Suggestions for Revision of the Law of Damages . . . . .	254
d. Increased Susceptibility to Disease . . . . .	257
(1) Non-Radiation Cases . . . . .	257

	PAGE
(a) Cases Involving Recurrence of Existing Injury .....	257
(b) Cases Involving Injury of a Type Different from Current Injury.....	260
(2) Radiation Cases .....	261
(3) The Standard of Proof Required to Prove Future Injury .....	262
(4) Conclusions .....	265
(a) When a Specific Injury is Feared.....	265
(b) When Future Injury is Only Increased Susceptibility to Disease Generally.....	266
e. Shortened Life Span.....	270
(1) English Cases .....	272
(2) Canadian Cases .....	279
(3) Other Commonwealth Cases.....	285
(4) United States Cases.....	288
(5) Some Suggestions Concerning Compensation for Shortened Life Span.....	295
(a) Comparison of Results under British and American Views .....	295
(b) Effect of Wrongful Death and Survival Statutes .....	299
(c) A Suggested Reconsideration of the Rule of Damages .....	300
(i) Recovery When the Injured Party Dies before Judgment .....	301
(ii) Recovery When Injured Party Survives but Has Shortened Life Expectancy .....	302
(iii) Recovery by Dependents for Lost Support .....	304
(d) Advantages and Disadvantages of the Recommendations .....	304
(e) Conclusions .....	308
f. Other Types of Damages.....	309
(1) Inability to Continue in Nuclear Work.....	309
(2) Psychological Injuries .....	314
(3) Lost Business Profits and Proximity of Atomic Installation .....	320
(a) Effect of Licensing—Constitutional Questions .....	326
(i) The Power of Congress.....	327
(ii) The Intent of Congress.....	348

	PAGE
(b) Effect of Licensing—Results under State Law .....	354
5. Proof Problems—Causation and Damages.....	360
a. The General Interrelationship.....	360
b. Multiple Defendants .....	361
(1) General Considerations .....	361
(2) Cumulative or Concurrent <i>Causation</i> Only— The negligence of each is a necessary link in the causal chain, or the negligence of each is suf- ficient to cause the total injury suffered and which actually caused injury cannot be deter- mined .....	365
(3) Cumulative or Concurrent <i>Contribution to Amount of Injury</i> —The extent of plaintiff's in- jury results from the accumulation of injurious impact from several sources, usually there being no causal connection between the sources but there being a contribution by each to the total single compensable injury.....	370
(a) Liability for Another's Negligence Assessed Because of a Legally Imposed Status Rela- tionship .....	372
(i) Concert of Action.....	372
(ii) Vicarious Liability .....	374
(iii) Common Duty .....	374
(b) Cumulative Contributions from Several <i>Negligent</i> Sources Legally Unrelated Ex- cept Each Contributes to the Total Single Injury .....	375
(i) Cases to be Distinguished.....	376
(ii) Cumulative or Concurrent Nuisance Cases Involving Negligence.....	377
(iii) Other Concurrent Contribution Cases Involving Negligence .....	401
(c) Alternative Liability— <i>Specific wrongdoer</i> who caused injury <i>unknown</i> although an identifiable group which includes the wrong- doer can be found.....	405
(i) All Potential Defendants Negligent..	409
(ii) Only One Defendant Negligent.....	415
(iii) Effect of Common Insurance Carrier.	417
(d) Cumulative Effect from Innocent Source..	418

	PAGE
c. Proof of Cause and Damage Generally . . . . .	421
(1) Proof of Radiation Injuries and the Law of Probabilities . . . . .	423
(a) Some General Considerations as to Proof of Biological Cause . . . . .	425
(b) The Legal Standard Required to Prove Cause-in-Fact . . . . .	428
Table of Cases—Problems of Proof . . . . .	430
(c) Kinds of Evidence Used . . . . .	448
(i) Circumstantial . . . . .	448
(ii) Expert Testimony . . . . .	449
(iii) The Use of Statistics, Scientific Treatises, and other Scientific Data . . . . .	450
(d) Use of Statistics in Personal Injury Cases . . . . .	456
(2) Future Injury—Standard of Certainty and Statistical Proof . . . . .	465
(a) Future Injury Preceded by Compensable Injury . . . . .	467
(b) Future Injury Not Preceded by Compensable Injury . . . . .	487
(3) Application of Proof Rules and Present Scientific Opinion . . . . .	495
(a) Specific Types of Radiation Injuries . . . . .	496
(i) Leukemia . . . . .	496
(ii) Pre-Birth Injuries—Genetic Damage . . . . .	498
(iii) Shortened Life Span . . . . .	501
(iv) Increased Susceptibility to Disease . . . . .	504
(v) General Somatic Effects . . . . .	505
(b) Other Legally Significant Scientific “Facts” . . . . .	505
(c) Conclusions . . . . .	507
(4) Some Recommendations . . . . .	511
(a) Inadequacies in the Present System . . . . .	512
(b) Suggestions for Modification of our Present Rules . . . . .	513
(c) Administration of the “Contingent Injury Fund” . . . . .	516
(d) Some Not Dissimilar Experience in New York . . . . .	522
(e) Concepts of the Civil Law Concerning Principles of Damages . . . . .	527
(f) Conclusions . . . . .	532

	PAGE
6. Application of <i>Res Ipsa Loquitur</i> Concepts.....	533
a. In General .....	533
(1) Development .....	534
(2) Prerequisites for Applying.....	536
(a) Nature of the Accident.....	536
(b) "Control" by the Defendant.....	539
(c) Eliminating the Party Injured.....	549
(3) Procedural Effect .....	550
b. In Radiation Cases.....	552
(1) Radiation Injury Characteristics.....	552
(2) Precedent: The X-Ray Cases.....	554
(3) Application of Principles in Other Radiation Cases .....	562
(a) Negligence Probability .....	563
(i) Expert Testimony .....	563
(ii) Accident Experience in Operations..	567
(iii) Relationship of Parties.....	568
(iv) Dangerous Instrumentality .....	569
(b) Defendant's Control .....	571
C. Insurance and Indemnity.....	572
1. Introduction .....	572
a. What the Amendment Does.....	573
b. What the Amendment Does Not Do.....	574
2. The Program in Detail.....	576
a. Nuclear Incident and Public Liability.....	576
(1) Nuclear Incident .....	577
(2) Public Liability .....	580
b. Indemnification .....	582
(1) Generally .....	583
(2) Protective Scheme .....	584
(3) Indemnity for Contractors and Materials Li- censees .....	584
c. Financial Protection .....	586
(1) General Requirements .....	587
(2) Educational Institutions .....	587
(3) Federal Facilities .....	591
(4) AEC Contractors .....	592
d. Financial Protection Available.....	593
(1) NELIA-MAERP Policy .....	594
(2) Potential Gaps in Protection.....	599
(3) NEPIA Policy .....	600
e. Limitation of Liability.....	601



3. Claim Satisfaction under Subsection 170e.....	605
a. Effect of Inability to Consolidate Claims.....	608
b. Available Consolidation Devices.....	612
(1) Bill of Peace.....	614
(2) Spurious Class Actions.....	615
(3) Receivership.....	616
(4) Consolidation.....	618
(5) Interpleader.....	619
(6) Federal Removal Power.....	621
c. Administrative Detail.....	626
(1) Arbitration.....	626
(2) Pre-Trial Conference.....	628
(3) Reference to a Master.....	631
4. Conclusion.....	632
CHAPTER IV. STRICT LIABILITY FOR RADIATION INJURIES.....	635
A. Introduction and Historical Background.....	635
B. Current Common Law Principles in General.....	637
C. Strict Liability Under the Doctrine of <i>Rylands v. Fletcher</i> — The English Decisions.....	640
D. The Doctrine of <i>Rylands v. Fletcher</i> Under the American Decisions.....	646
1. <i>Rylands v. Fletcher</i> Repudiated.....	647
2. <i>Rylands v. Fletcher</i> Accepted and Applied.....	651
3. <i>Rylands v. Fletcher</i> Accepted but Not Applied in View of the Circumstances of the Particular Case.....	658
4. Special Cases—Blasting, and X-Rays.....	664
5. Concluding Observations with Respect to the Doctrine of <i>Rylands v. Fletcher</i> .....	668
E. Strict Liability Under the American Law Institute Doctrine	670
F. Private Nuisance Doctrines—Absolute Nuisance.....	677
1. Nuisance Doctrines and Remedies.....	677
2. Some Special Features of Absolute Nuisance as Com- pared with <i>Rylands v. Fletcher</i> .....	680
G. Defenses to Strict Liability—Defendant's Contributory Negligence or Assumption of Risk—Third Party Actions	682
H. Conclusions Concerning Common Law Doctrines.....	684
I. Factual Analysis of Applications of Atomic Energy to Show Basis of Liability.....	686
1. Early History of Radiation Accidents.....	686
2. Radiation Accidents Since World II.....	687
3. Some Hypothetical Possibilities of Radiation Accidents.	699

	PAGE
4. Conclusions Concerning Types of Accidents and Injuries .....	705
J. Statutory Provisions Affecting Strict Liability.....	706
1. Statutory Immunization from Strict Liability.....	707
a. Statutory Franchises, Licenses, or Privileges and Their Effect .....	707
b. Statutory Limits on Maximum Liability.....	711
c. The Federal Tort Claims Act.....	712
2. Statutory Extension of Strict Liability.....	714
a. Illustrations of Legislation in the United States Imposing Strict Liability.....	714
b. Illustrations from Other Countries of Statutory Extensions of Strict Liability.....	715
c. Atomic Energy Acts and Proposed Acts Establishing Strict Liability for Atomic Activities.....	716
K. Conclusions Concerning Strict Liability.....	721
CHAPTER V. ENTERPRISE LIABILITY IN ATOMIC ENERGY.....	725
A. Product Liability .....	725
1. Introduction .....	725
2. Negligence .....	726
a. Historical Background .....	726
b. The General Nature of the Duty.....	729
c. By Whom is the Duty Owed?.....	730
d. To Whom is the Duty Owed?.....	733
e. The Dangerous Nature of the Product.....	735
f. Warnings of Danger and Assurances of Safety.....	738
g. Effect of Qualifications of Purchaser.....	747
h. Effect of Negligence by Others.....	750
i. Problems of Proof.....	758
j. Summary .....	761
3. Warranties .....	762
a. Express and Implied Warranties.....	762
b. Effect of Disclaimers.....	767
4. Strict Liability .....	769
a. Common Law .....	769
b. Under Statutes .....	770
5. Contractual Indemnification .....	771
6. Conclusion .....	771
B. Liability of Building Contractors.....	772
C. Protection Afforded Suppliers Under the Indemnification Provisions of the Atomic Energy Act.....	778

PART II—WORKMEN'S COMPENSATION AND  
RADIATION INJURIES

	PAGE
I. INTRODUCTION .....	783
II. SCOPE OF COVERAGE UNDER EXISTING LAWS.....	785
A. General Accidental Injury Coverage.....	786
1. Injury by Accident.....	786
2. "Arising out of and in the Course of Employment" ..	790
3. Summary .....	792
B. Occupational Disease Coverage.....	792
1. General Coverage .....	794
2. Schedule Type of Coverage.....	801
a. Examples of Older Legislation.....	802
b. Recent Legislation .....	808
c. The Requirement of Causal Connection in Schedule Type Statutes .....	810
3. Voluntary Coverage .....	811
C. Successive Injuries and Second Injury Funds.....	811
D. Apportionment of Liability in Occupational Disease Cases .....	814
E. Disability and Loss of Earning Capacity.....	816
1. General Principles .....	816
2. Application of General Principles to Atomic Injuries..	818
a. Temporary Disabilities and Atomic Injuries from Accidents .....	818
b. Permanent Disabilities and Atomic Injuries from Accidents .....	819
c. Occupational Diseases and Atomic Injuries.....	825
3. Summary .....	827
III. MEDICAL BENEFITS .....	827
A. Hospitalization and Treatment Costs.....	827
B. Rehabilitation Provisions .....	829
IV. LIMITATIONS PERIODS ON NOTICE OF INJURY AND FILING OF CLAIMS .....	830
A. General Principles in Relation to Radiation Injuries....	830
B. Notice and Claims for Accidental Injuries.....	832
C. Notice and Claims for Occupational Diseases.....	837
D. Summary .....	845
V. RECOMMENDATIONS .....	845

PART III—STATE REGULATION OF ATOMIC  
ENERGY

CHAPTER I. INTRODUCTION .....	849
-------------------------------	-----

	PAGE
CHAPTER II. PUBLIC UTILITY REGULATION . . . . .	851
A. Regulation of the Ownership of an Atomic Reactor by a Corporation Organized for the Specific Purpose, or by an Existing Corporation . . . . .	853
1. Ownership of Nuclear Reactor by an Existing Corporation . . . . .	853
2. Certificates of Convenience and Necessity . . . . .	853
3. Financing a Corporation to Construct a Nuclear Reactor . . . . .	855
a. Exemption of Short-Term Loans . . . . .	857
b. New York Public Service Commission—Basic Principles . . . . .	858
B. Restrictions Affecting the Purchase of Securities of an Atomic Power Corporation . . . . .	859
1. Regulation of Acquisition by Utility Companies of Stock in Other Utility Companies . . . . .	860
2. Regulation of Acquisition by Non-Utility Companies of Stock in Electric Utility Companies . . . . .	861
3. Financing the Purchase of Common Stock in an Atomic Energy Power Plant . . . . .	862
C. Regulation of Transactions between Affiliated Companies . . . . .	864
D. Rate Regulation Problems . . . . .	868
1. Expenditures for Research and Experimentation . . . . .	868
2. Construction of a Full-Scale Atomic Power Plant . . . . .	872
E. Conclusions . . . . .	879
CHAPTER III. HEALTH AND SAFETY REGULATION . . . . .	880
A. Public Utility Commissions . . . . .	882
B. Labor Departments and Industrial Commissions . . . . .	885
1. California . . . . .	886
2. Illinois . . . . .	888
3. Michigan . . . . .	890
4. Missouri . . . . .	891
5. New Jersey . . . . .	893
6. New York . . . . .	895
7. Ohio . . . . .	897
8. Pennsylvania . . . . .	898
9. Texas . . . . .	900
10. Wisconsin . . . . .	901
11. Conclusion . . . . .	902
C. Health Departments and Boards . . . . .	903
1. State Health Departments . . . . .	904
2. Local Health Agencies . . . . .	907
a. Cities . . . . .	907

b. Counties .....	908
c. Townships .....	909
d. Health Districts .....	909
3. Conclusion .....	910
D. Summary of State Health and Safety Regulations.....	911
CHAPTER IV. MISCELLANEOUS REGULATION.....	913
A. Disposal of Wastes.....	913
1. Water Pollution Regulation.....	914
a. New York .....	915
b. Pennsylvania .....	917
c. Ohio .....	918
d. Wisconsin .....	919
e. Illinois .....	920
f. California .....	921
g. New Jersey .....	923
h. Michigan .....	924
i. Texas .....	925
j. Missouri .....	926
k. Conclusion .....	926
2. Regulation of Air Pollution.....	927
3. Nuisances .....	932
a. Public Nuisances .....	933
b. Private Nuisances .....	934
c. Conclusion .....	936
B. Diversion of Waters.....	936
C. Regulation of Radioactive Materials as Drugs or Dangerous Substances .....	940
D. Transportation of Radioactive Materials.....	942
E. Regulation by Interstate Compact.....	944
1. Compacts Creating Joint Administrative Commissions..	945
a. Commissions with Enforcement Powers.....	945
b. Commissions without Enforcement Powers.....	948
2. Compacts Creating Informal Advisory Commissions...	949
3. Conclusion .....	950
CHAPTER V. RECENT STATE ATOMIC ENERGY LEGISLATION AND REGULATION .....	952
A. Study Commissions .....	952
B. State Promotional Programs.....	956
C. State Statutes and Regulations to Control Radiation Haz- ards .....	963

	PAGE
I. Legislative Action .....	965
a. Legislation Granting Rule-Making and Enforcing Powers .....	965
b. Legislation Imposing Certain Duties upon Radiation Source Users or Possessors but not Conferring Rule-Making Authority upon State Agencies.....	972
c. Legislation Directing Studies be Made as to Radiation Hazards .....	975
2. Administrative Action .....	976
a. Comprehensive Radiation Health and Safety Regulation .....	976
(1) California .....	979
(2) New York .....	983
(3) Pennsylvania and Texas.....	988
(4) Connecticut .....	991
(5) Michigan .....	994
b. Partial Radiation Health and Safety Regulation.....	998
D. Summary of State Atomic Energy Legislation and Regulation .....	1000
E. The Problem of Federal Pre-emption.....	1002
1. Introduction .....	1002
2. The Permissible Limits of State Health and Safety Regulation of Atomic Energy Activities.....	1004
a. Explicit Provision Allowing State Regulation.....	1004
b. Implied Pre-emption and State Regulation.....	1008
(1) Analogous Cases Involving the Implied Pre-emption Question .....	1008
(a) Labor Cases .....	1009
(i) Labor Cases Finding Federal Pre-emption .....	1011
(ii) Labor Cases Finding No Federal Pre-emption .....	1016
(iii) Summary of Labor Case Pre-emption Principles .....	1022
(b) Health and Safety Regulation Cases.....	1023
(i) Health and Safety Regulation Cases Finding Federal Pre-emption.....	1025
(ii) Health and Safety Regulation Cases Finding No Federal Pre-emption....	1031
(iii) Summary of Health and Safety Case Pre-emption Principles .....	1039
(c) Other Pre-emption Cases.....	1040

	PAGE
(i) National Security and Alien Regulation Cases .....	1040
(ii) Vehicle Weight Regulation Cases...	1046
c. The Nature and Scope of the Federal Health and Safety Program .....	1047
(1) Federal Precautions Preceding Operation.....	1048
(2) Federal Measures to Assure Safety During Operation .....	1051
(3) Enforcement of Federal Safety Standards.....	1052
d. Permissible Limits of State Action.....	1054
(1) State Regulation of Radiation Hazards Not Covered by the Atomic Energy Act of 1954....	1054
(2) State Regulation of Non-Radiation Health and Safety Hazards Connected with Federally Licensed Activities .....	1055
(3) State Regulation of Radiation Hazards Covered by the Atomic Energy Act of 1954.....	1058
(a) State Precautions Preceding Operation...	1058
(b) State Regulatory Measures During Operation .....	1067
(4) Enforcement of State Safety Standards.....	1073

#### CHAPTER VI. FUTURE STATE REGULATION OF ATOMIC ENERGY :

A SUGGESTED STATE ACT.....	1075
A. General Observations .....	1075
1. Utilization of Existing State Agencies.....	1076
2. Utilization of an Official Coordinator.....	1077
3. Utilization of a Central Agency Plan.....	1078
4. A Proposed Specialized Rule-Making Agency Plan.....	1079
a. Registration versus Licensing.....	1081
b. Uniformity of Regulation.....	1082
c. Public Utility Rate Regulations.....	1082
B. A Suggested State Act.....	1083
1. Introduction .....	1083
2. Model State Act to Promote Atomic Energy and Control Radiation Hazards: Text and Comments.....	1089

#### APPENDIX A

Item 1. AEC Standards for Protection Against Radiation— General Provisions .....	II111
Item 2. California General Industry Safety Orders: Radioactivity and Ionizing Radiation.....	II28

Item 3. New York Industrial Code Rule No. 38—Radiation Protection .....	1135
Item 4. New York Sanitary Code—Ionizing Radiation.....	1147
Item 5. Michigan Administrative Code—Regulations Concerning the Use of Radioactive Isotopes, X Radiation and all other Forms of Ionizing Radiation.....	1162

## APPENDIX B

Item 1. Report of the New England Committee on Atomic Energy to the New England Governors' Conference.....	1193
Item 2. A Suggested State Radiation Protection Act (National Bureau of Standards).....	1197

## PART IV—FEDERAL REGULATORY AND ADMINISTRATIVE LIMITATIONS UPON ATOMIC ACTIVITIES

I. INTRODUCTION .....	1207
A. Scope and Policy of AEC Regulation.....	1207
B. Encouragement of Private Industrial Development.....	1211
C. Development of Private Industry.....	1216
D. Role of Administrative Law.....	1218
II. RULE-MAKING PROCEDURES .....	1220
A. Rule Making in Administrative Law.....	1220
B. Rule Making Under Atomic Energy Act of 1946.....	1222
C. Rule Making Under Atomic Energy Act of 1954.....	1223
1. General Authority .....	1223
2. Informal Rule-Making Procedures.....	1224
3. Formal Rule-Making Procedures.....	1227
4. Public Rule-Making Hearings.....	1229
5. Written Submissions .....	1229
6. Promulgation of Rules.....	1230
7. Special Non-Public Procedures.....	1232
8. Miscellaneous Rule-Making Procedures.....	1233
a. Policy Determinations .....	1233
b. Interpretations .....	1234
c. Special Determinations and Authorizations.....	1234
9. General Content and Form of Rules.....	1235
D. Conclusions .....	1237
III. LICENSING .....	1238
A. Licensing in Administrative Law.....	1238



	PAGE
B. Licensing Under Atomic Energy Act of 1946.....	1240
1. Types of Licenses.....	1241
2. Standards and Conditions.....	1242
3. Licensing Procedures.....	1244
C. Licensing Under Atomic Energy Act of 1954.....	1245
1. Standards and Conditions.....	1248
2. Types of Licenses.....	1250
a. Use and Production of Special Nuclear Material..	1250
b. Use of Source and Byproduct Materials.....	1255
c. Operators.....	1256
d. Foreign Activity, Imports, and Exports.....	1257
e. Access Permits.....	1259
f. Commercial and Non-Commercial Facilities.....	1262
(1) Construction Permits.....	1262
(2) Non-Commercial Licenses.....	1268
(3) Commercial Licenses.....	1270
(a) Section 182 Restrictions.....	1271
(b) Section 105 Restrictions.....	1274
3. Hearing Procedures.....	1280
a. Hearing Officers.....	1285
b. Evidence.....	1287
c. Public Records.....	1288
d. "Parallel Procedures".....	1290
4. Revocation, Suspension, and Modification of Licenses and Construction Permits.....	1292
5. Internal Separation of Functions.....	1294
6. Congressional Review of Licensing.....	1298
7. Judicial Review.....	1302
8. Indemnity and Public Liability.....	1303
9. Transportation and Transmission.....	1309
a. Transportation.....	1309
b. Transmission.....	1312
D. Conclusions.....	1313
IV. ATOMIC ENERGY COMMISSION CONTRACTING.....	1315
A. Contracts in Administrative Law.....	1317
B. Contracting Authority Under Atomic Energy Act of 1946.....	1319
C. Contracting Authority Under Atomic Energy Act of 1954.....	1321
1. Research.....	1321
2. Commission Production Facilities.....	1323
3. Energy Generated in Production Facilities.....	1323

	PAGE
4. Purchase of Special Nuclear and Source Materials . . .	1324
5. Electric Utility Contracts . . . . .	1325
6. Congressional Review of AEC Contracts . . . . .	1328
D. Contracting with the AEC . . . . .	1333
1. Contracting in General . . . . .	1335
2. Types of AEC Contracts . . . . .	1338
3. AEC Contract Clauses . . . . .	1339
a. Mandatory Clauses . . . . .	1339
b. Non-Mandatory Clauses . . . . .	1341
E. Settlement of Contract Disputes at Administrative Level .	1342
1. The Disputes Clause . . . . .	1342
2. Advisory Board of Contract Appeals . . . . .	1345
a. Jurisdiction . . . . .	1346
b. Nature of Proceeding . . . . .	1349
3. Comptroller General . . . . .	1351
F. Judicial Review of Contract Disputes . . . . .	1352
1. Exhaustion of Administrative Remedies . . . . .	1352
2. Judicial Forums Available . . . . .	1352
3. Scope of Judicial Review . . . . .	1353
G. Conclusions . . . . .	1355

## PART V—INTERNATIONAL CONTROL OF ATOMIC ENERGY

### CHAPTER I. ATOMS FOR PEACE—THE NEW INTERNATIONAL

ATOMIC AGENCY . . . . .	1361
A. Membership . . . . .	1364
B. Organs of the Agency . . . . .	1365
C. Functions of the Agency . . . . .	1371
1. Peaceful vs. Military Purposes . . . . .	1371
2. Atomic Power . . . . .	1372
3. Training and Research . . . . .	1373
4. Health and Safety Standards . . . . .	1374
5. Exchange of Information . . . . .	1375
D. Agency Facilities . . . . .	1376
E. Agency Safeguards . . . . .	1377
F. Supplying of Materials . . . . .	1383
G. Project Agreements . . . . .	1387
H. Relation to Bilateral, Multilateral and National Programs .	1388
I. Privileges and Immunities . . . . .	1393
J. Settlement of Disputes . . . . .	1394
K. Financing of the Agency . . . . .	1396

	PAGE
L. Amendment Procedures .....	1398
M. United States Cooperation with the Agency.....	1400
N. Conclusions .....	1403
<b>CHAPTER II. SOVIET RUSSIA'S ROLE IN INTERNATIONAL COOP- ERATION FOR PEACEFUL USE OF ATOMIC ENERGY.....</b>	<b>1405</b>
A. Introduction .....	1405
B. The Joint Nuclear Research Institute.....	1408
C. The Soviet Union and the International Atomic Energy Agency .....	1427
D. Bilateral Agreements on the Peaceful Use of Atomic En- ergy in the Communist Bloc.....	1446
 <b>APPENDIX A</b>	
Item 1. Brief Summary of Negotiations for the International Atomic Energy Agency.....	1457
Item 2. (Footnote 19) .....	1461
Item 3. (Footnote 30) .....	1461
Item 4. (Footnote 38) .....	1463
Item 5. (Footnote 42) .....	1464
Item 6. (Footnote 64) .....	1465
Item 7. (Footnote 76) .....	1467
Item 8. (Footnote 89) .....	1468
Item 9. (Footnote 152) .....	1469
Item 10. Statute of the International Atomic Energy Agency.	1470
 <b>APPENDIX B</b>	
Item 1. Agreement on the Establishment of a Joint Nuclear Research Institute .....	1490
Item 2. Charter of the Joint Nuclear Research Institute.....	1493
Item 3. Soviet Government Statement on General European Cooperation in the Peaceful Use of Atomic Energy.....	1503
Item 4. Declaration of the U. S. S. R. Ministry of Foreign Affairs on Plans to Create EURATOM and a "Common Market" .....	1508