CONTENTS

FOREWORD 6
PREFACE 8
INTRODUCTION 10
LIST OF TABLES 15
LIST OF FIGURES 16

PROLOGUE 17

Negotiations 17
The Devices 31
Weapons Test Operations 39
AEC Device Diagnostic Standard Measurements 51
Radiochemistry/Sampling 53
Fireball Yield 57
The Reaction History 59
    Alpha 59
Bhangmeter 67
Time Interval 69
AEC Device Diagnostic Nonstandard Measurements 70
    Dinex 70
    Ganex 71
    Thermonuclear Burn Propagation Rate 71
    Ex.(b)(3) 72
    Tenex 74
    Pinex 75
Output Measurements 76
    Neutrons 76
    Gamma-Ray Flux 78
    Thermal Radiation 79
    Blast/Overpressure 81
    Electromagnetic Effects 83
    Effects Experiments 84
Systems Tests and Operational Exercises 88
Summary of Measurements 89
Organization 89
Other 92
Prologue Summary 93

CHAPTER I
PREMORATORIUM INTERNAL READINESS ACTIVITIES 94

AEC Laboratory Health in the Light of a Possible Moratorium 97
Premoratorium 1958 Nuclear Test Operations 100
Plowshare 108
Low-Yield Testing 109
Physical Test Readiness 110
Finale 116

CHAPTER II
TEST MORATORIUM, 1958-1961 117

Test Organization Situation, Late 1958 117
AEC/DOD Actions, Late 1958 121
Initial Readiness Directions 122
Evolution of High-Level Attitude Towards Testing, 1958-1959 124
Seismic Detection/Latter Hole, Early 1959 127
Laboratory Attitudes, Early 1959 127
Weakening of JTF-7, Early 1959 128
Treaty Progress, Early 1959 129
Test Planning, First Half, 1959 130
Deep Space Testing, May 1959 131
Clandestine Test Detection, Mid-1959 132
Effects of Moratorium 133
Sandia Balloons, 1959 134
Reduction of EPG Capability, 1959 134
Plowshare, Early 1959 135
NTS 90-Day Readiness, Late 1959 136
Radioactive Cloud Sampling, 1959 139
Pacific Test Capability/Willow Planning, 1959 140
High-Altitude Test Detection, Mid-1959 Through Early 1960 144
Deep Space and High-Altitude Nuclear Testing, Spring 1959 Through Early 1960 146
Underground Detection, 1959 149
Plowshare, Late 1959 151
Laboratory Weapons Programs, 1959 153
Summary of 1959 154
Geneva and Other International Developments, Early 1960 154
NTS Weapons Test Readiness, Early 1960 156
EPG Status, 1960 161
    Joint Task Force 161
    Task Groups 164
    Johnston Island 165
WET/AFSWC, 1960 165
Vela Hotel, Early 1960 166
Vela Sierra, Early 1960 167
Plowshare, 1960 167
    Gnome 168
    Oilsands 168
    Chariot-Ditchdigger-Panama Canal 168
    High-Explosive Cratering Experiments 170
Vela Uniform, 1960 170
    The Black Box Problem 170
Other Aspects of Vela Uniform 177
NTS Readiness Effort Shifts to Seismic Detection, Mid-1960 184
Device Predictions, Mid-1960 186
Vela Hotel, July-December 1960 188
Vela Sierra, Late 1960 191
Deep Space, Later-Half 1960 192
Domestic and International Political Developments, May-December 1960 192
Summary of 1960 199
Personnel Changes 200
Growth of Readiness Interest, Early 1961 201

Demise of JTF-7 208
Vela Uniform: Black Box, Etc., 1961 210
X-Ray Kill Problem, 1961 214
Vela Sierra, January-August 1961 216
Vela Hotel, January-August 1961 217
Plowshare, January-August 1961 218
Deep Space, January-August 1961 222
Domestic and International Political Developments, January-August 1961 223
New Test Planning, Mid-1961 234
The Moratorium Ends 240
Summation of 1961 Through August 241

CHAPTER III
RETURN TO TESTING--NEVADA 242

NTS Readiness Status 242
Real Preparations Begin 243
Presidential Direction to Prepare 245
Towards the First Shot 246
Presidential Approval to Resume Testing 251
Underground Testing Resumes 256
Operation Nougat 258
Expanded Testing Considered 259
Vela Uniform Reorientation 264
Nougat Continuation/Impact on Labs 264
Possibility of British Device Test 267
Further Consideration of Expanded Testing 268
Nougat Continues with Revisions 274
Radioactive Contamination of Tunnels 284
More Nougat 285
Toward Normalcy in Nevada 286
Livermore Rethinks Tunnels vs. Holes 291
Other Nevada Topics 292
Vela Uniform 292
Intentional Venting Study 293
Simultaneous Detonations 293
Nougat in 1962 294
Overview of Nougat 297
Balloon Shots at NTS, Early 1962 298
Steady State vs. Breather 300

CHAPTER IV
RETURN TO ATMOSPHERIC TESTING--PACIFIC 303

Program Formulation 304
Digression on Test Methods 321
Early Preparation 326
More Political Considerations 328
Technical Developments 330
Growth of the Task Force 332
The Pressure to Resume 334

The Preparatory Period 338
Samplers 345
DOD Experimental Plans 346
More Political Considerations 347
Task Force Plans 347
The Acquisition of Christmas Island 354
The High-Altitude Carrier 367
General Observations 370
The Open Sea Operation 371
Move to Christmas Island 373
The Jarvis, Baker, Howland Connection 381
Swordfish (ASROC Effects Test) 383
The Polaris System Test 386
The Atlas System Test 387
The Johnston Island Buildup 388
The Resumption of Testing 399
The Christmas Island Operation 400
Follow-on Air Drops 405
Outcome of Systems Tests 411
Angel Fire/Dial Right (Atlas/Air Force) 411
Frigate Bird (Polaris/Navy) 413
Swordfish (ASROC)/Navy) 415
The High-Altitude Series 416

EPILOGUE 432

APPENDIX A: A QUICK AND CURSORY SUMMARY OF THE CHRISTMAS ISLAND PORTION OF OPERATION DOMINIC 1962 440
APPENDIX B: STARFISH 447
APPENDIX C: CHECKMATE 450
APPENDIX D: BLUEGILL 452
APPENDIX E: KINGFISH 454
APPENDIX F: TIGHTROPE 457

GLOSSARY 460
INDEX 464

LIST OF TABLES

PROLOGUE

I.	TYPICAL YIELD-TO-WEIGHT RATIOS	39
II.	NUCLEAR WEAPON TEST OPERATIONS	52
III.	AIRCRAFT USED FOR THE COLLECTION OF RADIOCHEMICAL BOMB DEBRIS SAMPLES FOR AEC LABORATORY USE, PREMORATORIUM	55
IV.	DOD-SPONSORED EFFECT SHOTS	86

CHAPTER II

V.	A. PROPOSED AEC HIGH-ALTITUDE PROGRAM	132
	B. DOD WILLOW HIGH-ALTITUDE EFFECTS PROGRAM	132
VI.	LIVERMORE READINESS PROGRAM, EARLY 1960	157
VII.	RIPPLE	180
VIII.	SHADE AND DRIBBLE	183
IX.	SHADE STATUS	184
X.	YIELD VS WEIGHT	187
XI.	KEY PERSONNEL CHANGES	200
XII.	POST-MORATORIUM TEST PROGRAM PROPOSAL	237

CHAPTER III

XIII.	DEVICE, SITE, AND DIAGNOSTICS READINESS SCHEDULE	243
XIV.	SHORT-TERM PROGRAM--TENTATIVE SCHEDULE	248
XV.	LASL TESTING PLANS	248
XVI.	MEETING OF NTSO PLANNING BOARD	253
XVII.	NTS PLANNING BOARD RECOMMENDED SCHEDULE OF EVENTS OPERATION NOUGAT	254
XVIII.	REVISED NOUGAT SCHEDULE	257
XIX.	NOUGAT	261
XX.	TENTATIVE SCHEDULE NTS PLANNING BOARD MEETING	263
XXI.	COMPARISON OF DIAGNOSTIC QUALITY	273
XXII.	LIVERMORE NOUGAT SCHEDULE	278
XXIII.	LIVERMORE COMPARISON OF COSTS AND TIMES FOR UNDERGROUND SITES	279
XXIV.	LASL NOUGAT TEST LIST	281
XXV.	MODIFIED NOUGAT, NTS PLANNING BOARD	282
XXVI.	LASL UNDERGROUND SITE PROPOSAL THROUGH FY62	283
XXVII.	LASL AND LIVERMORE PROPOSED NOUGAT SCHEDULES	290
XXVIII.	UNDERGROUND SCHEDULE, NTS PLANNING BOARD	295

CHAPTER IV

XXIX.	INITIAL EVERREADY TESTS	307
XXX.	DOMINIC SCHEDULE, February 20, 1962	322
XXXI.	DOMINIC SCHEDULE	323
XXXII.	PROPOSED OVERSEAS SHOT PROGRAM	351
XXXIII.	BASIC ORGANIZATION OF JTF-8	352
XXXIV.	SHIP AND OTHER SEA REQUIREMENTS	353
XXXV.	TRAILER LOADING OF SHIPS	353
XXXVI.	LAND AND AIR USE REQUIREMENTS FOR HIGH-ALTITUDE SHOTS	353

XXXVII. AIRCRAFT ON CHRISTMAS ISLAND 381
XXXVIII. RESULTS OF DOMINIC II AIRDROPS 411

LIST OF FIGURES

PROLOGUE

1. Trinity tower cab. Fat Man device with N. E. bradbury. 41
2. Ranger control building--Frenchman Flat--Nevada Test Site. 43
3. Typical "balloon cab." 48
4. Operation Castle device being lowered into place on a barge. 49
5. Rossi presentation from Trinity. 61
6. Ranger alpha recording building (under the pile of dirt). 66
7. Author's Bhangmeter curve for high yields (1958). 68
8. Ivy Mike 73
9. Crossroads Baker just emerging; note ships. 87

CHAPTER III

10. A twilight photograph showing some of the drill rigs. 273
11. Early 1961 map of NTS. 275
12. (a) Part of teletype from Al Graves, Scientific Advisor for the Fisher event, to the Test Manager, referring to photograph of the Fisher Event. 287
(b) Close-up view of Fisher buildings before detonation. 288
(c) Close-up view of some of the same Fisher buildings after collapse. 288

CHAPTER IV

13. Map of Christmas Island showing principal facility locations. 375
14. A Christmas Island airdrop target raft, before detonation. 377
15. A Christmas Island target raft after detonation. 378