

The Traveler's Guide To Nuclear Weapons

TABLE OF CONTENTS

PREFACE

CHAPTER ONE

ORIENTATION

Overview of the Nuclear Weapons Complex
Material Flow and Production Process
A Brief History of Nuclear Weapons
Timeline of America's Nuclear Weapons Complex
A-Bombs 101
Generic Hydrogen Bomb
How To Use This Book
Key to the Maps
Acronyms

CHAPTER TWO

MAKING THE EARLY DECISIONS

Einstein's Summer Home – Cutchogue, New York
Manhattan Engineer District Headquarters – Manhattan, New York
U.S. Nuclear Energy Agencies
Manhattan Project Headquarters – Washington, D.C.
General Leslie R. Groves

CHAPTER THREE

MINING AND MILLING URANIUM AND THORIUM

Archer Daniels Midland Company – Staten Island, New York
Madison Square Area Engineers Office – Manhattan, New York
Sources of Uranium
Baker and Williams Warehouses – Manhattan, New York

Union Mines Development Corporation – Manhattan, New York
What is Uranium Milling?

AEC Colorado Raw Materials Office – Grand Junction, Colorado
Grand Junction Office Operating Contractors
The AEC's Domestic Uranium Purchases

Vanadium Corporation of America – Durango, Colorado

Union Carbide Nuclear Corporation – Uravan, Colorado
Uravan Mineral Belt

Union Carbide Nuclear Corporation – Slick Rock, Colorado

Vanadium Corporation of America – Naturita, Colorado

Monticello Uranium Mill – Monticello, Utah

Vitro Rare Metals Company – Canonsburg, Pennsylvania

Middlesex Sampling Plant – Middlesex, New Jersey

Raw Materials Development Laboratory – Woburn and Winchester,
Massachusetts

Climax Uranium Mill – Grand Junction, Colorado

Union Carbide Nuclear Corporation – Rifle, Colorado

The Grants Mineral Belt – West-Central New Mexico

Anaconda Copper Mining Company – Bluewater

Homestake Mining Company – Milan

Phillips Petroleum Company – Ambrosia Lake

Kerr-McGee Oil Industries – Ambrosia Lake

Kerr-McGee Oil Industries, Inc. – Shiprock, New Mexico

Atlas Corporation – Moab, Utah

Vitro Uranium Company – South Salt Lake City, Utah

Union Carbide Nuclear Corporation – Green River, Utah

Dawn Mining Company – Ford, Washington

Susquehanna-Western, Inc. – Falls City, Texas

Lakeview Mining Company – Lakeview, Oregon

Porter Brothers Corporation – Lowman, Idaho
Thorium and Its Sources

W.R. Grace & Company – Wayne, New Jersey

W.R. Grace & Company – Baltimore, Maryland

Maywood Chemical Company – Maywood, New Jersey

Lindsay Chemical Company – West Chicago, Illinois

CHAPTER FOUR

REFINING URANIUM AND THORIUM

Linde Air Products Company – Tonawanda, New York

Ames Laboratory – Ames, Iowa

Mallinckrodt Chemical Company – St. Louis, Missouri

Westinghouse Electric and Manufacturing Company – Bloomfield,
New Jersey
 E.I du Pont de Nemours & Company – Deepwater, New Jersey
 Harshaw Chemical Company – Cleveland, Ohio
 Metal Hydrides, Inc. – Beverly, Massachusetts
 Electro Metallurgical Company – Niagara Falls, New York
 Battelle Memorial Institute – Columbus and West Jefferson, Ohio
 New Brunswick Laboratory – New Brunswick, New Jersey
 AlliedSignal, Inc. – Metropolis, Illinois
Turning Yellowcake into Uranium Hexafluoride

CHAPTER FIVE

ENRICHING THE ISOTOPES OF URANIUM, HYDROGEN, AND LITHIUM

University of California – Berkeley, California
Isotopes
 Columbia University – Manhattan, New York
 Kellex Corporation Headquarters – Manhattan, New York
Gaseous Diffusion Separation of U-235 from U-238
 Kellex Corporation – Jersey City, New Jersey
 International Nickel Company – Huntington, West Virginia
 Nash Garage Building – Manhattan, New York
 American Chicle Company – Long Island City, New York
 Houdaille-Hershey Corporation – Decatur, Illinois
 Bart Laboratories – Belleville, New Jersey
 Beach-Russ Company – Brooklyn, New York
 Crane Company – Chicago, Illinois
 Chrysler Corporation – Detroit, Michigan
 A.O. Smith Company – Milwaukee, Wisconsin
 Westinghouse Electric and Manufacturing Company – East Pittsburgh,
 Pennsylvania
Electromagnetic Separation of U-235 from U-238
 West Point Depository – West Point, New York
 U.S. Metals Refining Company – Carteret, New Jersey
 Phelps Dodge Copper Products Corporation – Elizabeth, New Jersey
 Allis-Chalmers Company – West Allis, Wisconsin
 Chapman Valve Manufacturing Company – Springfield, Massachusetts
 Naval Research Laboratory – Washington, D.C.
Liquid Thermal Diffusion
 Philadelphia Naval Shipyard – Philadelphia, Pennsylvania
 Oak Ridge Reservation – Oak Ridge, Tennessee
Lithium

Paducah Gaseous Diffusion Plant – Paducah, Kentucky
Key Paducah Gaseous Diffusion Plant Buildings
Uranium Processing at the Paducah Gaseous Diffusion Plant
 Portsmouth Gaseous Diffusion Plant – Piketon, Ohio
The Future of Uranium Enrichment
 Consolidated Mining & Smelting Company – Trail, British Columbia
Obtaining Deuterium
 Morgantown Ordnance Works – Morgantown, West Virginia
 The Dana Plant – Newport, Indiana

CHAPTER SIX

FABRICATING REACTOR FUEL, TARGETS, AND CONTROL ELEMENTS

Massachusetts Institute of Technology – Cambridge, Massachusetts
Machine Shops
 International Register Company – Chicago, Illinois
 B&T Metals Company – Columbus, Ohio
 Revere Copper & Brass Company – Detroit, Michigan
 Baker Brothers Company – Toledo, Ohio
 Grasselli Research Laboratory – Cleveland, Ohio
 Copperweld Steel Company – Warren, Ohio
 American Chain & Cable Company – Bridgeport, Connecticut
 Quality Hardware Machine Corporation – Chicago, Illinois
 McKinney Tool and Manufacturing Company – Cleveland, Ohio
 C.H. Schnoor and Company – Springdale, Pennsylvania
 Joslyn Manufacturing & Supply Company – Fort Wayne, Indiana
 Wolverine Tube Company – Detroit, Michigan
 Herring-Hall-Marvin Safe Company – Hamilton, Ohio
 Vulcan Crucible Steel Company – Aliquippa, Pennsylvania
 Brush Beryllium Company – Cleveland, Ohio
 Brush Beryllium Company – Lorain, Ohio
 Brush Beryllium Company – Luckey, Ohio
 Simonds Saw & Steel Company – Lockport, New York
 Allegheny-Ludlum Steel Corporation – Dunkirk, New York
 Allegheny-Ludlum Steel Corporation – Watervliet, New York
 Bliss & Laughlin Steel – Buffalo, New York
 Sylvania Electric Products – Hicksville, New York
 Alba Craft Laboratory – Oxford, Ohio
 Associated Aircraft Tool and Manufacturing, Inc. – Fairfield, Ohio
 Metals & Controls Corporation – Attleboro, Massachusetts
 American Brass Company – Waterbury, Connecticut

Northwest Electrodevelopment Laboratory – Albany, Oregon
Key Northwest Electrodevelopment Laboratory Buildings
 Bridgeport Brass Company – Bridgeport, Connecticut
 Bridgeport Brass Company – Adrian, Michigan
 Bridgeport Brass Company – Riverside, California
 Bridgeport Brass Company – Seymour, Connecticut
 Weldon Spring Feed Materials Plant – Weldon Spring, Missouri
Weldon Spring Feed Materials Plant Operations
 Dow Chemical Company – Madison, Illinois
 General Steel Industries, Inc. – Granite City, Illinois
 Feed Materials Production Center – Fernald, Ohio
Raw Materials and Products
Feed Materials Production Center Chronology
 Reactive Metals, Inc – Ashtabula, Ohio
 Nuclear Metals, Inc. – Concord, Massachusetts

CHAPTER SEVEN

OPERATING THE REACTORS AND RECOVERING THE PRODUCT

Washington University – St. Louis, Missouri
The Grades of Uranium and Plutonium
 University of Chicago – Chicago, Illinois
 National Guard Armory – Chicago, Illinois
Radioactivity: A New Workplace Hazard
 Site A – Palos Township, Illinois
Radiation Risks
 Hanford Reservation – Richland, Washington
General Groves' Selection Criteria
Chronology of Hanford Reservation Operators
Hanford Reservation Reactors
The Early Plutonium Separation Process
The Green Run
 Argonne National Laboratory – Lemont, Illinois
 Knolls Atomic Power Laboratory – Niskayuna, New York
 Idaho National Engineering Laboratory – Idaho Falls, Idaho
 Savannah River Plant – Aiken, South Carolina
Reactor Operations at the Savannah River Plant
Savannah River Plant Reactors
Canyon Operations at the Savannah River Plant
Tritium Processing at the Savannah River Plant
 Watts Bar Nuclear Plant – Spring City, Tennessee

CHAPTER EIGHT

DESIGNING, MANUFACTURING, AND REFURBISHING THE WEAPONS

Los Alamos National Laboratory – Los Alamos, New Mexico
Genesis of the Laboratory
The Buildings of TA-1

Explosives Research Laboratory – Bruceton, Pennsylvania
 Naval Gun Factory – Washington, D.C.
 Expert Die & Tool Company – Detroit, Michigan
 Naval Ordnance Plant – Warren, Michigan
 Naval Ordnance Test Station – Ridgecrest, California
 Douglas Aircraft Company – Santa Monica, California
Ancillary Components

Northrop Aircraft Company – Hawthorne, California
 The Dayton Project – Dayton, Ohio
 Mound Laboratory – Miamisburg, Ohio
 Rock Island Arsenal – Rock Island, Illinois
The Permissive Action Link

Iowa Army Ammunition Plant – Burlington, Iowa
Mason & Hangar-Silas Mason Company

American Car & Foundry Company – Buffalo, New York
Mike

ACF Industries, Inc. – Albuquerque, New Mexico
 Lawrence Livermore National Laboratory – Livermore, California
Name Changes

Sandia National Laboratories – Livermore, California
 Rocky Flats Plant – Golden, Colorado
Key Rocky Flats Plant Buildings

Clarksville Base – Fort Campbell, Tennessee
 Medina Base – San Antonio, Texas
 Pantex Plant – Amarillo, Texas
 Pinellas Plant – Largo, Florida
Pinellas Plant Products
Key Pinellas Plant Buildings

Precision Forge – Santa Monica, California
 U.S. Department of Energy Oxnard Facility – Oxnard, California
 Kansas City Plant - Kansas City, Missouri
U.S. Nuclear Weapons Stockpile

CHAPTER NINE

TESTING THE WEAPONS

Trinity Site – White Sands Missile Range, New Mexico
Naval Proving Ground – Dahlgren, Virginia
Wendover Army Airfield – Wendover, Utah
 The 509th Composite Group
 Wendover Airfield Historical Tour Markers
Sandia National Laboratories – Albuquerque, New Mexico
Salton Sea Test Base – Imperial County, California
Tonopah Test Range – Nye County, Nevada
Kauai Test Facility – Mana, Kauai, Hawaii
Nevada Test Site – Las Vegas, Nevada
 Underground Nuclear Detonations
 Some of the Nuclear Tests at the NTS
Project Gnome – Carlsbad, New Mexico
 Plowshare Program
Project Gasbuggy – Carson National Forest, New Mexico
Project Rulison – Rulison, Colorado
Project Rio Blanco – Rio Blanco County, Colorado
Project Shoal – Churchill County, Nevada
 Project Vela
Projects Salmon and Sterling – Baxterville, Mississippi
Project Faultless – Moores Station, Nevada
Amchitka Island Test Site – Amchitka, Alaska

AFTERWORD

QUOTATIONS CITATIONS

BIBLIOGRAPHY

INDEX

AUTHOR BIOGRAPHIES