DEFENSE THREAT REDUCTION AGENCY
8725 JOHN J. KINGMAN ROAD, STOP 6201
FORT BELVOIR, VA 22060-6201

March 9, 2022

John Greenewald, Jr.
27305 W Live Oak Rd.
Suite 1203r
Castaic, CA 91384

Re: FOIA Case No.: 20-031

Dear Mr. Greenewald

This is our final response to your Freedom of Information Act (FOIA) request perfected March 18, 2020, referred by the Air Force and assigned FOIA case number 20-031 by the Defense Threat Reduction Agency (DTRA). You requested a copy of TM4-1, Glossary of Nuclear Weapons Material and Related Terms.

Enclosed is a copy of the responsive document totaling 228 pages. This record is being released to you in full. No fees are due as the assessable cost total $25.00 or less.

Determinations on behalf of DTRA were made by the Initial Denial Authority (IDA), Mr. Earl Washington, Chief, Records Management, FOIA, and Privacy Act Division. If you consider this decision to be an adverse determination, you may file a written appeal that is postmarked no later than 90 calendar days after the date of this letter to the Deputy Director, Defense Threat Reduction Agency, Information Management and Technology Directorate, ATTN: FOIA/PA Office, 8725 John J. Kingman Road, MSC 6201, Fort Belvoir, Virginia 22060. The appeal should reference the FOIA/Privacy Act case number, contain a concise statement of the grounds upon which the appeal is brought, and a description of the relief sought. A copy of this letter should also accompany your appeal. Both the envelope and your letter should clearly identify that a Freedom of Information Act and/or a Privacy Act Appeal is being made.

Should you have additional questions or concerns regarding this case, you may seek dispute resolution services from the DTRA FOIA Public Liaison or the Office of Government Information Services (OGIS). The DTRA FOIA Public Liaison, Mr. Mario Vizcarra, may be contacted by phone at (703)767-1792 or by email at dtrafoiaprivacy@mail.mil. The contact information for OGIS can be found at www.archives.gov/ogis.

Sincerely,

*Eugene McGirt*

Eugene McGirt
FOIA/Privacy Act Specialist
Freedom of Information/Privacy Act Office

Enclosure(s):
As stated

| | | |
|---|---|---|
| DOE-DTRA | TP | 4-1 |
| ARMY | TM | 39-4-1 |
| NAVY | SWOP | 4-1 |
| AIR FORCE | T.O. | 11N-4-1 |

## TECHNICAL MANUAL

# GLOSSARY OF NUCLEAR WEAPONS MATERIEL AND RELATED TERMS

Published under the authority of the Secretaries of the Army, Navy, and Air Force; the Director, Defense Threat Reduction Agency; and the Department of Energy.

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| DOE-DTRA | TP | 4-1 |
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**TECHNICAL MANUAL** IC 1-1

# GLOSSARY OF NUCLEAR WEAPONS MATERIEL AND RELATED TERMS

This publication supersedes TP 4-1/TM 39-4-1/SWOP 4-1/T.O. 11N-4-1 dated 1 November 2011. (Superseded publications will be disposed of in accordance with applicable regulations.)

Published under the authority of the Secretaries of the Army, Navy, and Air Force; the Director, Defense Threat Reduction Agency; and the Department of Energy.

**DISTRIBUTION STATEMENT C:** Distribution authorized to U. S. Government Agencies and their contractors as required by provisions of the contract for use in support of the nuclear weapons stockpile, as determined by the Joint Nuclear Weapons Publication System on 30 July 2016.

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**30 JULY 2016**

DTRA — Defense Threat Reduction Agency

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# LIST OF EFFECTIVE PAGES

When applicable, insert latest change pages; dispose of superseded pages in accordance with applicable regulations.

NOTE: When applicable, on a change page, the portion of the text affected by the latest change is indicated by a vertical line in the margin of the page. Relocated material is indicated by a vertical line next to the page number. If illustrations are used, the portion of the illustration affected by the latest change is indicated by a miniature pointing hand, shading and screening, or a vertical line in the margin of the page.

Total number of pages in this manual is 222, consisting of the following:

| Page No. | Change No. |
|---|---|
| Title | Original |
| A | Original |
| i thru ii | Original |
| 1-1 thru 1-2 | Original |
| 2-1 thru 2-180 | Original |
| 3-1 thru 3-35 | Original |
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# INTERIM CHANGE

1. This is interim change number 1-1, 10 October 2018, to TP 4-1, dated 30 July 2016.

2. A suitable entry of this change will be made in the referenced publication.

3. Make the following change(s):

Section 2, Page 2-177, Term: “WEAPON TYPE”, paragraph c. TYPE UNITS FOR DOE USE, paragraph (3) Special Test Units, following (e) add a new paragraph (f):

“(f) TYPE 6F is a special test unit that is used to characterize transportation environments within the Stockpile-to-Target Sequence.”

4. This change is effective upon receipt and shall be retained until receipt of permanent change number 1 or publication revision.

Published under the authority of the Secretaries of the Army, Navy, and Air Force; the Director, Defense Threat Reduction Agency; and the Department of Energy.

Distribution same as: TP 4-1

Change Number 1-1

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# TABLE OF CONTENTS

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4-1

# SECTION 1

# INTRODUCTION

## 1-1 PURPOSE.

The purpose of this publication is to provide a reference of unclassified terms and definitions, abbreviations and acronyms without undue use of technical or scientific symbols or formulas, used within the Department of Defense (DoD) and the Department of Energy (DOE).

## 1-2 SCOPE.

This publication includes those unique terms, definitions, abbreviations, and acronyms associated with the field of nuclear weapons. Terms are extracted from several sources. In the event of any discrepancy between definitions in this publication and Joint Chiefs of Staff Joint Publication (JP) 1-02, "Department of Defense Dictionary of Military and Associated Terms," the definition appearing in JP 1-02 will take precedence, unless referenced material herein is uniquely associated with the field of nuclear weapons.

## 1-3 POLICY.

Submit recommended corrections, additions, or deletions in accordance with applicable Service directives.

## 1-4 ARRANGEMENT OF THE PUBLICATION.

**1-4.1** Terms and definitions are entered alphabetically (Section 2); cross references are made to related terms.

**1-4.2** Abbreviations and acronyms are listed in (Section 3).

## 1-5 SUPPLEMENT.

Classified terms and definitions are in Technical Publication (TP) 4-1A.

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## SECTION 2

## TERMS AND DEFINITIONS

# A

**ABLATIVE MATERIAL.** A material designed to dissipate heat by vaporizing or melting. It absorbs heat by an increase in temperature and change in chemical or physical state. The heat is carried away from the surface by a loss of mass (liquid or vapor). The departing mass also blocks part of the convective heat transfer to the remaining material. More specifically an ablating material is used to cover a nose cone in order to protect the basic skin of the nose cone from heat upon reentry into the Earth's atmosphere. The ablative material melts and vaporizes during reentry but survives long enough to keep the vehicle at a tolerable temperature when the basic skin is exposed.

**ABNORMAL ENVIRONMENT.** (See environment.)

**ABORT.**

**a.** To terminate a mission for any reason other than enemy action. It may occur at any point after the beginning of the mission and prior to its completion.

**b.** To discontinue aircraft takeoff or missile launch.

**ABOVE GROUND STORAGE STRUCTURE.** A storage structure for explosives that does not meet the minimum strength specifications for a standard igloo magazine or earth-covered structure.

**ABSOLUTE DUD.** A nuclear weapon which, when launched at or emplaced on a target, fails to explode.

**ABSORBED DOSE.** The amount of energy imparted by nuclear (or ionizing) radiation to unit mass of absorbing material. The unit is the rad. (See dose and radiation absorbed dose (RAD)

**ABSORPTION.** The irreversible conversion of the energy of an electromagnetic wave into another form of energy as a result of its interaction with matter. As applied to gamma (or X) rays it is the process (or processes) resulting in the transfer of energy by the radiation to an absorbing material through which it passes. In this sense, absorption involves the photoelectric effect and pair production, but only part of the Compton effect. (See attenuation, compton effect, pair production, photoelectric effect)

**ABSORPTION COEFFICIENT.** A measure of the capacity of matter to absorb radiation by the destruction of photons of a given frequency through excitation or ionization of atoms.

**ABSORPTIVE MATERIALS.** Materials that remove undesirable contaminants or reactive materials.

**ACCELEROMETER.** A device used to measure the translation motion of an inertial system. An accelerometer measures acceleration along a given axis.

**ACCEPTANCE EQUIPMENT.** The equipment used by a DOE production agency or the quality assurance inspection agency (QAIA) for acceptance of weapons materiel including associated test and handling equipment and joint test assemblies. Acceptance equipment includes gages, product testers, cables, adapters, equipment which generates data, and related equipment such as environmental chambers, shock and vibration equipment, and required fixtures.

**ACCEPTANCE INSPECTION.** An inspection which consists of a visual inspection and verification that the warhead (W) section, reentry vehicle (RV)/bodies or bombs meet all the acceptance criteria established for deployment, and that all items will pass all tests (electrical/mechanical) required of that unit. The inspection may be combined with other operations and does not require starting from or ending with a specific configuration. Such inspection must be accomplished as soon as practicable and, in any event, prior to shipment or mate/reconfiguration. (See preshipment inspection; receipt inspection; verification inspection.)

**ACCEPTANCE TEST.** A test to ascertain if a manufactured product meets the requirements for certain pre-selected essential characteristics. The acceptance test normally follows qualification approval.

**ACCESS (NUCLEAR WEAPONS).** Close physical proximity to a nuclear weapon in such a manner as to allow the opportunity to tamper with or damage a nuclear weapon.

**ACCESS (VERIFIABLE CONTROL PROCEDURES [VCP] EQUIPMENT).** Close physical proximity to nuclear weapon code equipment which would allow an opportunity to tamper, damage, or implant unauthorized devices. Unauthorized devices are those which might cause operational codes to be compromised and/or cause an unauthorized failure or detonation of the nuclear weapon.

**ACCESS TO CLASSIFIED INFORMATION.** The ability and opportunity to obtain knowledge of classified information by persons with the proper security clearance and a need to know of specified classified information.

**ACCIDENT.** (See nuclear weapon(s) accident.)

**ACCIDENT APPRAISAL.** Evaluation of the hazards resulting from an accident involving nuclear weapons or nuclear material. Accident appraisal includes recognition of explosive and nuclear weapon components and related hazards. It requires a practical knowledge of accident patterns, salvage, declassification, and disposition, and emergency destruction, as well as knowledge of the existing nuclear weapons accident alerting system.

**ACCOUNTABILITY.** The obligation imposed by law or lawful order or regulation on an officer or other person for keeping accurate records of property, documents, or funds. The person having this obligation may or may not have actual possession of the property, documents, or funds. Accountability is concerned primarily with records, while responsibility is concerned primarily with custody, care, and safekeeping.

**ACTINIDES.** The series of heavy radioactive metallic elements of increasing atomic number from actinium (atomic number Z-89) through hafnium (atomic number Z + 105). Nuclear reactor operations are among the processes which might produce or involve these elements.

**ACTINIUM (AC).** A radioactive element found in uranium ores, used in equilibrium with its decay products as a source of alpha rays. Its longest live isotope is $Ac^{227}$ with a half-life of 21.7 years. $Ac^{227}$ may be used in a neutron generator in nuclear weapons.

**ACTIVATION.** The process by which stable isotopes are converted to radioactive ones, usually by neutron capture.

**ACTIVATION ANALYSIS.** A technique for measuring trace quantities of elements in materials by making them radioactive by neutron irradiation. The elements can then be detected by counting the decay radiation. The result is an elemental signature or fingerprint that can be used to trace the source of the material. Activation analysis or neutron activation analysis is often used in forensic investigations. The radioactivity of the activated sample is usually negligible.

**ACTIVE MATERIAL.** Material, such as plutonium and certain isotopes of uranium, which is capable of supporting a fission chain reaction. (See source and special (SS) nuclear material.)

**ACTIVE PROTECTION.** The concept of a use control system that senses attempts to gain unauthorized access to weapon components, with option to respond by initiating weapon disablement.

**ACTIVE PROTECTION SYSTEM (APS).** A part of the code-controlled nuclear weapon use control subsystem that senses attempts to gain unauthorized access to critical weapon components and responds by initiating weapon disablement (i.e., non-violent disablement of critical weapon components).

**ACTIVE RESERVE.** Warheads in excess of Combatant Commanders (CC) requirements designated by the Joint Staff for retention, in varying configurations, to meet potential contingencies.

**ACTIVE STOCKPILE (AS).** The number and types of operational warheads listed in the AS portion of the Requirements and Planning Document (RPD). These warheads are maintained in an operational, ready-for-use configuration with tritium bottles and other Limited-Life Components (LLC) installed. They incorporate the latest warhead refurbishment modifications or alterations and are assessed for reliability and safety. AS includes deployed strategic warheads, logistics spares, some hedge weapons, and deployed non-strategic weapons.

**ACTIVITY (NUCLEAR).** The rate at which atomic nuclei are disintegrating. Normally measured in disintegrations per unit time (d/s - disintegrations/second or dpm - disintegrations/minute).

**ACTUAL GROUND ZERO (AGZ).** The point on the surface of the Earth at, or vertically below or above, the center of an actual nuclear detonation. (See desired ground zero (DGZ); ground zero.)

**ACUTE EFFECT.** Symptom of exposure to a hazardous material; normally the result of a short-term exposure which comes quickly to a crisis. For example, one effect of an intense radiation exposure is a rapid browning of the skin, known as a nuclear tan.

**ACUTE RADIATION DOSE.** Total ionizing radiation dose received at one time and over a period so short that biological recovery cannot occur.

**ACUTE RADIATION SYNDROME (ARS).** An acute illness caused by irradiation of the body by a high dose of penetrating radiation in a very short period of time.

**ADAPTION KIT (AK).** DoD components required to adapt a nuclear warhead to a weapon. Normally this includes the arming, safing and fuzing systems, the necessary power supplies, hardware, support structures and, in some cases, the warhead compartment.

**ADOPTED ITEMS OF MATERIEL.** Items of materiel which are suitable for their intended military purpose, have been type classified, are suitable for inclusion in equipment authorization documents, and are described in adopted item lists published to provide the official nomenclature source and type classification status of such items.

**ADSORPTION.** The surface retention of solid, liquid, or gas molecules, atoms, or ions by a solid or liquid.

**ADVANCE CHANGE ORDER (ACO).** A document which identifies a change authorization issued by a DOE design agency before the drawing changes are all incorporated in new drawing issues. (See engineering release (ER).)

**ADVANCE ENGINEERING RELEASE (AER).** For weapon product, a release which issues part or all of the product definition or authorizes specific actions by a production agency to prepare for full production, such as the fabrication of gages, tooling, fixtures, procurement of long lead time items and limited fabrication of product; e.g., pilot production quantities. (See engineering release (ER).)

**ADVANCED DEVELOPMENT, CONCEPTS, DESIGNS, ETC.** Those that are more than refinements on previous technology.

**ADVERSARIAL ATTACK.** An attack on a nuclear weapon(s) or nuclear explosive device(s) with the objective of causing unauthorized use.

**ADVERSARY.** A party acknowledged as potentially hostile to a friendly party and against which the use of force may be envisaged.

**AFTERWINDS.** Wind currents set up in the vicinity of a nuclear explosion directed toward the burst center, resulting from the updraft accompanying the rise of the fireball.

**AIRBLAST-INDUCED GROUND DIRECT MOTION.** As an airblast wave passes away from ground zero over the surface of the ground, the signal or stress wave that follows a direct or vertical path from the airblast wave to a point of observation on the ground is called the airblast-induced ground motion. It is often referred to more simply as the direct wave, which is not to be confused with direct ground shock whose point of origin is ground zero of the burst.

**AIRBLAST-INDUCED GROUND TRANSMITTED MOTION.** As an airblast wave passes away from ground zero over the surface of the ground, the signal or stress wave that follows a refracted path, that is, a path from ground zero of the airblast wave to a point of observation on the ground, is called the airblast-induced ground transmitted motion. It is often referred to more simply as the ground wave whose point of origin is ground zero.

**AIRBOURNE RADIOACTIVITY.** Any radioactive material suspended in the atmosphere.

**AIRBURST.** (See nuclear airburst)

**AIRCRAFT COMPATIBILITY CONTROL DRAWING (ACCD).** A document produced by Sandia National Laboratories which describes hardware and software compatibility details and any exceptions or restrictions between a nuclear bomb type and all of its associated aircraft.

**AIRCRAFT MONITORING AND CONTROL (AMAC).** That equipment installed in aircraft to permit monitoring and control of safing, arming, and fuzing functions of nuclear weapons or nuclear weapon systems.

**AIR LENS.** (See lens (conventional, air, or ring).)

**AIR RADEX.** A contour representation of the contamination pattern due to a radioactive cloud, including the effects of its travel as predicted from meteorological information. (See Radiation Exclusion (radex plot).)

**AIR SAMPLER.** A device used to detect and determine the amount of radioactive contamination in the air.

**AIR ZERO.** That point in space at which a detonation occurs. This differs from the term ground zero in that the height of burst above the surface is specified. (See ground zero.)

**ALGORITHM.** A computational procedure used in a computer program for carrying out a task; usually performed repeatedly.

**ALLOCATED UNDEPLOYED WEAPONS AND COMPONENTS.** Those weapons and components allocated to the unified commanders but not deployed.

**ALLOCATION (NUCLEAR).** The apportionment of specific numbers and types of nuclear weapons to a commander for a stated time period as a planning factor for use in the development of war plans. (Additional authority is required for the actual deployment of allocated weapons to locations desired by the commander to support his war plans. Expenditures of these weapons are not authorized until released by proper authority).

**ALL-UP-ROUND (AUR).** A completely assembled missile consisting of a payload, delivery vehicle, and where applicable, a launch capsule/canister.

**ALPHA.** The neutron multiplication rate in a fissioning system, measured in generations per unit time.

**ALPHA BARRIER.** A layer of material coated on the inside of beryllium tampers to prevent alpha-neutron reactions in the beryllium tamper caused by the spontaneous release of alpha radiation from the plutonium fissile material.

**ALPHA-N INITIATOR.** An alpha-n initiator is based on the reaction in which alpha particles from an alpha-emitter, such as polonium ($Po^{210}$), interact with a light element, such as beryllium. The two materials are separated and shielded, then physically mixed to produce a neutron flux at the proper time.

**ALPHA PARTICLE, RADIATION.** A positively charged particle made up of two neutrons and two protons, emitted by certain radioactive nuclei. Alpha particles can be stopped by thin layers of light materials, such as a sheet of paper, and pose no direct or external radiation threat; however, they can pose a serious health threat if ingested.

**ALTERATION (ALT).** Any change or changes that typically affect the assembly, testing, maintenance, and/or storage of weapons. An ALT may address identified defects and component obsolescence, but does not change a weapon's operational capabilities.

**ALTERATION CODE (ALT CODE).** A 3-letter reporting code designation reflecting the weapon ALT series configuration.

**ALTERNATION NUMBER.** A 3-digit number applied to a weapon, reflecting a specific procedural driven repair or alteration. It may or may not be associated with a corresponding rework (drop) number.

**ANCILLARY EQUIPMENT.** A general term applied to those items provided for operational and maintenance support of weapons and weapons materiel. (See special equipment and use control systems (UCS).) Ancillary equipment includes the following categories:

**a.** S - Computer software used for field maintenance of testing.

**b.** T - Equipment or accessories used for field testing, maintenance or assembly of weapons material.

**c.** H - Mechanical equipment used to handle weapons.

**d.** CT - Cables, cable assemblies, plugs, connectors, etc., used with T category equipment.

**e.** DE - Devices or equipment used in emergency disablement operations.

**ANNUAL LIMIT ON INTAKE (ALI).** The smaller amount of radioactive material taken into the body of an adult worker through inhalation, ingestion, or skin absorption in a 2,000-hour occupational year (40 hours for 50 weeks) that would result in a Committed Effective Dose Equivalent of 5 rem (0.05 Sv) or a Committed Dose Equivalent of 50 rem (0.5 Sv) to any individual organ or tissue containing the radioactive material.

**ANTI-CONTAMINATION CLOTHING (ANTI-C'S).** Clothing consisting of coveralls, shoe covers, gloves, and hood or hair cap. Anti-contamination clothing provides protection for the user from alpha radiation, and is also a control device to prevent the spread of contamination. A respirator can be worn with the anti-contamination clothing which provides protection against the inhalation of contaminants.

**APPARENT CRATER.** (See crater.)

**ARCHIVE ENGINEERING RELEASE.** A release which authorizes retention of an aperture card of the latest drawing issue in archives and the destruction of the drawing original.

**ARCTIC AREA.** (See area.)

**AREA.**

**a.** **ARCTIC AREA**. A geographical area having a normal temperature range from 0°F to 80°F during the summer and -80°F to 30°F during the winter. Relative humidity normally varies up to 100 percent. There is heavy annual precipitation in the form of ice and snow. Although specific humidity is low, small amounts of water vapor in the air result in high relative humidity because of the low temperature.

**b.** **DESERT AREA**. A geographical area having a normal daytime temperature average from 85°F to 95°F during the summer and from 60°F to 70°F during the winter. Summer daytime temperatures, however, may reach 130°F, and temperatures of 100°F or higher for 50 consecutive days are not uncommon. Nighttime temperatures are 20°F to 30°F below daytime temperatures. A similar differential exists between the hottest and coldest months. Relative humidity varies from 2 to 40 percent. There is very little rainfall.

**c.** **TEMPERATE AREA**. A geographical area not covered by definitions of tropic, desert, or arctic areas. Generally temperature and precipitation are moderate in comparison with the extremes of other areas although the relative humidity may reach the extremes of other areas.

**d.** **TROPIC AREA**. A geographical area having a normal temperature from 82°F to 94°F during the day, and 70°F to76°F during the night. Relative humidity varies from 80 to 100 percent. There is heavy rainfall. The main average temperature difference between summer and winter months is 5°F to 8°F. Above characteristics generally are true for islands in the area, except that temperature variations and rainfall are less.

**ARMED (NUCLEAR).** The configuration of a nuclear weapon in which a single signal will initiate the action required for obtaining a nuclear detonation. (See prearmed.)

**ARMING.** Readying a nuclear weapon so that a fuzing signal will operate the firing system; includes operation or reversal of safing items.

**ARMING AND FUZING DEVICE (AFD).** A Navy-produced device within the reentry body (RB) which, upon sensing or receiving the appropriate input or environment, provides the electrical signals for arming, safing, and fuzing functions.

**ARMING AND FUZING SUBSYSTEM (AFS).** (See arming system; fuzing system.)

**ARMING, FUZING, AND FIRING (AF&F).** A group of one or more subassemblies, hardware, or major components that performs arming, fuzing, and firing (AF&F) functions of a nuclear fuzing system.

**ARMING SIGNALS.** Generally safety-critical electrical signals that place a nuclear weapon in an energy state ready to receive a fuzing or firing signal. These do not include enabling stimuli.

**ARMING SYSTEM.** That portion of a weapon which serves to ready (arm), safe, or re-safe (disarm) the firing system and fuzing system and which may actuate devices in the nuclear system. (See firing system; fuzing system.)

**AS LOW AS REASONABLY ACHIEVABLE (ALARA).** Refers to Service and DOE radiation protection programs to keep radiation doses as low as reasonably achievable.

**ASSIGNMENT (NUCLEAR).** A specified number of complete nuclear rounds authorized for expenditure by a commander. An assignment may be made for a specific period of time, for a phase of an operation, or to accomplish a particular mission.

**ASSIGNMENT OF DEVELOPMENT SUPPORT AND PRODUCTION RESPONSIBILITIES.** A document prepared by DOE which officially assigns development support and responsibilities to all concerned U.S. DOE, National Nuclear Security Administration (NNSA) or other DOE production agencies. Primary considerations for assignments are based on the “Recommended Development Support and Production Responsibility Assignments” letter.

**ATOM.** The smallest (or ultimate) particle of an element that still retains the characteristics of that element. Every atom consists of a positively charged central nucleus, which carries nearly all the mass of the atom, surrounded by a number of negatively charged electrons, so that the whole system is electrically neutral. (See electron, element, nucleus (or atomic nucleus).)

**ATOMIC BOMB.** An explosive device whose energy typically comes from the fission of uranium or plutonium.

**ATOMIC CLOUD.** (See nuclear cloud.)

**ATOMIC ENERGY.** (See nuclear energy.)

**ATOMIC NUMBER.** The number of protons in the nucleus of an element. It determines the position of an element in the Periodic Table in which all elements are arranged in the order of their atomic number.

**ATOMIC ORDNANCE ITEM.** (See nuclear ordnance (NUOR) items.)

**ATOMIC WARHEAD.** (See nuclear warhead.)

**ATOMIC WEAPON.** (See nuclear weapon (or bomb).)

**ATOMIC WEAPONS MATERIEL.** (See nuclear weapons materiel (NWM).)

**ATOMIC WEIGHT.** The relative mass of an atom of the given element. As a basis of reference, the atomic weight of the common isotope of carbon (carbon-12) is taken to be exactly12; the atomic weight of hydrogen (the lightest element) is then 1.008. Hence, the atomic weight of any element is approximately the mass of an atom of that element relative to the mass of a hydrogen atom.

**ATTENUATION.** Decrease in intensity of a signal, beam, or wave as a result of absorption and scattering out of the path of a detector, but not including the reduction due to geometric spreading (i.e., the inverse square of distance effect). As applied to gamma (and X) rays, attenuation refers to the loss of photons (by the Compton, photoelectric, and pair-production effect) in the passage of the radiation through a material. (See Absorption, inverse square law, photon, scattering)

**ATTENUATION COEFFICIENT.** A number characterizing the extent of interaction of photons of specified gamma (or X) rays in their passage through a material. The linear attenuation coefficient is a measure of the photon interaction per unit thickness of material and is stated in units of reciprocal length (or thickness). The mass attenuation coefficient is equal to the linear attenuation coefficient divided by the density of the material; it is a measure of the attenuation per unit mass. (See Absorption Coefficient).

**AUDIT RECORD.** Weapon operation status generated by a Communication Module for each weapon-specific operation. Audit records are compiled by Code Management System (CMS) field equipment into monitor files and transmitted from the field to HQ CMS. After verification against the operation's expected state, the audit record information is used to update the CMS database. Audit records are not generated by generic weapon operations.

**AUGMENTATION RESERVE FORCE (ARF).** Additional military personnel (or units) other than those assigned to a specific security or reserve force, trained and capable of augmenting a security and reserve force as required.

**AUGMENTATION WARHEADS.** Warheads retained in the inactive stockpile for reactivation to increase the operational capability of the active stockpile, if required by national security considerations.

**AUTHORIZATION PLANNING SCHEDULE.** (See schedule.)

**AUTHORIZED INDIVIDUAL.** A person who has been properly cleared, indoctrinated, and briefed regarding continuous handling, observation, and recovery procedures for coding equipment.

**AUTOMATIC DISABLEMENT.** Related to Active Protection Systems (APSs), mode of nonviolent nuclear weapon disablement which occurs automatically if any attempt is made to penetrate the APS in an unauthorized attempt to bypass or defeat the use control system (UCS)/permissive action link (PAL).

# B

**BACKGROUND COUNT.** The evidence or effect on a detector of radiation, other than that which it is desired to detect, caused by any agent. In connection with health protection, the background count usually includes radiation produced by naturally occurring radioactivity and cosmic rays.

**BACKGROUND RADIATION.** Nuclear (or ionizing) radiations arising from within the body from the surroundings to which individuals are always exposed. The main sources of the natural background radiation are potassium-40 in the body, potassium-40 and thorium, uranium and their decay products (including radium) present in rocks and soil, and cosmic rays.

**BACKUP ALERT FORCE (BAF).** Three or more security force members, in addition to those on established guard posts and the security alert team (SAT), designated to reinforce the SAT.

**BALLISTIC CASE.** A complete aerodynamic-shaped case, designed to house the operational, training, or inert components of a nuclear weapon. (See case section.)

**BALLISTIC COEFFICIENT.** A measure of the relative efficiency of any projectile in overcoming air resistance. It is defined by $W/C_D$, A, where W is the projectile's weight in pounds; $C_D$ is the drag coefficient; and A is the reference cross-sectional area of the projectile in square feet. The Greek symbol "beta" $\beta$ is normally used for ballistic coefficient.

**BALLISTIC MISSILE.** Any missile which does not rely upon aerodynamic surfaces to produce lift and consequently follows a ballistic trajectory when thrust is terminated.

**BALLISTIC SHAPE.** An inert dummy weapon having the same external configuration and identical ballistic characteristics as the weapon which it simulates. (See bomb dummy unit (BDU); practice bomb.)

**BAROSWITCH (ALSO BARO).** An item which performs electrical switching functions by mechanical actuation resulting from changes in atmospheric pressure, (i.e., changes in altitude). (See differential pressure switch.)

**BARRAGE MODE.** A model type anti-ballistic missile (ABM) tactic in which waves of defensive missiles, using nuclear warheads, attack successive segments of a threat tube. (See threat tube.)

**BARRICADE.** An intervening approved obstruction, natural or artificial, of such type, size, and construction as to limit, in a prescribed manner, the effect of an explosion on nearby buildings or exposures.

**BARRIER (NUCLEAR).** As used in conjunction with passive protection, the term barrier refers to the system which makes penetration difficult and delays access to critical weapon components.

**BARRIER MATERIAL.** Material used in a nuclear weapon passive protection feature which, because of its properties, will delay or prevent attempts to penetrate the UCS. Barrier material is also a common term for packaging material used to protect the contents against outside elements.

**BASE AND MILITARY SPARES SERVER (BMSS).** The National Security Campus (DOE/NSC) database used to order Air Force base and military spares, and DOE-designed/DoD-owned special equipment.

**BASE SPARES.** Parts and components authorized in the spare parts list (SPL) published by Sandia National Laboratories (SNL), funded for, procured, and owned by the DOE, and furnished to the DoD for use in maintaining and repairing war reserve (WR) nuclear weapons and DOE-owned equipment supplied to the DoD with the WR weapon. Parts remain the property of the DOE regardless of custody. (See spare parts list (SPL).)

**BASE SURGE.** A cloud which rolls out from the bottom of the column produced by a subsurface burst of a nuclear weapon. For underwater bursts, the surge is, in effect, a cloud of liquid droplets which has the property of flowing almost as if it were a homogeneous fluid. For subsurface land bursts the surge is made up of small solid particles but still behaves like a fluid. (See crown; nuclear column; plume.)

**BASIC ASSEMBLY (BA).** As used in Chairman Joint Chiefs of Staff Instruction (CJCSI) 3150.04, a basic assembly is a nuclear weapon which requires the addition of one or more components before it can be used as a bomb or warhead; e.g., aerodynamic surfaces, shock mitigating components, retarding components, and some firing and fuzing components.

**BEARING WALL.** As pertains to nuclear weapons storage and maintenance facilities, a wall which supports (or bears) part of the mass of a structure, such as the floor and roof systems.

**BECQUEREL (BQ).** The International System unit of activity of a radionuclide, equal to the activity of a quantity of a radionuclide having one spontaneous nuclear transformation a second.

**BENT SPEAR.** A term used in the DoD to identify and report a nuclear incident involving a nuclear weapon/warhead or nuclear component. In the Air Force this includes a “significant incident” as defined in DoD Directive 3150.8. (See nuclear incident.)

**BETA PARTICLE.** A charged particle of very small mass emitted spontaneously from the nuclei of certain radioactive elements. Most (if not all) of the direct fission products emit (negative) beta particles. Physically, the beta particle is identical with an electron moving at a high velocity. (See electron, fission products, radioactivity.)

**BHANGMETER.** A device designed to give a rapid determination of the approximate yield of a bomb from observation of the explosion by measuring the time interval between the appearance of the first light after detonation and the occurrence of the principal light minimum. The yields calculated on this basis are not absolute but are derived from the known yields of other bombs by applying appropriate scaling procedures.

**BIOLOGICAL DOSE.** (See radiation dose.)

**BIOLOGICAL HALF-LIFE.** (See half-life.)

**BLACKBODY.** An idealized body that absorbs all electromagnetic energy falling upon it. At constant temperature it emits electromagnetic radiation with distribution or spectrum that is described by its temperature.

**BLAST EFFECT.** Destruction of or damage to structures and personnel by the force of an explosion on or above the surface of the ground. Blast effect may be contrasted with the cratering and ground-shock effects of a projectile or charge that goes off beneath the surface.

**BLAST LETHAL VOLUME.** The region in the atmosphere, relative to a target, where the combined overpressure and dynamic pressure loading of a nuclear burst will destroy the target.

**BLAST LINE.** A horizontal radial line on the surface of the Earth originating at ground zero on which measurements of blast from an explosion are taken. (See thermal line.)

**BLAST LOADING.** The loading or force on an object caused by the air shock wave striking and flowing around the object. It is a combination of overpressure (diffraction) and dynamic pressure (drag) loading. (See dynamic pressure; overpressure.)

**BLAST PRESSURE.** The overpressure of a shock wave in the air at a given distance from the source of detonation. (See dynamic pressure; overpressure.)

**BLAST SCALING LAWS.** (See scaling law.)

**BLAST SHIELD.** A heavy metal component placed between a hydrodynamic energy source and a component to be protected from the energy. (See shock.)

**BLAST WAVE.** A sharply defined wave of increased pressure rapidly propagated through a surrounding medium from a center of detonation or similar disturbance. (See shock wave.)

**BLAST YIELD.** That portion of the total energy of a nuclear detonation which manifests as a blast or shock wave. Blast is often expressed in terms of overpressure. (See yield (or energy yield).)

**BOMB (B).** (See nuclear weapon (or bomb))

**BOMB ALARM SYSTEM.** A fully automatic system of detectors ringing key target areas in North America for transmitting to display centers reports of nuclear bursts. (See nuclear detonation detection and reporting system.)

**BOMB DEBRIS.** (See weapon debris (nuclear).)

**BOMB DUMMY UNIT (BDU).** An Air Force-procured item which has the external appearance of a specific nuclear bomb, and is used for training personnel in loading, handling, and delivery procedures. (See ballistic shape; practice bomb.)

**BOOST RESERVOIR.** A reservoir for storing boosting fuel.

**BOOSTED FISSION WEAPON.** A weapon in which neutrons produced by thermonuclear reaction serve to enhance the fission process. The thermonuclear energy represents only a small fraction of the total explosion energy. (See fission, thermonuclear (TN).)

**BOOSTING.** Enhancement of a fission reaction by thermonuclear (TN) neutrons where the energy released in the TN reaction is a small fraction (a few percent) of the total.

**BOX A.** The room or enclosure surrounding the nuclear source (working point) of an effects test.

**BREAKAWAY.**

**a.** The onset of a condition in which the shock front moves away from the exterior of the expanding fireball produced by the explosion of a nuclear weapon. (DoD)

**b.** After completion of attack, turn to heading as directed.

**BRIDGE (B).** The element in an electroexplosive device (EED) that, when exploded by electrical energy, initiates detonation in an explosive. If initiation is by printed circuit techniques, then bridge (B) is generally used. (See bridgewire (BW).)

**BRIDGEWIRE (BW).** The element in an EED that, when exploded by electrical energy, initiates detonation in an explosive. If a "wire" is used, it is usually called a bridgewire (BW). (See bridge (B).)

**BROKEN ARROW.** The Joint Reporting Structure Event and Incident Report flagword for a nuclear weapons accident. (See nuclear weapon(s) accident.)

**BUFFER DISTANCE.** In nuclear warfare:

**a.** The horizontal distance which, when added to the radius of safety, will give the desired assurance that the specified degree of risk will not be exceeded. The buffer distance is normally expressed quantitatively in multiples of the delivery error.

**b.** The vertical distance which is added to the fallout safe-height of burst in order to determine a desired height of burst which will provide the desired assurance that militarily significant fallout will not occur. It is normally expressed quantitatively in multiples of the vertical error.

**BURST.** (See nuclear airburst; nuclear exoatmospheric burst; nuclear surface burst; nuclear underground burst; nuclear underwater burst.)

**BURST PRESSURE.** Pressure at which a vessel bursts during destructive testing.

**BYPASS ASSESSMENT (STUDY) DATA.** Details of the experimental and analytical operations performed along with documented results of the bypass assessment for each weapon and/or its related UCS.

# C

**CAMOUFLET.** The resulting cavity in a deep underground burst when there is no rupture of the surface. (See crater; nuclear column.)

**CANISTER/RACK/PEDESTAL.** The assembly that contains or supports a nuclear test device and related hardware.

**CANNED SUBASSEMBLY.** A term used in the nuclear weapon complex for a subassembly consisting of one or more parts hermetically sealed (canned) by welding in a thin metal container, usually made of stainless steel or aluminum alloy.

**CANNIBALIZATION.** To remove serviceable components from one weapon and install them on another weapon in order to make that weapon serviceable.

**CAP/MET KEYS.** Encryption keys for MCCS Encryption Translator (MET) or Code Activated Processor (CAP). Each MET and CAP contains a Normal key and a Master key. The Normal key is used for all decryption operations within the MET or CAP. The Master key is used only in the rekey process, which replaces one or both keys with new keys.

**CAPABILITY AND PROFICIENCY EVALUATION (CAPE).** A joint effort by the Navy's Strategic Systems Project Office and cognizant fleet activities to assure that fleet ballistic missile (FBM) tenders have the required capability and proficiency to accomplish their mission in support of the FBM Weapon System. The maintenance and repair functions of the tender, the availability and adequacy of support equipment, facilities and technical documentation are evaluated. A CAPE is conducted on FBM tenders during and after construction and overhaul/conversion periods, and prior to deployment.

**CAPSULE.** For early implosion weapons, capsule was used as an unclassified designator for the assembled fissile material, initiator, and associated hardware inserted into the pit.

**CARRIER.** A term applied to the means of delivering a nuclear warhead on a target. Examples of carriers are missiles, rockets, and delivery aircraft. In missile application, the missile provides the flight configuration and the means of propulsion to "carry" the warhead to the target.

**CASE SECTION.** A division or segment of a ballistic case of a nuclear weapon. (See ballistic case.)

**CENTRAL SCREENING ACTIVITY.** The Service activity charged with screening internal requests for DOE engineering data to determine the need for the requested information. Engineering data requirements will be directed to DTRA for support after initial screening review.

**CERTIFICATION.** When used in the context of weapon and carrier systems, the authorization to use the designated system within the specified limits. (See recertification.)

**CERTIFICATION (NUCLEAR WEAPONS TECHNICAL INSPECTION (NWTI)).** A determination by the applicable Service that a unit is capable of performing its assigned nuclear mission. Navy accomplishes this by Navy Technical Proficiency Inspection (NTPI) and Nuclear Weapons Acceptance Inspection (NWAI); and Air Force by Nuclear Surety Inspection (NSI) and Initial Nuclear Surety Inspection (INSI).

**CF ITEM.** An electrical cable assembly, plug, connector, or adapter used in the electrical circuitry of a weapon or weapon materiel.

**CHAIN REACTION.** A process in which some of the neutrons released in one fission event causes other fissions to occur.

**a.** **MULTIPLYING CHAIN REACTION**. An average of more than one fission is produced by the neutrons released by each previous fission.

**b.** **NONSUSTAINING CHAIN REACTION**. An average of less than one fission is produced by the neutrons released by each previous fission

**c.** **SUSTAINING CHAIN REACTION**. An average of exactly one fission is produced by the neutrons released by each previous fission.

**CHANNEL.** (See radiation.)

**CHEMICAL DOSIMETER.** A self-indicating device for determining total or accumulated radiation exposure based on color changes accompanying chemical reactions induced by radiation. (See film badge; radiac dosimeter.)

**CHRONIC RADIATION DOSE.** A dose of ionizing radiation received either continuously or intermittently over a prolonged period of time. A chronic radiation dose may be high enough to cause radiation sickness and death but, if received at a low dose rate, a significant portion of the acute cellular damage my be repaired.

**CIRCULAR ERROR PROBABLE (CEP).** An indicator of the delivery accuracy of a weapon system, used as a factor in determining probable damage to a target. It is the radius of a circle within which half of a missile's projectiles are expected to fall. (See delivery error; dispersion error; horizontal error; spherical error probability (SEP).)

**CIRCUMVENT OR CIRCUMVENTION.** Actions taken to overcome or defeat the UCS of a nuclear weapon. This includes physical and electrical bypass of the PAL and APS, as well as gaining knowledge of the PAL unlocking combinations and taking actions which would allow an unauthorized nuclear detonation.

**CLADDING (CLAD).** A spherical shell surrounding an initiator.

**CLASS II NUCLEAR COMPONENTS.** The 992P-Z, 992T-Z, 994P-W, and sealed pits. (See nuclear components.)

**CLEAN WEAPON.** A nuclear weapon where measures have been taken to reduce the amount of residual radioactivity relative to a “normal” weapon of the same energy yield.

**CLOSE-IN LOCATION.** A storage or operational facility located at a distance of less than four statute miles from civilian habitation not under government control.

**CLOSURE (NUCLEAR).** An obstruction placed in a line-of-sight (LOS) pipe to prevent radiation or debris from exiting.

**CLOUD CHAMBER EFFECT.** (See condensation cloud.)

**CLOUD COLUMN.** The visible column of smoke extending upward from the point of burst of a nuclear weapon. In the case of an airburst it may extend to the tropopause, the boundary between the troposphere and the stratosphere.

**CLOUD TOP HEIGHT.** The maximal altitude to which a nuclear mushroom cloud rises.

**CODE ACTIVATED PROCESSOR (CAP).** A microprocessor-based coded device with the additional capability of enhanced code protection and ease of handling through encryption.

**CODE INHIBIT.** Precludes access by the inhibited code for recoding, locking, or unlocking until cleared by performing alternate code recode procedure.

**CODE MANAGEMENT SYSTEM (CMS).** CMS is comprised of a headquarters component (HQ CMS) and a field component (Field CMS) that is used to perform use control operations. HQ CMS consists of a Host Processor and Cryptographic Processor and associated software. Field CMS consists of a Base Station, Field Processor, Communication Module, Power Module, Interface Adapter and Field Tester.

**CODED SWITCH.** A device included in a nuclear weapon system to preclude arming and/or launching until the insertion of a prescribed discrete code or combination.

**CODED SWITCH SET (CSS).** A system installed in an aircraft with associated ground equipment to preclude prearming of a nuclear weapon until the insertion of a prescribed discrete code. (See permissive action link (PAL).)

**CODE ENABLING SWITCH (CES).** That part of the CSS which contains the stored codes where the codes transmitted from the coded switch set controller (CSSC) are compared with the stored codes.

**CODED SWITCH SET CONTROLLER (CSSC).** That part of the CSS which is located in the crew compartment and where a code is inserted for transmission to the CES.

**CODED SWITCH SET (CSS) RECODER.** Part of the CSS which accepts codes from cards or tapes and inserts them in storage in the CES.

**CODED SWITCH SET (CSS) CODE.** A sequence of letters set into a CSS to meet operational requirements by permitting enabling or testing of the CSS.

**CODED SWITCH SET (CSS) CHECK.** An operation which verifies that the selected codes have been set into the CSS.

**CODED SWITCH SET (CSS) DISENABLE.** To insert a discrete code into a CSS which will place the CSS in ~~a~~an disenabled condition.

**CODED SWITCH SET (CSS) DISENABLED.** The state of a CSS which precludes normal prearming of a nuclear weapon or weapon system.

**CODED SWITCH SET (CSS) ENABLE.** To insert a discrete code into a CSS which will place the CSS in an enabled condition.

**CODED SWITCH SET (CSS) ENABLED.** The state of a CSS which permits normal prearming of a nuclear weapon or weapon system.

**CODED SWITCH SET (CSS) RECODING.** The act of changing a code previously set into a CSS so that the CSS will respond when the changed code is subsequently inserted.

**INTERCONNECTING BOX (ICB).** Part of the CSS where prearming AMAC circuits are interrupted (disenabled) or closed (enabled) as a result of a disenabling action initiated in the CSSC or insertion of an enabling code in the CSSC and its comparison with an identical stored code in the CES.

**SUM CHECK CODE.** The sum of all the individual enabling codes stored in the CES assembly.

**SUM CODE CALCULATOR.** A calculator that accepts all the individual codes stored in the CES and calculates their sum.

**COLD X-RAY SPECTRUM.** One consisting primarily of X-ray photons of energies less than 10keV.

**COLOR CATEGORY.** (See weapon status.)

**COLUMN.** (See nuclear column.)

**COLUMN (OR PLUME).** A hollow cylinder of water and spray thrown up from an underwater burst of a nuclear (or atomic) weapon, through which the hot, high pressure gases formed in the explosion are vented to the atmosphere. A somewhat similar column of dirt is formed in an underground explosion.

**COMBAT TRAINING LAUNCH (CTL).** A term used as a modifier to describe a payload assembly that utilizes a warhead designed for training launches.

**COMBINATION INITIATING SYSTEM.** One nonelectric initiating system and one electric initiating system which operate entirely independent of each other.

**COMMAND AND CONTROL (NUCLEAR WEAPONS).** The exercise of authority and direction by the President: as Commander-in-Chief, through established command lines, over nuclear weapon operations of military forces; as Chief Executive, over all government activities that support those operations; and as Head of State, over required multinational actions that support those operations.

**COMMAND-CODED ARMING DEVICE (CCAD).** A device located remotely from a nuclear warhead which prohibits the transmission of signals to the weapon until the proper PAL code is inserted into the device.

**COMMAND DISABLE (CD).** A feature which allows manual activation of the nonviolent disablement of critical weapon components. The CD system may be internal or external to the weapon.

**COMMAND DISABLE CODE (CDC).** A code placed in a weapon or controller that allows the command disablement of the weapon to be initiated.

**NOTE**

The DE designator is inactive for new designs released after March 1, 1991. Disablement equipment released after that date shall be designated UD. Associated cables or cable adapters released after March 1, 1991 are designated UL.

**COMMAND DISABLE SYSTEM (CDS).** A system internal to a bomb (with internal control devices) or a system internal to a warhead (but having external control devices) which when activated destroys a weapon's ability to achieve a significant nuclear yield. Disablement is achieved by nonviolent means. (See nonviolent disablement (NVD).)

**a.** **DISABLEMENT EQUIPMENT (DE OR UD).** An unassociated electrical and/or mechanical device or system used for emergency disablement of weapons material. Such a device is designated by disablement equipment nomenclature (DE or UD) followed by a number (starting with 1000). Associated cables or adapters associated with DE or UD equipment are given a CT or UL designation.

**b.** **COMMAND DISABLE SYSTEM (CDS) RECODE**. An operation which changes a code previously set into the CDS such that the CDS will respond when the changed code is subsequently inserted.

**c.** **COMMAND DISABLE SYSTEM (CDS) CODE CHECK**. An operation which verifies that the selected code has been set into the CDS switch.

**d.** **DISABLEMENT**. The act of inserting the CDS code and activating the CDS to disable internal critical components.

**e.** **DISABLEMENT ABORT**. A term devised to describe the resetting of the CDS code devices and switches after the decision has been made to discontinue a disablement operation.

**COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE.** A five character data element assigned to establishments which are manufacturers or have design control of items of supply procured by the Federal Government. Any reference number entered into the Federal Catalog System will have a CAGE code assigned to it prior to entering the central catalog file.

**COMMERCIAL EQUIPMENT LIST (CEL).** A list of commercial tools and equipment recommended for field use with a specific weapon system. The list is issued by SNL. (See special equipment list (SEL).)

**COMMERCIAL ITEMS.** Articles of supply readily available from established commercial distribution sources, which the DoD or inventory managers in the Military Services have designated to be obtained directly or indirectly from such sources. (See nuclear weapons materiel (NWM); standard service item.)

**COMMITTED EFFECTIVE DOSE EQUIVALENT (CEDE).** The internal radiation dose that would be delivered over the next 50 years following an intake, summed and assigned as a single dose in the year of the occurrence of the intake.

**COMMUNICATION MODULE (CM) (UC1630).** DOE-designed Field CMS component. This CM communicates encrypted field operations to weapons and creates audit records of each weapon-specific operation.

**COMMUNICATION MODULE (CM) (UC1631).** DOE designed Field CMS component.This CM decrypts field operations, supports team authentication, communicates field operations to weapons, and creates audit records of each weapon-specific operation.

**COMPARTMENTED STRUCTURE.** An earth-covered or underground structure divided internally with sandbag or polystyrene partitions.

**COMPLETE ENGINEERING RELEASE (CER).** For weapon product, a DOE design agency release that authorizes fabrication of production quantities of parts, subassemblies, or assemblies to meet directive schedule requirements. (See engineering release (ER).)

**COMPLETELY ASSEMBLED FOR STRIKE (CAS) OR LAUNCH (CAL).** A term used by the Navy to identify the condition to which a weapon is assembled for a strike mission (used as an adjective). The CAS condition is usually used to describe the condition of weapons dropped or launched from aircraft. The CAL condition is usually used to describe the condition of weapons launched from shipboard launchers or torpedo

tubes. A weapon assembled to the CAL condition requires no further assembly or testing prior to launch, except that which is necessary during loading in the launcher or torpedo tube and pre-launch tests. A weapon assembled to the CAS or CAL condition is properly described as a CAS or CAL weapon throughout its history from completion of assembly to delivery on target. The term CAS or CAL operation may be loosely used to designate any operation, including a CAS or CAL weapon. The initial assembly of weapons to the CAS or CAL condition may be more specifically termed CAS or CAL assembly operation.

**COMPONENT.** (See nonnuclear component; nuclear components.)

**COMPONENT TEST EQUIPMENT (CTE).** Test equipment used to test components removed from a payload vehicle.

**COMPOSITING.** The use of more than one type of active material in the core of a fission weapon. This is done for purposes of economy, increased efficiency, or to utilize a combination of the virtues of each of the materials used separately.

**COMPROMISE.** The known or suspected exposure of clandestine personnel, installations, or other assets or of classified information or material, to an unauthorized person.

**COMPTON EFFECT.** The scattering of photons (of gamma or X-rays) by the orbital electrons of atoms. In a collision between a (primary) photon and an electron, some of the energy of the photon is transferred to the electron which is generally ejected from the atom. Another (secondary) photon, with less energy, then moves off in a new direction at an angle to the direction of motion of the primary photon. (See scattering.)

**CONCEPT FORMULATION.** (See phase (nuclear) (phase 1.)

**CONDENSATION CLOUD.** A mist or fog of minute water droplets that temporarily surrounds the fireball following a nuclear (or atomic) detonation in a comparatively humid atmosphere. The expansion of the air in the negative phase of the blast wave from the explosion results in a lowering of the temperature, so that condensation of water vapor present in the air occurs and a cloud forms. The cloud is soon dispelled when the pressure returns to normal and the air warms up again. The phenomenon is similar to that used by physicists in the Wilson cloud chamber and is sometimes called the cloud chamber effect.

**CONFIGURATION.** A particular status of assembly of a bomb, warhead, warhead section, reentry system (RS), etc., which differs from similar items by virtue of the arrangement, deletion, or addition of its component parts.

**CONSOLIDATED OPERABILITY TEST (COT).** A primary formal test conducted under the direction of the Naval Ordnance Command to demonstrate satisfactory operation of the weapon systems and their ability to meet all specified time rates.

**CONTACT BURST PRECLUSION.** A fuzing arrangement which prevents an unwanted surface burst in the event of failure of the airburst fuze.

**CONTACT CRYSTAL.** A crystal which has the ability to produce electrical impulses when stressed along the proper axis. Such crystals may be used in weapon fuzing systems to provide a contact burst capability.

**CONTACT SURFACE BURST.** (See nuclear surface burst.)

**CONTAINED UNDERGROUND BURST.** An underground detonation at such a depth that none of the radioactive residues escape through the surface of the ground.

**CONTAINER (NUCLEAR).** A box or enclosure capable of housing a nuclear weapon or component for the purpose of storage or transportation, or to contain nuclear radiation.

**CONTAMINATION.**

**a.** The deposit, absorption, or adsorption of radioactive material, or of biological or chemical agents on and by structures, areas, personnel, or objects. (See induced radiation; residual radiation.)

**b.** Food and/or water made unfit for consumption by humans or animals because of the presence of environmental chemicals, radioactive elements, bacteria or organisms, the by-product of the growth of bacteria or organisms, the decomposing material (to include the food substance itself), or waste in the food or water. (See residual contamination; residual radioactivity.)

**CONTINENTAL UNITED STATES (CONUS).** United States territory including the adjacent territorial waters located within the North American continent between Canada and Mexico. For CJCSI 3150.04 reporting purposes, CONUS does not include the adjacent territorial waters.

**CONTINGENT EFFECTS.** The effects, both desirable and undesirable, which are in addition to the primary effects associated with a nuclear detonation.

**CONTOUR LINE.** A line on a map, diagram, or overlay joining all points at which the radiation dose rate at a given time is the same.

**CONTROLLED AREA.** A security area adjacent to or encompassing limited or exclusion areas. Within this area uncontrolled movement does not permit access to a security interest. The controlled area is designed for the principal purpose of providing administrative control and safety, and a buffer area of security restrictions for limited or exclusion areas. (See exclusion area; limited area.)

**CONTROLLED ENVIRONMENT.** (See environment.)

**CONTROLLED POSITION.** A position, (as pertains to the personnel reliability program) the incumbent of which, by the nature of his/her authorized duties:

**a.** Has access but no technical knowledge; or

**b.** Controls entry into an exclusion area, but does not have access or technical knowledge.

**CONTROLLED STRUCTURE.** A structure in which a controlled environment is maintained. Representative of a controlled structure is one in which the temperature is maintained between 21$^{o}$C (70$^{o}$F) and 32$^{o}$C (90$^{o}$F) with a maximum relative humidity of 55 percent.

**CONTROLLER.** An item of use control equipment used to perform one or more of the following functions:

**a.** Recode

**b.** Decode (includes lock and unlock)

**c.** Code Check

**d.** Change APS State (ON-TEST-OFF)

**COORDINATED SHIPBOARD/ACTIVITY ALLOWANCE LIST (COSAL).** A listing by ship/activity of the training weapons and major assemblies, test and handling equipment, tools, consumables, and repair parts to support the weapon programs assigned in the Naval Atomic Planning, Support and Capabilities Report.

**CORE UNIT.** The fissionable material in a gun-type weapon consisting of the projectile assembly and the target assembly. (See gun-type weapon.)

**COUNTER-COUNTERMEASURE (CCM).** An action undertaken to make an attacking weapon resist or minimize any possible countermeasure that can be effectively applied against it. This includes passive and active techniques such as circuit hardening and maneuvering.

**COUNTERMEASURES (NUCLEAR).** Actions taken to defeat or degrade performance of a nuclear weapon on its way to the target. In the safing, arming, fuzing and firing (SAF&F) context, concern is normally with electrical or electronic countermeasures or jamming.

**COUPLING.** The energy transfer of a shock wave traveling in one medium which produces a shock wave in a second medium at their common interface.

**CRACK.** The light colored region which follows closely behind the dark slick in an underwater burst. It is probably caused by the reflection of the water shock wave at the surface. (See slick.)

**CRATER.** The pit, depression, or cavity formed in the surface of the Earth by an explosion. It may range from saucer shaped to conical, depending largely on the depth of burst. In the case of a deep underground burst, no rupture of the surface may occur. The resulting cavity is termed a camouflet. (See nuclear column.)

**CRATER DEPTH.** The maximum depth of the crater measured from the deepest point of the pit to the original ground level.

**CRATER RADIUS.** The average radius of the crater measured at the level corresponding to the original surface of the ground.

**CRITICAL COMPONENTS.** As defined for Air Force use, the following are critical components of a nuclear weapon system:

**a.** A nuclear weapon, with or without its fuzing and firing system installed;

**b.** A nuclear weapon mated to a missile, pod assembly, reentry vehicle, or delivery vehicle; and

**c.** Other components of a nuclear weapon system that are designated as critical in a nuclear weapon system safety group (NWSSG) study.

**CRITICAL MASS (CRIT).** The minimum mass of a fissionable material that will just maintain a fission chain reaction under precisely specified condition, such as the nature of the material and its purity, the nature and thickness of the tamper (or neutron reflector), the density (or compression), and the physical shape (or geometry). For an explosion to occur, the system must be supercritical (i.e., the mass of material must exceed the critical mass under the existing conditions). (See subcritical.)

**CRITICAL NUCLEAR WEAPON DESIGN INFORMATION (CNWDI).** That TOP SECRET Restricted Data (RD) or SECRET Restricted Data revealing the theory of operation or design of the components of a thermonuclear or implosion-type fission bomb, warhead, demolition munition, or test device. Specifically excluded is information concerning arming, fuzing, and firing systems; limited-life components; and total contained quantity of fissionable, fusionable, and high explosive (HE) materials by type. Among these excluded items are the components which Service personnel set, maintain, operate, test, or replace.

**CRITICAL POSITION.** A position, (as it pertains to the personnel reliability program) the incumbent of which, by the nature of his/her authorized duties:

- **a.** Has access and technical knowledge; or
- **b.** Can, at battalions/squadron/ship level or below, either directly or indirectly, cause the launch or employment of a nuclear weapon; or
- **c.** Controls or uses sealed authenticators, codes, strategic missile computer tapes, emergency action messages, or release procedures for nuclear weapons.

**CRITICALITY.** The state of a given fission system when the specified conditions are such that the mass of active material present in the system is precisely a critical mass. Thus, the fission neutron production rate is a constant and is exactly balanced by the total of neutron loss and utilization rate, and the neutron population remains constant. The word "criticality" alone is often used improperly to describe the degree of criticality of a system, which is a relative term describing a variable physical property of the fissionable assembly. The degree of criticality is the ratio of the mass of active material actually present in the system to the critical mass under the identical conditions, and is usually expressed as a decimal. NOTE: The state of the fissile system, where $k_{eff=}1$, is the steady-state condition. (See subcritical; supercritical.)

**CRITICALITY LIMIT.** The maximum amount of fissile materials, usually stated as kilograms of plutonium (Pu), that may be contained among all nuclear weapons in a particular storage or transport volume or space.

**CROWN.** A function of depth of burst and yield and may be the familiar mushroom-shaped top of the column for a shallow burst, or it may be contained within the column for an intermediate depth of burst. The crown phenomena occur only in the shallow, very shallow, and intermediate depth ranges. (See base surge; nuclear column; plume.)

**CRYPTOGRAPHIC PROCESSOR (CP).** The CP/KS-11 consists of DOE designed custom hardware and software performing actions in response to commands from the Host Processor. It is used to decrypt code and key data from NSA, manipulate the data into weapon operations and then re-encrypt the data for field use.

**CT ITEM.** An electrical cable assembly, plug, connector, or adapter used with test equipment or testing operations.

**CUBE ROOT LAW.** A scaling law applicable to many blast phenomena. It relates the time and distance at which a given blast effect is observed to the cube root of the energy yield of the explosion. (See scaling law.)

**CUMULATIVE DOSE (RADIATION).** The total dose resulting from repeated exposure to radiation in the same region, or of the whole body.

**CURIE.** A unit of radioactivity; it is the activity of a quantity of any radioactive species in which 3.700 x 1010 nuclear disintegrations occur per second. The gamma curie is sometimes defined correspondingly as the activity of material in which the number of gamma-ray photons are emitted per second.

**CUSTODIAL DETACHMENT.** A United States unit which maintains custody of nuclear weapons for use by a non-United States delivery unit and acts in support of that unit. A custodial detachment may also maintain accountability for nuclear weapons in its custody.

**CUSTODY.**

**a.** As defined in the DOE-DoD stockpile agreement, custody is the responsibility for the control of transfer and movement of, and access to, weapons and components. Custody also includes the maintenance of accountability for weapons and components.

**b.** As used within the individual Military Services, custody is guardianship and safekeeping of nuclear weapons and their components and of source and special nuclear material. Custody may or may not include accountability. (See accountability; Weapons transfer.)

# D

**D-38.** (See tuballoy (TU).)

**D-TEST.** The performance of tests on parts, components, subassemblies, assemblies, units, and the like, designed as destructive or degrading that render the item unsuitable for its intended purpose after test.

**D-TESTED MATERIEL.** Parts, components, subassemblies, assemblies, units, and any residue remaining after D-tests are performed. *(*See reject materiel.)

**DAMAGE CRITERIA.** The critical levels of various effects, such as blast pressure and thermal radiation, required to achieve specified levels of damage.

**DAMAGE LEVEL.** Degree of damage. *(*See nuclear damage (land warfare).)

**a.** **LIGHT DAMAGE.** Damage which does not preclude or prevent the immediate use of an item or equipment for its intended purpose. Some repair required to make full use of the item or equipment. Authorization for repair of light damage may be required.

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**b.** **MODERATE DAMAGE.** Damage which prevents use of the item or equipment for its intended purpose and requires extensive repairs before it can be used again for its intended purpose.

**c.** **SIGINIFICANT DAMAGE.** Damage which prevents use of equipment permanently or requires complete reconstruction of the item before it can be used again for its intended purpose.

**DAZZLE.** Temporary loss of vision or a temporary reduction in visual acuity.

**DEBRIS.** Residue from detonation of a weapon, plus radioactive materials from its environment.

**DEBRIS ENTRAPMENT.** Trapping a major part of the radioactive debris from an underground nuclear explosion; e.g., by ejecting it down a hole below the burst point or by HE closures and fast gate valves.

**DECAY (OR RADIOACTIVE DECAY).** The decrease in activity or any radioactive material with the passage of time due to the spontaneous emission from the atomic nuclei of either alpha or beta particles, sometimes accompanied by gamma radiation. (See half-life, radioactivity.)

**DECLASSIFICATION.** The determination that classified information no longer requires, in the interest of national defense, any degree of protection against unauthorized disclosure, coupled with removal or cancellation of the classification designation.

**DECLASSIFICATION (PHYSICAL MATERIEL).** That action taken to render materiel devoid of security classification by mutilating, smelting, fusing, burning, cutting, crushing, breaking, punching, tearing, disassembling, removing identifying data or a combination of these and/or other suitable actions.

**DECODER.** A type of controller, e.g., the T1535 decoder, that is capable of generating the appropriate coded switch message to cause an unlocking operation.

**DECONTAMINATION (NUCLEAR).** The reduction or removal of contaminating radioactive material from a structure, area, object, or person. Decontamination may be accomplished by (1) treating the surface so as to remove or decrease the contamination. (2) letting the material stand so that the radioactivity is decreased as a result of natural decay; and (3) covering the contamination so as to attenuate the radiation emitted. Radioactive material removed in process (1) must be disposed of by burial on land or at sea, or in other suitable way.

**DEFENSE INTEGRATION AND MANAGEMENT OF NUCLEAR DATA SERVICES (DIAMONDS).** DIAMONDS is the DoD system of record for nuclear weapons stockpile accountability and management including components and select non-weapon items containing source and special material. Fielded at every nuclear custodial site, its chain of command, OSD USSTRATCOM, and the Joint Staff. This database maintains accurate, current information on the entire stockpile and is used to monitor

service compliance with Presidential, NWC and NWCSSC stockpile policy. DIAMONDS also contains stockpile related modules for Joint Nuclear Weapons Publications System (JNWPS), Unsatisfactory Reporting, Inspection Record Cards and Stockpile Emergency Verification.

**DEFENSE LOGISTICS AGENCY, LOGISTICS INFORMATION SERVICE (DLIS).** The DLIS is responsible for management and operation of the Federal Logistics Information System (FLIS) which incorporates the data requirements for cataloging, supply and other logistics support needs of the DoD civil government agencies and participating North Atlantic Treaty Organization (NATO) countries.

**DEFENSE NUCLEAR SURETY INSPECTION (DNSI).** A DTRA inspection of a nuclear-capable unit conducted to examine nuclear weapons technical assembly, maintenance, storage functions, logistic movement, handling, and safety and security directly associated with these functions. (See nuclear weapons technical inspection (NWTI).)

**DEFENSE STANDARDIZATION PROGRAM (DSP).** This program was established to improve the operational readiness and cost-effectiveness of defense materiel by promoting the development and use of common systems, subsystems, equipment, components, parts, materials, engineering practices, and technical data. It is a single, integrated defense-wide program managed by the Assistant Secretary of Defense (Economic Security). The statutory requirement for such a program is contained in Title 10, U.S. Code, Chapter 145, Cataloging and Standardization. The basic policy regarding DoD standardization is contained in DoD Instruction 5000.2, Operation of the Defense Acquisition System. The primary objective of the program is to ensure optimal materiel standardization is achieved during the design, development, and acquisition process. This is accomplished by applying standardization principles, such as item commonality, interchangeability, and interface compatibility, in engineering and acquisition management.

**DEFENSE THREAT REDUCTION AGENCY CATALOGING ACTIVITY (DTRACA).** The cataloging activity within DTRA which proposes new or revised cataloging tools and/or proposes new or revised item identifications and related data for DOE-designed and -controlled items for submittal directly to the DLA or to the NOCO for approval. The DTRACA (activity XB) is the only cataloging activity authorized to originate and introduce new or revised item identifications for DOE special design and DOE-controlled commercial items into the FCS.

**DEFICIENCY.** (See nuclear weapon deficiency.)

**DEFLAGRATION.** A rapid chemical reaction in which the output of heat is sufficient to enable the reaction to proceed and be accelerated without input of heat from another source. Deflagration is a surface phenomenon with the reaction products flowing away from the unreacted material along the surface at subsonic velocity.

**DEGREE OF RISK.** As specified by the commander, the risk to which friendly forces may be subjected from the effects of the detonation of a nuclear weapon used in the attack of a close-in enemy target; acceptable degrees of risk under differing tactical conditions are emergency, moderate, and negligible. (See emergency risk (nuclear); moderate risk (nuclear); negligible risk (nuclear).)

**DELIVERY ERROR.** The inaccuracy associated with a given weapon system resulting in a dispersion of shots about the aiming point. (See circular error probable (CEP); dispersion error; horizontal error.)

**DELIVERY SYSTEM.** The military vehicle (e.g., ballistic or cruise missile, artillery shell, airplane, submarine) by which a nuclear weapon would be delivered; most warheads have been designed for specific delivery systems (analogous to “carrier”).

**DELIVERY VEHICLE.** The portion of a weapon system that delivers a nuclear weapon to its target, usually a missile or aircraft.

**DEMILITARIZATION.** Action taken to render nuclear weapons materiel or components harmless, ineffectual, and devoid of security classification, military characteristics and intended use by destruction or disassembly and removal of identifying data which associates the materiel with nuclear weapons systems.

**DEMONSTRATION AND SHAKEDOWN OPERATIONS (DASO).** Tests conducted by a Service, assisted by Service technical agencies, in an operational environment using operational procedures. During these tests, operational and logistical procedures are refined, basic system capabilities and limitations are demonstrated, and the determination is made that the system is capable of performing its assigned mission.

**DEPLETED URANIUM.** (See Uranium (U).)

**DEPLOYED NUCLEAR WEAPONS.**

**a.** When used in connection with the transfer of weapons between the DOE and the DoD, this term describes those weapons transferred to, and in the custody of, the DoD.

**b.** Those nuclear weapons specifically authorized by the JCS to be transferred to the custody of the storage facilities, carrying or delivery units of the armed forces.

**DEPLOYMENT AUTHORITY.** Presidential authorization, by fiscal year, which specifies the maximum number of nuclear weapons which may be transferred to CC custody for deployment within the continental United States (CONUS) and to specified geographical areas overseas.

**DEPLOYMENT REQUIREMENTS.** A commander's fiscal year statement of allocated weapons required for deployment to geographical areas within his command and positioning (in CONUS) in support of war plans.

**DERIVED AIR CONCENTRATION (DAC).** The concentration of a radionuclide in air ($Ci/m^3$ which if breathed by a "reference man" for 2,000 hours (40 hours for 50 weeks)) under conditions of "light work"; i.e., 1.2 cubic meters of air per hour, results in one annual limit on intake (Ci) of the radionuclide.

**DESIGN CRITERIA DRAWING RELEASE.** A release accomplished by the use of a Lawrence Livermore National Laboratory (LLNL) letter signed by the project engineer. The release authorizes the production agency (PA) to prepare product definition drawings, specifications, and gage concepts for LLNL review and sign-off. DOE six-digit drawing numbers and part titles are assigned by this release. (See engineering release (ER).)

**DESIGN CRITERIA ENGINEERING RELEASE (DCER).** A release that authorizes the production agency (PA) to prepare product definition drawings and specifications for design agency review and sign-off. DOE six-digit drawing numbers and part titles are assigned by this release.

**DESIGN REVIEW AND ACCEPTANCE GROUP (DRAAG).** A DoD group, usually consisting of the Lead Project Officer (LPO) from the Service plus one representative from each affected military Service and the Defense Threat Reduction Agency responsible for providing an independent review of the down-selected weapon design to determine the compliance of the design with requirements specified by the Military Characteristics and

Stockpile-to-Target Sequence. DRAAG findings and recommendations are forwarded through the Service to the NWC for consideration.

**DESIGNATED (SPECIFIED).**

**DESIGNATOR.** A unique alphanumeric identifier for a component or material; e.g., DOE six-digit part number, major component (MC), Los Alamos National Laboratory (LANL) type number (2j, LFxx), SPxxx. (See also nickname.) The terms, designator and nickname, have sometimes been used interchangeably and both are in use throughout the DOE complex.

**DESIRED EFFECTS.** The damage or casualties to the enemy or material which a commander desires to achieve from a nuclear weapon detonation. Damage effects on material are classified as light, moderate, or severe. Casualty effects on personnel may be immediate, prompt, or delayed.

**DESIRED GROUND ZERO (DGZ).** The point on the surface of the Earth at, or vertically below or above, the center of a planned nuclear detonation. (See actual ground zero (AGZ); ground zero.)

**DETONATION.** A stable explosive process characterized by the existence of a shock initiated chemical reaction that, in turn, supplies the energy to support the shock.

**DETONATOR.** A device containing a sensitive explosive intended to produce a detonation wave for setting off a high-explosive element. In a nuclear weapon, it triggers the ignition of the main chemical explosive which, in turn, compresses the special nuclear material in order to explode the nuclear weapon.

**DEUTERIUM.** An isotope of hydrogen of mass 2 units; it is sometimes referred to as heavy hydrogen. It can be used in thermonuclear fusion reactions for the release of energy. Deuterium is extracted from water which always contains 1 atom of deuterium to about 6,500 atoms of ordinary (light) hydrogen. (See fusion, isotopes, thermonuclear (TN).)

**DEVELOPMENT AND PRODUCTION SCHEDULE.** A schedule of the important events and planned dates of a DOE weapon development program. (See engineering release (ER).)

**DEVELOPMENT ENGINEERING RELEASE (DER).** A release which issues DOE design agency engineering information and authorizes specific development agency actions related to design, development, or fabrication of development hardware. (See engineering release (ER).)

**DEVELOPMENT TEST.** A test of a component or system usually conducted before a design is released for production.

**DEVELOPMENT TEST UNIT.** A nonnuclear configuration which externally looks like a nuclear weapon (including warheads assembled into RVs, shells, and missiles); or a nonnuclear version of the high explosive and nuclear assembly which externally looks like the WR version.

**DEVICE.** A nuclear explosive. May be applied to one that has been weaponized or to a prototype/ developmental design. It may apply to a single-stage design, to a primary or secondary, or to a complete-staged design. Usually is given a designator (e.g., LLNL: Mandolin, Skua, Ruth; LANL: Kingbolt, Tsetse, Rattler).

**DIAGNOSTIC EXPERIMENT.** An experiment which is intended only to furnish information regarding the efficiency and yield of a nuclear device. (See effects experiment.)

**DIAGNOSTICS CANISTER/RACK.** The enclosed assembly or open framework that contains and supports diagnostic detectors.

**DIFFERENTIAL PRESSURE SWITCH.** A baro type device in which activation does not occur until the weapon experiences a change in pressure. (See baroswitch (also baro).)

**DIFFRACTION.** The bending of waves around the edge of objects. In connection with a blast wave impinging upon a structure, diffraction refers to passage around and envelopment of the structure by the blast wave.

**DIFFRACTION LOADING.** The total force which is exerted on the sides of a structure by the advancing shock front of a nuclear explosion.

**DIFFRACTION TARGET.** A target which is primarily susceptible to the forces produced by the overpressure reflecting off the front face and diffracting around and over the target prior to complete engulfment of the target by the blast wave. Examples of diffraction targets are large, closed structures such as houses.

**DIGITAL SIGNATURE.** A cryptographic construct for demonstrating the authenticity of a digital message.

**DIRECT SHOCK WAVE.** A shock wave traveling through the medium in which the explosion occurred, without having encountered an interface.

**DIRECTIVE SCHEDULE.** (See schedule.)

**DISABLEMENT.** An action, such as damaging a component, that prevents a nuclear weapon from achieving a significant yield without extensive weapon disassembly and repair of critical components.

**DISABLEMENT CONTAINER.** Container for material other than non-reacting gas used if a weapon's disablement system is activated. Not a reservoir or work bottle.

**DISABLEMENT EQUIPMENT (DE OR UD).** (See command disable system (CDS).)

**DISASSEMBLY.** The process of taking apart a nuclear warhead and removing one or more subassemblies, or components, or individual parts. Disassembly may be required to support quality assurance inspection, reliability testing, or subassembly/component exchange as a part of scheduled maintenance or refurbishment; it is normally done in a manner that permits reassembly with either the original or replacement subassemblies/ components.

**DISASSOCIATION.** The act of rendering a nuclear weapon incapable of achieving a nuclear yield in its intended mode by removal of critical components for storage elsewhere. Reassociation is achieved by return of critical components and restores a weapon to operational status.

**DISASTER PREPAREDNESS AND DISASTER CONTROL.** That series of actions required to control and manage nuclear incidents or accidents and bring them to the most practicable conclusion within the established security and safety framework. It includes initial and subsequent reporting response; explosive ordnance disposal (EOD) procedural action on the weapon; appropriate security, legal, and medical aspects; public information; and control of hazards caused by the accident. Control of the accident-caused hazards includes such things as: survey of the incident/accident area to establish isodose lines and all types of monitoring; personnel and area decontamination; and disposition of nuclear, high explosive, and contaminated items.

**DISCERNIBLE DEFECT.** A detectable cosmetic deficiency in a DOE product that does not involve safety or reliability.

**DISENABLING (LOCKING).** The operation by which a code set in the controller operates a coded switch in a nuclear weapon to establish a condition that precludes weapon arming. (See lock (locking).)

**DISMANTLEMENT.** The process of taking apart a nuclear warhead and removing all subassemblies, components, and individual parts for the purpose of physical elimination of the nuclear warhead. Dismantled subassemblies, components and parts, including nuclear materials, may be put into a disposal process, or may be used again in another warhead, or may be held in strategic reserve.

**DISPERSION ERROR.** The distance from the point of impact or burst of a round to the mean point of impact or burst. (See circular error probable (CEP); delivery error; horizontal error.)

**DISPOSAL PROCEDURES.** (See explosive ordnance disposal procedures.)

**DISPOSITION OF MATERIEL.** The process of redistributing, transferring, or destroying nuclear weapons materiel.

**DOE SHIPPING AND STORAGE CONTAINER.** The DOE-designated handling equipment used as a shipping and/or storage container. Containers, which are designated by “H” numbers, consist of various roadable containers, trailers, hand trucks, dollies, bolsters, cradles, cases, pallets, storage frames, and drums used for storing and shipping nuclear weapons.

**DOE SPARES REPAIR LIST (DSRL).** A list of base and military spares that must be returned to DOE contractors for repair or disposition. NNSA publishes the list. This list is included as part of the BMSS.

**DOME.** (See spray dome.)

**DOSAGE.** (See radiation dose.)

**DOSE.** (See radiation dose.)

**DOSE EQUIVALENT.** In radiation protection associated with peacetime nuclear activities, the dose equivalent in rems is a measure of the biological effectiveness of absorbed ionizing radiation. It is similar to the biological dose which is used in connection with the large radiation exposures that might accompany a nuclear explosion. (See dose, Roentgen Equivalent Man/Mammal (REM).)

**DOSE RATE.** (See radiation dose rate.)

**DOSE RATE CONTOUR LINE.** A line on a map, diagram, or overlay joining all points at which the radiation dose rate at a given time is the same.

**DOSIMETER.** (See chemical dosimeter; radiac dosimeter.)

**DOSIMETRY.** The measurement of radiation doses. It applies to both the devices used (dosimeters) and to the techniques.

**DRAG.** Force of aerodynamic resistance caused by the violent currents behind the shock front.

**DRAG LOADING.** The force on an object or structure due to transient winds accompanying the passage of a blast wave. The drag pressure is the product of the dynamic pressure and the drag coefficient which is dependent upon the shape (or geometry) of the structure or object.

**DRAG TARGET.** A target which is primarily susceptible to the drag forces produced by the dynamic pressures (mass air flow) of the blast wave. The target configuration is such that diffraction forces are of such short duration as to be of minor damage potential compared to the drag force. Examples of drag targets are small targets such as artillery pieces or telephone poles or open structures such as truss bridges.

**DRIVER CODE.** A code value held in the 9th code location of the MET and all seven of the code locations of the Multiple Code Coded Switch (MCCS) that allow the MET and MCCS to communicate with one another.

**DROGUE PARACHUTE.** (See retardation device.)

**DROP NUMBER.** A commonly used term for Rework Number due to it’s “dropped” location below the item part number. (See rework number.)

**DROP SEQUENCE.** The prescribed order of events which takes place in the AF&F systems of a nuclear weapon from time of release to detonation.

**DUAL MULTI-CAPABLE WEAPONS.**

**a.** Weapons, weapon systems, or vehicles capable of selective equipage with different types or mixes of armament of firepower.

**b.** Sometimes restricted to weapons capable of handling either nuclear or nonnuclear munitions.

**DUD.** Explosive munition which has not been armed as intended or which has failed to explode after being armed.

**DUD PROBABILITY.** The expected percentage of failures in a given number of firings.

**DULL SWORD.** A term used in the DoD to identify and report a nuclear weapon safety deficiency. (See nuclear weapon deficiency.) (For Navy see OPNAVINST 3100.6.)

**DUMMY COMPONENT.** An item of weapons materiel having the same physical dimensions and appearance as the WR component. Its functional characteristics must meet any Military Service requirement of assembly, handling, test, or maintenance operations. When use of dummy components is authorized, rejected or D-tested components may be used to reduce cost, provided that they meet the functional criteria. HE and nuclear materials will not be construed as dummy components. If they should be used for training purposes, they will be fully defined in the configuration conference.

**DUMMY PIT.** A component, or set of components, designed to simulate a live pit but which will not create a nuclear explosive if placed in the central cavity of an implosion system. Dummy pits may contain fissile material.

**DURESS SYSTEM.** A method by which security force personnel, who control entry into and vouch for or escort visitors into a limited and/or exclusive area, can covertly communicate a situation of duress to other operating or security personnel.

**DWARF DUD.** A nuclear weapon that, when launched at or emplaced on a target, fails to provide a yield within a reasonable range of that which could be anticipated with normal operation of the weapon. This constitutes a dud only in a relative sense.

**DYNAMIC PRESSURE.** The air pressure which results from the mass air flow (or wind) behind the shock front of a blast wave. It is equal to the product of half the density of the air through which the blast wave passes and the square of the particle (or wind) velocity behind the shock front as it impinges on the object or structure.

# E

**EARDRUM RUPTURE (ER).** The distance at which one percent of the personnel, standing in the open when the warhead HE detonates, would suffer from ruptured eardrums.

**EARLY TRANSIENT INCAPACITATION (ETI).** A temporary inability to properly perform a required task with onset shortly after exposure to insult or stress. The incapacitation phase will be followed by partial or complete recovery of performance ability. (See incapacitation.)

**EARTH-COVERED STRUCTURE.** A standard igloo magazine or similar earth-covered structure equivalent in strength to the standard igloo magazine, which meets the user's explosive safety criteria. (See storage structure.)

**EFFECTS.** All phenomena resulting from the energy output of a nuclear explosion.

**EFFECTS EXPERIMENT.** An experiment which is intended only to furnish information regarding the effects produced by a nuclear explosion. (See diagnostic experiment.)

**EFFECTS TEST.** A test conducted to measure the response of objects to the energy output of a weapon.

**ELASTIC RANGE.** The stress range in which a material will recover its original form when the force (or loading) is removed. Elastic deformation refers to dimensional changes occurring within the elastic range. (See Plastic range.)

**ELASTIC ZONE.** The zone beyond the plastic zone in crater formation in which the ground is disturbed by the explosion but returns to its original condition.

**ELECTRIC INITIATION SYSTEM.** An electric blasting cap, firing wire, and a power source, used to initiate detonating cord which in turn detonates explosive charges.

**ELECTRIC MATCH.** An electrically initiated device used to activate thermal batteries. Upon application of sufficient electrical energy the match is ignited and initiates burning of heat powder which, by melting of the battery electrolyte, activates the thermal battery. (See squib.)

**ELECTROEXPLOSIVE DEVICES (EED).** An electrically actuated explosive device usually sensitive to static electricity and electrostatic discharge.

**ELECTROMAGNETIC DETECTION.** The detection of nuclear detonations by devices which are capable of sensing electromagnetic energy radiated from an explosion.

**ELECTROMAGNETIC PULSE (EMP).** A sharp pulse of radio-frequency (long wavelength) electromagnetic radiation produced when an explosion occurs in an unsymmetrical environment, especially at or near the earth's surface or at high altitudes. The intense electric and magnetic fields can damage unprotected electrical and electronic equipment over a large area. (See electromagnetic radiation (EMR), high altitude burst (HAB).)

**ELECTROMAGNETIC RADIATION (EMR).** A traveling wave motion resulting from oscillating magnetic and electric fields. Familiar electromagnetic radiation range from X-rays (and gamma rays) of short wavelength (high frequency), through the ultraviolet, visible, and infrared regions, to radar and radio waves of relativity long wavelength (low frequency). All electromagnetic radiations travel in a vacuum with the velocity of light. (See photon.)

**ELECTRON.** A particle of very small mass, carrying a unit negative or positive charge. Negative electrons, surrounding the nucleus, (i.e., orbital electrons); are present in all atoms; their number is equal to the number of positive charges (or Protons) in the particular nucleus. The term electron, where used alone, commonly refers to negative electrons. A positive electron is usually called a positron, and a negative electron is sometimes called a negatron. (See beta particle.)

**ELECTRONIC INSPECTION RECORD CARD (EIRC).** A digital form used in DIAMONDS similar to the Inspection Record Card (SF 5700-IRA). (See inspection record card (IRC)).

**ELECTROSTATIC SENSITIVE DEVICES (ESSD).** Devices that, when exposed to electrostatic discharge, might affect weapon function. These may be either explosive or nonexplosive devices.

**ELEMENT.** One of the distinct, basic varieties of matter occurring in nature which, individually or in combination, compose substances of all kinds. Approximately ninety different elements are known to exist in nature and several others, including plutonium, have been obtained as a result of nuclear reactions with these elements.

**EMERGENCY CAPABILITY RELEASE.** An Emergency Capability Release is a special category in the Major Assembly Release (MAR) system used when all of the prerequisites for a MAR have not been satisfied. (See major assembly release (MAR).)

**EMERGENCY DENIAL ACTIONS.** Actions taken to:

- **a.** Prevent capture of a complete weapon, warhead(s), or nuclear component: or
- **b.** Disable a weapon or warhead so that it cannot be used in its intended mode for a prescribed period of time. These actions include emergency evacuation, emergency destruction, command disablement, nonviolent disablement, use of emergency disablement systems, and jettisoning.

**EMERGENCY DESTRUCTION (ED) PROCEDURES.** Violent destruction of WR weapons and WR nuclear components by HE charges, or as a last resort, by burning.

**EMERGENCY LOGISTIC MOVEMENT.** The movement of a nuclear weapon in response to an unanticipated event such as a disaster (natural or man-made) or civil unrest. Emergency logistic movement includes, but is not limited to:

- **a.** Movement of nuclear weapons between weapon storage facilities for military contingency or logistic supply during periods of political or military tension.
- **b.** Emergency evacuation of nuclear weapons under conditions such that noncompliance with portions of the nuclear and flight safety regulations is the only alternative to destruction or loss of a weapon.
- **c.** Movement of nuclear weapons when conditions suggest the possibility of an accident related to natural causes (e.g., a tsunami, earthquake, or volcanic activity).

**EMERGENCY RISK (NUCLEAR).** A degree of risk where anticipated effects may cause some temporary shock casualties, and may significantly reduce the unit's combat efficiency. (See degree of risk; moderate risk (nuclear); negligible risk (nuclear).)

**EMERGENCY SECURITY FORCES.** Those designated reinforcing security personnel to include the Security Alert Team, the Back-up Alert Force, the Reserve Force, and the Augmentation Reserve Force.

**EMPLOYMENT (UTILIZATION, OPERATIONAL).** The final application of a weapon by a military unit which delivers the weapon to a target.

**EMPTY QUIVER.** A term used in the Department of Defense (DoD) to identify and report the seizure, theft, or loss of a nuclear weapon or nuclear component.

**ENABLE.** (See unlock.)

**ENABLED WEAPON.** The state of a nuclear weapon after receipt of all the enabling stimuli, generally but not necessarily, occurring before receipt of the arming signals.

**ENABLING STIMULI.** Enabling stimuli are safety critical input, that are not PAL related, that are either unique signals or unique environments that operate (or will be used to operate) safety devices in nuclear weapons. They are selected during weapon development such that they will not be duplicated or simulated by abnormal environments. Enabling stimuli and the time of application to the weapon (e.g., the time/ place in the weapon flight trajectory to the target) are approved by the DoD/DOE project officers.

**END ITEM (NUCLEAR).** A bomb or warhead, either WR or training, and all items of cable test (CT), DE, test (T), and handling (H) equipment.

**ENERGY PARTITION.** (See partition of energy.)

**ENERGY RATIO (ER).** A proportional measure which provides a useful criterion for underground damage due to seismic waves. Assuming sinusoidal wave action in an underground explosion, it is the ratio of the square of the particle acceleration to the square of the resulting vibration frequently produced, or $\left(\frac{(ft/\sec^2)}{(hertz)}\right)^2$.

**ENGINEERING DATA.** Data contained in original source documents prepared by a design activity for the disclosure and description of configuration design form and fit, performance, operations, reliability, maintainability, quality control, or other engineering features of items, materials, methods, practices, procedures, processes, and services. The principal types of engineering data are standards, specifications, engineering drawings, associated lists (material, parts, data, and index), item data sheets, performance

procedures, test procedures or reports, engineering configuration changes, and other documents providing data or design disclosure.

**ENGINEERING RELEASE (ER).** An official DOE design agency communication which authorizes the use of engineering information as specifically delineated therein. (See advance change order (ACO); advance engineering release (AER); complete engineering release (CER); design criteria drawing release; development engineering release (DER); development and production schedule; first production drawing release (FPDR); Qualification acceptance equipment release (QAER); qualification evaluation release (QER); special instruction engineering release (SIER).)

**ENGINEERING PRACTICES.** The methods or procedures used in the application of engineering principles. Engineering practices/studies are for the purpose of standardizing practices such as drafting procedures and methods; codes; engineering terms and terminology; dimensional and functional interchangeability such as tolerancing, dimensioning limits, and fits; and basic characteristics of equipment and materials.

**ENHANCED NUCLEAR DETONATION SAFETY (ENDS).** The current standard for nuclear detonation safety implemented through the use of sophisticated electrical firing system safety devices; specifies that the probability for unintentional nuclear detonation will be less than 1 in $10^9$ in normal environments and less than 1 in $10^6$ in an accident or in abnormal environments.

**ENHANCED RADIATION (ER) WEAPON.** A weapon designed to produce significantly more and/or higher energy output of neutrons (ENR), energy X-rays (EXR), energy gamma rays (EGR), or a combination thereof, than a normal weapon of the same total yield.

**ENRICHED URANIUM.** (See Uranium (U).)

**ENVIRONMENT.** The environment of a nuclear weapon is the aggregate of all the external conditions and influences affecting the weapon throughout the stockpile-to-target sequence. Besides such obvious environmental factors as temperature, humidity, and contaminants of the surrounding air, the environment of a nuclear weapon includes the physical location and operating characteristics of both the surrounding equipment and occupants; the operational procedures; and acceleration, shock, vibration, heating effects, and radiation.

**a.** **ABNORMAL ENVIRONMENT.** Those environments as defined in a weapon's stockpile-to-target sequence and military characteristics in which the weapon is not expected to retain full operational reliability.

**b.** **CONTROLLED ENVIRONMENT.** The controlled environment of a nuclear weapon is the environment maintained in a nuclear storage or handling facility in which conditions such as temperature, pressure, and humidity are maintained within specified limits to provide the most satisfactory conditions for the weapon.

**c.** **NORMAL ENVIRONMENT.** The expected logistical and operational environments as defined in a weapon's stockpile-to-target sequence and military characteristics which the weapon is required to survive without degradation in operational reliability.

**d.** **PARTIALLY CONTROLLED ENVIRONMENT.** An environment in which either temperature or humidity is kept within specified limits. For example, a stockpile container with desiccant may control humidity but not temperature while a storage magazine may control temperature but not humidity.

**e.** **UNCONTROLLED ENVIRONMENT.** The environment in a nuclear storage and handling facility where no attempt is made to control ambient conditions such as temperature, pressure, and humidity. An attempt is made to protect the weapon from direct exposure to the elements.

**ENVIRONMENTAL CRITERIA.** The listed extremes of temperature, humidity, accelerations, vibrations, nuclear effects, etc., which can be expected in the handling of a nuclear weapon through its stockpile-to-target sequence. The environmental criteria are listed in each using Service's stockpile-to-target sequence, and they prescribe the conditions which will be met often enough to require consideration in the design of weapons.

**ENVIRONMENTAL SENSING DEVICE (ESD).** A safety device placed in the arming circuit of a weapon to prevent inadvertent function of the circuit until after the weapon, having been launched or released, experiences an environmental change peculiar to its delivery method. Differential pressure switches and integrating accelerometers are commonly employed for this use. (See integrating accelerometer; pressure switch.)

**EQUATION OF STATE (EOS).** The relationship between the thermodynamic properties of a material; e.g., pressure, density, and internal energy.

**EQUIPMENT REQUIREMENT PROGRAM (ERP).** A document published periodically to serve as the planning document for budgeting and procurement of nuclear weapons materiel (except WR weapons) for DTRA.

**EQUIPMENT REQUIREMENTS SCHEDULE (ERS).** (See schedule.)

**EQUIVALENT FISSION YIELD.** Fission yield plus a fictitious "yield" derived from factors that take into account residual radioactivity produced by a nuclear explosion other than that caused by fission reactions. These fission equivalency factors depend on the composition of weapon debris (weapon structural material, components, etc.) and on the method used to calculate fission equivalency. When the calculational method is not otherwise specified, it is understood to be based on integrated radiation dose from 0.1 hour (after detonation) to infinity. Equivalent fission yield provides a means of comparing the amount of residual radioactivity produced by a nuclear weapon.

**EVALUATION SUPPORT DOCUMENT.** One of five DOE documents comprising the DOE Production Program Definition. The Evaluation Support Document (PPD-E-XX), commonly referred to as the "E" document, is a directive schedule for the production of nuclear and nonnuclear quality evaluation support material.

**EVENTS.** Specific nuclear test device experiments, including those planned but never executed.

**EXCLUSION AREA.** Any designated area containing one or more nuclear weapons. (See controlled area; limited area.)

**EXECUTING COMMANDER (NUCLEAR WEAPONS).** A commander to whom nuclear weapons are released for delivery against specific targets or in accordance with approved plans.

**EXOATMOSPHERE.** (See nuclear exoatmospheric burst.)

**EXPENDABLE ITEMS.** Base spares and military spares that are not listed on the DSRL. They may be disposed of IAW Service procedures.

**EXPENDABLE MATERIAL.** Material consumed in service or use. It is listed in the Table of Expendable Materials in Technical Publication (TP) 35-51A/Technical Manual (TM), 39-35-51A/Special Weapons Ordnance Publication (SWOP) 35-51A and Technical Order (TO) 11N-35-51A.

**EXPERIMENT STATIONS.** Locations along a line-of-sight (LOS) pipe where experiments or samples are placed for exposure to radiation.

**EXPIRATION DATE.** The date beyond which shelf life non-extendible items (Type I) should be discarded as no longer suitable for issue or use.

**EXPLODING BRIDGEWIRE (EBW); EXPLODING BRIDGE (EB) DETONATORS.** Those in which the explosion of a bridgewire or a bridge by an electrical pulse is used to initiate detonation in a charge or secondary explosive adjacent to the BW or bridge (B).

**EXPLOSION.** A chemical reaction of any chemical compound or mechanical mixture which, when initiated, undergoes a very rapid combustion or decomposition releasing large volumes of highly heated gases which exert pressures on the surrounding medium. Also, a mechanical reaction in which the failure of the container causes the sudden release of pressure from within a pressure vessel.

**EXPLOSIVE HAZARD CLASSIFICATION.** Assignment of explosive hazard classification to items of nuclear weapons materiel which contain explosives and are the responsibility of the design and production agency.

**EXPLOSIVE ORDNANCE.** All munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads; guided and ballistic missiles; artillery, mortar, rocket and small arms ammunition; all mines, torpedoes, and depth charges; demolition charges; pyrotechnics; clusters and dispensers; cartridge and propellant actuated devices; electro-explosive devices; clandestine and improvised explosive devices; and all similar or related items or components explosive in nature.

**EXPLOSIVE ORDNANCE DISPOSAL PROCEDURES.** Those particular courses or modes of action taken by explosive ordnance disposal personnel for access to, diagnosis, rendering safe, recovery, and final disposal of explosive ordnance or any hazardous material associated with an explosive ordnance disposal incident.

- **a.** **ACCESS.** Those actions taken to locate exactly and gain access to unexploded explosive ordnance.
- **b.** **DIAGNOSTIC PROCEDURES.** Those actions taken to identify and evaluate unexploded explosive ordnance.

c. **RENDER SAFE PROCEDURES.** The portion of the explosive ordnance disposal procedures involving the application of special explosive ordnance disposal methods and tools to provide for the interruption of functions or separation of essential components of unexploded explosive ordnance to prevent an unacceptable detonation.

d. **RECOVERY PROCEDURES.**Those actions taken to recover unexploded explosive ordnance.

e. **FINAL DISPOSAL PROCEDURES.** The final disposal of explosive ordnance which may include demolition or burning in place, removal to a disposal area or other appropriate means.

**EXPLOSIVE ORDNANCE DISPOSAL WORKING GROUP (EODWG).** A meeting formed by DTRA for the purpose of developing EOD Type units and for forming EOD render safe procedures and disposal concepts. The EODWG is convened under the lead Service reporting to the Project Officers Group (POG).

**EXPLOSIVE SWITCH.** A device containing a propellant explosive or pyrotechnic charge which, when electrically initiated, actuates an electrical switch. The gas pressure generated by the igniting charge is not sufficient to rupture the device case. (See electric match.)

**EXPOSURE.** A measure expressed in roentgens of the ionization produced by gamma (or X) rays in air. The exposure rate is the exposure per unit time (e.g., roentgens per hour). (See dose, dose rate, roentgen.)

**EXPOSURE DOSE.** The exposure dose at a given point is a measurement of radiation in relation to its ability to produce ionization. The unit of measurement of the exposure dose is the roentgen.

**EXTERNAL CARRIAGE.** The carriage of a detachable item such as a bomb, fuel tank, missile, etc., on the outside of an aircraft that is directly exposed to flight environments. Examples: wing carriage, pylon carriage, and centerline carriage. (See internal carriage.)

# F

**FACTORY RETROFIT PROGRAM.** (See retrofit spares.)

**FALLOUT.** The process or phenomenon of the descent to the earth's surface of particles contaminated with radioactive material from the radioactive cloud. The term is also applied in a collective sense to the contaminated particulate matter itself. The early (or local) fallout is defined, somewhat arbitrarily, as those particles which reach the earth within 24 hours after a nuclear explosion. The delayed (or worldwide) fallout consists of the smaller particles which ascend into the upper troposphere and into the stratosphere and are carried by the winds to all parts of the earth. The delayed fallout is brought to earth, mainly by rain and snow, over extended periods ranging from months to years.

**FALLOUT CONTOURS.** Lines joining points which have the same radiation intensity that define a fallout pattern, represented in terms of roentgens per hour.

**FALLOUT PATTERN.** The distribution of fallout as portrayed by fallout contours.

**FALLOUT PREDICTION.** An estimate, made before and immediately after a nuclear detonation, of the location and intensity of militarily significant quantities of radioactive fallout.

**FALLOUT SAFE HEIGHT OF BURST.** The height of burst at or above which no militarily significant fallout will be reproduced as a result of a nuclear weapon detonation.

**FALLOUT WIND VECTOR PLOT.** A wind vector diagram based on the wind structure from the surface of the Earth to the highest altitude of interest.

**FEASIBILITY PROGRAM (STUDY).** (See phase (nuclear) (phase 2.)

**FEDERAL ACQUISITION REGULATION (FAR) SYSTEM.** A codification and publication of uniform policies and procedures for acquisition by all executive agencies. It houses all logistics data of all federalized items of supply.

**FEDERAL ITEM IDENTIFICATION (FII).** A description of an item of supply (IOS) which consists of minimum data essential to establish those characteristics which give an item its unique character to differentiate it from every other IOS within the FCS and required related management data.

**FEDERAL LOGISTICS INFORMATION SYSTEM (FLIS).** An automated data processing system designed to provide a centralized data bank in support of DoD, Federal Civil Agencies, and foreign countries participating in the integrated logistics support program.

**FEDERAL SUPPLY CLASSIFICATION (FSC) CLASSES.** The commodity classes are established in the H2, Federal Supply Classification, Groups and Classes located via DLIS web enabled product.

**FEDERAL SUPPLY GROUP (FSG).** A two digit coding structure used to group related FSCs under logical families for supply management purpose. The first two digits of each FSC represent the related FSG. The FSGs are discussed and identified in the DLIS H2 web enabled product.

**FEDERALIZED.** The term "federalized" used within the context of this publication refers to an item of supply that has been assigned a national stock number.

**FERROMAGNETIC EXPLOSIVE TRANSDUCER.** A firing set which employs flux transfer units to provide the electrical impulse to the detonators.

**FERRY SHIPMENT.** A United States Air Force shipment by combatant or cargo aircraft to a forward or strike base of one or more completely or almost completely assembled weapons which are to be staged at that base before use on a strike mission. The weapons may require additional preparation before loading for the strike mission. (See logistic movement; tactical ferry.)

**FIELD IR ADAPTER.** Set of components that supports shielded IR communication between an UC1620 Field Processor and an UC1631 Communication Module.

**FIELD JOINT TASK GROUP.** A Joint Task Group (JTG) operation held at a field location to review and verify authorized procedures for field conditions. (See joint task group (JTG).)

**FIELD PROCESSOR.** Handheld COTS component of Field CMS that (1) transfers files and other data to/from the Base Station and a Communication Module; (2) provides display and selection of field operations; and (3) builds monitor files.

**FIELD RETROFIT PROGRAM.** (See retrofit spares.)

**FIELD UNIT.** An organization in the DoD that is responsible for a nuclear weapon related mission.

**FILE KEY.** A STROBELIGHT Mark II key used for encrypting code, key, and parameter data in a National Security Agency (NSA) file. The keys are reconstructed in the Cryptographic Processor from file key masks and memory phrase pairs.

**FILL PRESSURE.** Pressure to which a vessel is filled.

**FILM BADGE.** A photographic film packet to be carried by personnel, in the form of a badge, for measuring and permanently recording (usually) gamma-ray dosage. (See chemical dosimeter; radiac dosimeter.)

**FILTER.** A material in a suitable geometry for attenuating radiation by absorption.

**FINAL CHANGE ORDER (FCO).** A document which identifies a change authorization issued by a DOE design agency after the drawing changes are all incorporated in new drawing issues. (See engineering release (ER).)

**FINAL HAZARD CLASSIFICATION (FHC).** One of the nine U.N. recognized hazard classifications assigned to an item containing hazardous material after the appropriate testing has been completed.

**FINAL WEAPON DEVELOPMENT REPORT (FWDR).** A report issued in late Phase 6.5 to provide warhead/bomb design objectives, description, test program results, ancillary equipment, and programming as of the time of the first production for stockpile. A supplemental FWDR can be issued in case of follow-on applications of existing warhead/ bombs as a significant change to the MCs.

**FIREBALL.** The luminous sphere of hot gases which forms a few millionths of a second after a nuclear (or Atomic) explosion as the result of the absorption by the surrounding medium of the thermal X-rays emitted by the extremely hot (several tens of million degrees) weapon residues. The exterior of the fireball in air is initially sharply defined by the luminous shock front and later by the limits of the hot gases themselves (radiation front). (See breakaway, thermal x-rays.)

**FIRE POINT.** A safe point in regard to the area to be destroyed, from which the destruct officer in charge or noncommissioned officer in charge initiates the destruct system.

**FIRE STORM.** Stationary mass fire, generally in built up urban areas, causing strong, inrushing winds from all sides; the winds keep the fires from spreading while adding fresh oxygen to increase their intensity.

**FIRING.** Provision, normally by a firing set, of the proper electrical energy to fire a nuclear assembly's detonator system.

**FIRING SET (FS).** An item that includes the necessary electrical, mechanical, or explosive components. Upon receipt of a fuzing signal, it controls the initiation of the final high explosive sequence in a nuclear weapon.

**FIRING SYSTEM.**

- **a.** For an implosion weapon, that portion which, upon a signal from the arming system, achieves a state of electrical readiness such that upon receipt of a signal from the fuzing system, delivers sufficient electrical energy to detonate the implosion system.
- **b.** For a gun assembly weapon, that portion of the weapon which receives a signal to ignite a pyrotechnic power train, which in turn ignites the propellant (See arming system; fuzing system.)

**FIRST GENERATION TRAINING.** Training on nuclear-weapon-related procedures, offered by Sandia National Laboratories/Military Liaison (SNL/ML) to DoD and DOE personnel. Training consists of reviewing the procedures with enough "hands-on" practice to satisfy the instructor that the trainees can perform competently. SNL/ML issues certificates of completion to the trainees, qualifying them to train others.

**FIRST PRODUCTION DRAWING RELEASE (FPDR).** This document releases LLNL product definition drawings and specifications in the DOE system. This release may also authorize the production agency to order the design of gages, tooling, fixtures, and material quotations from outside suppliers for first production unit (FPU) WR components. (See engineering release (ER).)

**FIRST PRODUCTION UNIT (FPU) DATE.**

- **a. FIRST PRODUCTION UNIT DATE, TRAINER (FPU DATE-TR).** The month in which it is planned (or actually takes place) to deliver the first production training unit to the DoD.

**b. FIRST PRODUCTION UNIT DATE, WAR RESERVE (FPU DATE WR).** The month in which it is planned (or actually takes place) to deliver the first production WR unit to the DoD (normally three months after first production unit date, trainer (FPU DATE-TR).

**FISSILE.** The property of a heavy nucleus such that the binding energy of an additional neutron is sufficient to excite the resultant nucleus above the fission threshold.

**FISSILE MATERIAL, FISSILE ISOTYPE.** Isotopes of certain heavy elements whose nuclei readily undergo immediate fission by absorbing neutrons of any energy. Fissile materials that can be produced currently in significant quantities are uranium-235, uranium-233, plutonium-239, and plutonium-241. Uranium-235 is the only naturally occurring fissile isotope.

**FISSION.** The process whereby the nucleus of a particular heavy element splits into (generally) two nuclei of lighter elements, with the release of substantial amounts of energy. The most important fissionable materials are uranium-235 and plutonium-239, fission is caused by the absorption of neutrons.

**FISSION FRACTION.** (See fission to yield ratio.)

**FISSION FRAGMENTS.** The primary or initial elements formed as the result of a fission reaction. They are of medium atomic weight and are radioactive.

**FISSION PRODUCT RADIATION.** Radiation resulting from the radioactive decay of fission products.

**FISSION PRODUCTS.** A general term for the complex mixture of substances produced as a result of nuclear fission. A distinction should be made between these and the direct fission products or fission fragments which are formed by the actual splitting of the heavy-element nuclei. Something like 80 different fission fragments result from roughly 40 different modes of fission of a given nuclear species (e.g., uranium-235 or plutonium-239). The fission fragments, being radioactive, immediately begin to decay, forming additional (daughter) products, with the result that the complex mixture of fission products so formed contains over 300 different isotopes of 36 elements.

**FISSION TO YIELD RATIO.** The ratio of the yield derived from nuclear fission to the total yield; it is frequently expressed in percent.

**FISSION WEAPON.** A nuclear warhead whose material is uranium or plutonium that is brought to a critical mass under pressure from a chemical explosive detonation to create an explosion that produces blast, thermal radiation, and nuclear radiation through fission. The complete fission of one pound of fissionable material has a yield equivalent to 8000 tons of TNT.

**FISSION YIELD.** That portion of the yield which derives its energy entirely from nuclear fission. (See yield (or energy yield).)

**FISSIONABLE FUEL OR MATERIAL.** A heavy isotope capable of undergoing fission by some process; in a weapon context, materials such as $U^{238}$ that have a fission threshold above 1MeV for neutrons. (See source and special (SS) nuclear material.)

**FK SUPPLY.** An Air Force term used to identify the supply activity responsible for requisition, receipt, storage, stock control, issue, shipment, disposition, identification of, and accounting for nuclear ordnance equipment and supplies and other munitions.

**FLARE ASSEMBLY.** A conical flare fastened to the aft end of a warhead which provides aerodynamic stability during the reentry phase of flight.

**FLARE DUD.** A nuclear weapon that when launched at a target, detonates with anticipated yield but at an altitude appreciably greater than intended. This is not a dud insofar as yield is concerned, but is a dud with respect to the effects on the target and the normal operation of the weapon.

**FLASH BLINDNESS.** Impairment of vision resulting from an intense flash of light. It includes temporary or permanent loss of visual functions and may be associated with retinal burns. (See dazzle.)

**FLASH BURN.** A burn caused by excessive exposure (of bare skin) to thermal radiation.

**FLEET BALLISTIC MISSILE (FBM).** Strategic ballistic missiles capable of being fired from surfaced or submerged nuclear submarines.

**FLIGHT EQUIPMENT.** (See aircraft monitoring and control (AMAC).)

**FLIGHT TEST UNIT (FTU).** An instrumented model of a weapon (usually full size) constructed for use in operations which duplicates the ultimate usage conditions of the weapon system under development.

**FLUENCE (OR INTEGRATED FLUX).** The product (or integral) of particle (neutron or photon) flux and time, expressed in units of particles per square centimeter. The absorbed dose of radiation (in rads) is related to the fluence. (See flux (or flux density).)

**FLUX (OR FLUX DENSITY).** The product of the particle (neutron or photon) density (i.e., number per cubic centimeter) and the particle velocity. The flux is expressed as particles per square centimeter per second and is related to the absorbed dose rate. It is numerically equal to the total number of particles passing in all directions through a sphere of one square centimeter cross-sectional area per second.

**FOAM.** As used in render safe procedures (RSP) and delineated in TP XXX-6, EOD Publications: foaming is the use of a two-component foam system to stabilize and fix damaged weapon parts to prevent relative movement during subsequent EOD operations and shipment.

**FOLLOW-ON OPERATIONAL TEST (FOT).** Tests conducted continuously to ensure the preservation of reliability and accuracy during the life of the weapon system.

**FORMERLY RESTRICTED DATA (FRD).** Information removed from the Restricted Data category upon a joint determination by the DOE (or antecedent agencies) and DoD that such information relates primarily to the military utilization of atomic weapons and that such information can be adequately safeguarded as classified defense information. (Section 142d, Atomic Energy Act of 1954, as amended). (See restricted data (RD).)

**FRACTIONATION.** Any one of several processes, apart from radioactive decay, which results in change in the composition of the radioactive weapon debris. As a result of fractionation, the delayed fallout generally contains relatively more of strontium-90 and cesium-137, which have gaseous precursors, than does the early fallout from a surface burst.

**FRAGMENTATION.** The breaking up of the confining material of a chemical compound or mechanical mixture when an explosion takes place. Fragments may be complete items, subassemblies, or pieces thereof, as well as pieces of equipment or buildings containing the items.

**FRATRICIDE.** (See nuclear fratricide.)

**FREE AIR.** A region of homogeneous air sufficiently remote from reflecting surfaces or other objects that the characteristics of the direct shock wave are not modified in any way by reflected shocks or other disturbances arising from scattering objects.

**FREE AIR OVERPRESSURE.** The unreflected pressure, in excess of the ambient atmospheric pressure, created in the air by the blast wave from an explosion. (See overpressure.)

**FREE-EARTH MEASUREMENTS.** Quantitative determinations of acceleration, velocity, displacement, impulse, and pressure produced in the Earth by an explosion, with the measurements made in such a manner that they are not influenced by discontinuities in the ground structure.

**FREE-FIELD ENVIRONMENT.** The nuclear environment resulting from a nuclear detonation in the atmosphere or in a vacuum unperturbed by a system or the Earth. (See nuclear environment; nuclear system.)

**FREE FIELD OVERPRESSURE.** (See free air overpressure.)

**FULL-FUZING OPTION (FUFO).** The capability that a bomb may have airburst, contact burst, laydown operation, and depth bomb or subsurface detonation.

**FUNCTIONAL TESTING.** Testing consisting of partial or complete operation of a component or subassembly to determine its status or reliability.

**FUSION.** The process whereby the nuclei of light elements, especially those of the isotopes of hydrogen, namely, deuterium and tritium, combine to form the nucleus of a heavier element with the release of substantial amounts of energy. (See thermonuclear (TN).)

**FUSION FUEL.** Material such as deuterium-tritium (DT) that will undergo a nuclear fusion reaction with a net energy release.

**FUSION WEAPON.** Two-stage nuclear warhead containing fusion materials, such as deuterium and tritium, that are brought to critical density and temperature conditions by use of a primary fission reaction in order to initiate and sustain a rapid-fusion process. This process in turn creates an explosion that produces blast, thermal radiation, and nuclear radiation. This type of device is commonly known as a hydrogen bomb or thermonuclear weapon.

**FUZE (F).**

**a.** **NONRADIATING**. A passive device that acts or is acted upon to generate a signal.

**b.** **RADIATING.** An active device that emits emanations to sense the proper location to generate a signal.

**c.** **SALVAGE.** A passive (nonradiating) fuze actuated by an effect of a defensive burst.

**FUZING.** Generating a signal that, in an armed nuclear weapon, will operate the firing system.

**FUZING SYSTEM.** That portion of a weapon that originates the signal which triggers the firing system. The fuzing system normally consists of such components as radars, baroswitches, timers, impact crystals, antennas, baro sensing elements, and similar devices. (See arming system; firing system

# G

**GAMMA-RADIOGRAPHY.** An industrial application of gamma-rays to make X-ray-like images of the internal structure of thick pieces of metal, buildings, etc. Very intense sources of gamma-rays are required.

**GAMMA RAY.** Electromagnetic radiations of high photon energy originating in atomic nuclei and accompanying many nuclear reactions (e.g., fission radioactivity, and neutron capture). Physically, gamma rays are identical with X-rays of high energy, the only essential difference being that X-rays do not originate from atomic nuclei, but are produced in other ways (e.g., by slowing down (fast) electrons of high energy). (See electromagnetic radiation (EMR), photon, x-rays.)

**GAS BOOSTING.** (See boosting.)

**GAS TRANSFER VALVE.** An explosive-actuated device that controls transfer of the deuterium-tritium gas to a weapon pit.

**GENETIC EFFECT.** The effect of various agents (including nuclear radiation) in producing changes (mutations) in the hereditary components (genes) of the germ cells present in the reproductive organs (gonads). A mutant gene causes changes in the next generation which may or may not be apparent.

**GEOMETRY.** (See nuclear geometry.)

**GROSS ERROR.** A nuclear weapon detonation at such a distance from the desired ground zero as to cause no nuclear damage to the target.

**GROUND MOTION.** A general term which includes all aspects of motion; e.g., accelerations, particle velocity, displacement, stress and strain.

**GROUND WAVE.** A wave formed in the ground by the blast from an explosion. These waves are of three types: the longitudinal waves (compression), the transverse waves (shear), and the surface waves (similar to water rippling). Sometimes referred to as a seismic wave or a stress wave. Stress waves in soil are not classical shock waves since dissipative and dispersive effects tend to increase markedly the rise time to the order of milliseconds.

**GROUND ZERO.** The point on the surface of land vertically below or above the center of a burst of a nuclear (or atomic) weapon; frequently abbreviated to GZ. For a burst over or under water the corresponding term is surface zero (SZ). Surface zero is also commonly used for ground surface and underground bursts.

**GROUP ASSEMBLY PARTS LIST (GAPL).** The GAPL is a breakdown of the equipment by short physical description, supported by illustrations. Indentation shows assembly relationship.

**GROUP OF WEAPONS.** The number of nuclear weapons in any particular storage or transportation configuration that are subject to detonation as the result of a single accident.

**GROUP X KIT.** A kit containing commercial and/or special design items required on a 100 percent basis to support limited-life component exchange (LLCE) on an individual weapon.

**GUN-TYPE WEAPON.** A device in which two or more pieces of fissionable material, each less than a critical mass, are brought together very rapidly so as to form a supercritical mass that can explode as the result of a rapidly expanding fission chain. (See core unit)

**GUST LOADING.** The loading on an aircraft in flight associated with the dynamic pressure in an air shock wave.

# H

**HALF-LIFE.** The time required for the activity of a given radioactive species to decrease to half of its initial value due to radioactive decay. The half-life is a characteristic property of each radioactive species and is independent of its amount or condition. The effective half-life of a given isotope is the time in which the quantity in the body will decrease to half as a result of both radioactive decay and biological elimination. (See decay (or radioactive Decay).)

**HALF-LIFE RESIDENCE TIME.** As applied to delayed fallout, it is the time required for the amount of weapon debris deposited in a particular part of the atmosphere (e.g., stratosphere or troposphere to decrease to half of its initial value.

**HALF THICKNESS.** Thickness of absorbing material necessary to reduce by one-half the intensity of radiation which passes through it. (See transmission factor (nuclear).)

**HANDLING (NUCLEAR).** The phase of weapon logistics wherein weapons are physically manipulated directly or indirectly by people. (This is characterized as lifting, sliding, hoisting, lowering, or moving items on dollies or pallets over short distances through the use of manpower, tugs, cranes, forklifts, and hoists.)

**HANDLING EQUIPMENT (H).** Specially designed devices or apparatus intended for use in assembling, disassembling, handling, transporting, or containing weapons material and considered an entity from the standpoint of function, material control, and for purposes of engineering specifications. (See ancillary equipment.)

**HARDENED SITE.** A site, normally constructed under rock or concrete cover, designed to provide protection against the effects of conventional weapons. It may also be equipped to provide protection against the side effects of a nuclear attack and against a chemical or a biological attack.

**HARDENING.** Measures taken in the design and fabrication of a weapon or its part to reduce their vulnerability.

**HARD MISSILE BASE.** A launching base that is protected against a nuclear explosion.

**HARDNESS.** The degree of resistance of a weapon or its components to adverse environments, particularly the effects of a defensive nuclear burst.

**HARD TARGET.** A target which has been specifically constructed to resist the effects of a nuclear explosion or which, because of its designed use, is very resistant to effects of a nuclear explosion.

**HAZARDOUS-MATERIALS.** Any material that is flammable, corrosive, an oxidizing agent, explosive, toxic, poisonous, etiological, radioactive, nuclear, unduly magnetic, a chemical agent, biological research material, compressed gases, or any other material that, because of its quantity, properties, or packaging, may endanger human life or property.

**HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO).** The danger of accidental actuation of electro-explosive devices or otherwise electrically activating ordnance because of radio frequency electromagnetic fields. This unintended actuation could have safety (premature firing) or reliability (dudding) consequences. (See also hero safe ordnance; hero unsafe ordnance.)

**H-BOMB.** An abbreviation for hydrogen bomb. (See hydrogen bomb.)

**HEAVILY POPULATED AREA.** Any urban/industrial area whose size would preclude aircraft in an emergency from reaching a suitable emergency landing area from any position en route at the altitudes being flown by the aircraft.

**HEAVY METAL.** The fuel materials, including uranium, plutonium and thorium, with atomic numbers of 90 and above, used in nuclear reactors and nuclear weapons.

**HEIGHT OF BURST (HOB).** The height above the earth's surface at which a bomb is detonated in the air. The optimum height of burst for a particular target (or area) is that at which it is estimated a weapon of a specified energy yield will produce a certain desired effect over the maximum possible area.

**HERO SAFE ORDNANCE.** Any ordnance item that is percussion initiated, sufficiently shielded or otherwise so protected that all electro-explosive devices contained by the item are immune to adverse effects (safety or reliability) when the item is employed in its expected radio frequency environments, provided that the general hazards of electromagnetic radiation to ordnance requirements defined in the hazards from electromagnetic radiation manual are observed. (See also electromagnetic radiation (EMR), hazards of electromagnetic radiation to ordnance (HERO); hero susceptible ordnance; hero unsafe ordnance).

**HERO SUSCEPTIBLE ORDNANCE.** Any ordnance item containing electro-explosive devices proven by test or analysis to be adversely affected by radio frequency energy to the point that the safety and/or reliability of the system is in jeopardy when the system is employed in its expected radio frequency environment. (See also electromagnetic radiation (EMR), hazards of electromagnetic radiation to ordnance (HERO); hero safe ordnance.)

**HERO UNSAFE ORDNANCE.** Any ordnance item containing electro-explosive devices that has not been classified as HERO SAFE or HERO SUSCEPTIBLE ordnance as a result of a hazards of electromagnetic radiation to ordnance (HERO) analysis or test is considered HERO UNSAFE ordnance. Additionally, any ordnance item containing electro-explosive devices (including those previously classified as HERO SAFE or HERO SUSCEPTIBLE ordnance) that has its internal wiring exposed; when tests are being conducted on that item that result in additional electrical connections to the item; when electro-explosive devices having exposed wire leads are present and handled or loaded in any but the tested condition; when the item is being assembled or disassembled; or when such ordnance items are damaged causing exposure of internal wiring or components or destroying engineered HERO protective devices. (See also electromagnetic radiation (EMR), hazards of electromagnetic radiation to ordnance (HERO); hero safe ordnance; hero unsafe ordnance.)

**HIGH AIRBURST.** The fallout safe height of burst for a nuclear weapon that increases damage to or casualties on soft targets, or reduces induced radiation contamination at actual ground zero.

**HIGH ALTITUDE BURST (HAB).** This is defined, somewhat arbitrarily, as a detonation at an altitude over 100,000 feet. Above this level the distribution of the energy of the explosion between blast and thermal radiation changes appreciably with increasing altitude due to changes in the fireball phenomena.

**HIGH-ALTITUDE PHENOMENOLOGY.** Effects of nuclear explosions that occur above 250,000 feet.

**HIGH EXPLOSIVE (HE).** A material or mixture of material capable of shock-initiated detonation.

**HIGH EXPLOSIVE TRANSIT TIME (HETT).** The time between the HE electrical detonation signal supplied to the device and the peak of the primary gamma signal.

**HIGHLY-ENRICHED URANIUM (HEU).** Uranium that is enriched in uranium-235 to above 20 percent, if 90 percent or greater, it is termed weapons-grade HEU or simply weapons-grade uranium.

**HISTORICAL POSTMORTEM.** A laboratory analysis of DOE designed material, requested by the DOE, to determine the cause of a reported defect. The results of this analysis will normally not be furnished to the DoD unless they are significant or indicative of corrective action.

**HOHLRAUM.** A cavity whose walls are in radiative equilibrium with the radiant energy within the cavity.

**HOHLRAUM EXPERIMENT.** Use of a hohlraum so that the contained radiation may be measured or used.

**HOLD ORDER.** A hold order is a SNL prepared, NNSA approved, recommendation to prohibit operational use of specified major assemblies or test (T) or handling (H) designed ancillary equipment, when a high probability of malfunction or physical hazard is involved in the use of material. If such material can be used under certain conditions, no hold order will be issued. Instead, the Major Assembly Release (MAR) will be revised to include the information under exceptions and limitations.

**HORIZONTAL ERROR.** The error in range, deflection, or in radius, which a weapon may be expected to exceed as often as not. Horizontal error of weapons making nearly vertical approach to the target is described in terms of circular error probable. Horizontal error of weapons producing elliptical dispersion pattern is expressed in terms of probable error. (See circular error probable (CEP); delivery error; dispersion error.)

**HOST PROCESSOR.** A component of HQ CMS consisting of a desktop or laptop computer into which US1600x software is loaded.

**HOT.** A colloquial term meaning highly radioactive.

**HOT SPOT.** Region in a contaminated area in which the level of radioactive contamination is considerably greater than in neighboring regions in the area.

**HOT X-RAY SPECTRUM.** One consisting primarily of X-ray photons of energies equal to or greater than 10keV.

**HUGONIOT.** A pressure/density curve, usually determined from shock-wave measurements.

**HUMAN NUCLEAR TOLERANCE.** (See tolerance dose.)

**HYDRIDE.** A compound containing hydrogen and another element. Also, to form a hydride.

**HYDRODYNAMICS.** The behavior of continuously deformable media, including the compressibility of material by shock waves.

**HYDROGEN BOMB.** (See thermonuclear (TN) weapon.)

**HYPERGOLIC FUEL.** Fuel which will spontaneously ignite with an oxidizer, such as aniline with fuming nitric acid. It is used as the propulsion agent in certain missile system.

**HYPOCENTER.** A term sometimes used for ground zero. (See ground zero.

## I

**IGLOO.** (See storage structure.)

**ILLUSTRATED PARTS BREAKDOWN (IPB).** Line drawings that depict DOE-designed special equipment, weapon system, or TYPE weapons. Drawings are broken down to identify spares for maintaining or repairing DOE-designed special equipment, weapon system, or TYPE weapons.

**IMMEDIATE NUCLEAR SUPPORT.** Nuclear support to meet specific requests which arise during the course of a battle, and which, by their nature, cannot be planned in advance.

**IMMEDIATE OPERATIONAL READINESS.** Those operations directly related to the assumption of an alert or quick-reaction posture. Typical operations include strip alert, airborne alert/indoctrination, no-notice launch of an alert force, and the maintenance of missiles in an alert configuration. (See nuclear weapon exercise; nuclear weapon maneuver.)

**IMMEDIATE RADIATION.** (See Initial Nuclear Radiation.)

**IMPLOSION DETONATION SYSTEM.** A system that commences with circuits carrying electrical energy from the firing set and terminates with the units that detonate the main HE charge, including HE, air, or ring lenses.

**IMPLOSION SYSTEM.** That portion of a nuclear weapon of the implosion type which provides the compression necessary for functioning of the weapon.

**IMPLOSION WEAPON.** A device in which a quantity of fissionable material, less than a critical mass, has its volume suddenly decreased by compression, so that it becomes supercritical and an explosion can take place. The compression is achieved by means of a spherical arrangement of specially fabricated shapes of ordinary high explosive which produce an inwardly-directed implosion wave, the fissionable material being at the center of the sphere. (See critical mass (CRIT), supercritical).

**IMPROVISED NUCLEAR DEVICE (IND).** A device intended to disperse radioactive materials or to produce a nuclear yield using fissile or fissionable material. Such devices may be fabricated in a completely improvised manner or may be an improvised modification to a U.S. or foreign nuclear weapon.

**IMPULSE (PER UNIT AREA).** The product of the overpressure (or dynamic pressure) from the blast wave of an explosion and the time during which it acts at a given point. More specifically, it is the integral, with respect to time of over-pressure (or dynamic pressure), the integration being between the time of arrival of the blast wave and that at which the overpressure (or dynamic pressure) returns to zero at the given point.

**INACTIVE STOCKPILE (IS).** Warheads retained in a non-operational status for augmentation or replacement of warheads in the active stockpile.

**INCAPACITATION.** The inability of personnel to perform a required task as the result of a physical or mental disability. (See early transient incapacitation (ETI); performance decrement (PD); permanent complete incapacitation (PCI).)

**INCIDENT.** (See nuclear incident.)

**INDIRECT DAMAGE ASSESSMENT.** (See poststrike damage estimation.)

**INDOCTRINATED.** Personnel who are cleared for access and briefed regarding the continuous handling, observation, and recovery procedures specific to VCP.

**INDUCED RADIATION.** Radiation produced as a result of exposure to radioactive materials, particularly the capture of neutrons. (See contamination; Initial Nuclear Radiation; residual radioactivity.)

**INDUCED RADIOACTIVITY.** Radioactivity produced in certain materials as a result of nuclear reactions, particularly the capture of neutrons, which are accompanied by the formation of unstable (radioactive) nuclei. In a nuclear explosion, neutrons can induce radioactivity in the weapon materials, as well as in the surroundings (e.g., by interaction with nitrogen in the air and with sodium, manganese, aluminum, and silicon in soil and sea water).

**INDUCED SHOCK WAVE.** The shock wave induced in a medium when a shock wave traveling in another medium crosses the interface between the two media.

**INFRARED.** Electromagnetic radiations of wavelength between the longest visible red (7,000 Angstroms or $7 \times 10^{-4}$ millimeter) and about 1 millimeter. (See electromagnetic radiation (EMR).)

**INFINITE INTEGRATED DOSE.** The radiation dose that would be received if a subject remained at a given position in a radiation field for an infinitely long time.

**INFORMATION UR.** A UR that provides information that will assist the engineering agencies in trend analysis.

**INERT.** A munitions item or component which contains no explosives, active chemicals or pyrotechnics, but is not necessarily nonhazardous.

**INHERENTLY SAFE.** A nuclear weapon is inherently safe when its warhead satisfies the definition of being one-point safe, even when no safing mechanism is used.

**INHIBIT.** A weapon coded switch feature that disallows use of a particular code.

**INITIAL NUCLEAR RADIATION.** Nuclear radiation (essentially neutrons and gamma rays) emitted from the fireball and the cloud column during the first minute after a nuclear (or atomic) explosion. The time limit of one minute is set, somewhat arbitrarily, as that required for the source of part of the radiation (fission products, etc., in the radioactive cloud) to attain such a height that only insignificant amounts of radiation reach the earth's surface. (See residual radiation.)

**INITIAL OPERATIONAL CAPABILITY (IOC).** The first attainment of the capability to employ effectively a weapon, item of equipment, or system of approved specific characteristics, and which is manned or operated by an adequately trained, equipped, and supported military unit or force.

**INITIAL OPERATIONAL CAPABILITY DATE (IOCD).** The date when the first combat missile unit is equipped, trained, and logistic support established to permit performance of combat missions in the field. An initial operational capability date is associated with each new missile system as a target date for delivery of combat equipment, repair parts, maintenance equipment and publications, plus supply of trained personnel.

**INITIAL PRODUCTION SYSTEMS TEST (IPST).** An Air Force testing program which applies SERVICE STAR techniques to samples of DoD contractor output during first year of production. Provides for reliability assessment of ballistic missile reentry system components during initial production and establishes baseline for future reliability assessment programs.

**INITIAL PROVISIONING CONFERENCE.** A conference convened by Sandia National Laboratories to determine and establish the range and depth of base spares required to support maintenance and repair operations.

**INITIATION POINT.** The point where detonation of the main charge is initiated.

**INITIATOR.** A device that emits neutrons to start a chain reaction.

**ION.** An atom or molecule in which the number of electrons does not equal the number of protons. A negative ion, or anion, has one or more excess electrons. A positive ion, or cation, lacks one or more electrons.

**INRAD.** (See intrinsic radiation (INRAD)).

**INSENSITIVE HIGH EXPLOSIVE (IHE).** High explosive that requires a shock of more than usual strength to cause detonation; this relative insensitivity contributes to weapon safety.

**INSPECTION.** (See periodic inspection.)

**INSPECTION RECORD CARD (IRC).** A form initially issued by Sandia National Laboratories (SNL), approved by the DOE, and packed with nuclear weapons major assemblies. The IRC provides a historical record of significant information pertaining to the major assembly.

**INTEGRATED LABORATORY TEST.** A joint laboratory test of associated, interconnected DoD and DOE material that provides laboratory evaluation of the interface between DOE and DoD portions of a weapon system. This test is part of new materiel laboratory tests (NMLT) and the stockpile laboratory test (SLT) and may be conducted at either a DOE or DoD facility.

**INTEGRATED MATERIEL MANAGEMENT (IMM).** The exercise of total DoD management responsibility for an FSG/Class, commodity or item by a single agency. The IMM normally includes computation of requirements, funding, budgeting, storing, issuing, cataloging, standardizing, and acquisitioning functions.

**INTEGRATING ACCELEROMETER.** An electromechanical device that measures the forces of acceleration along its sensitive axis and produces an output signal proportional to velocity. (See environmental sensing device (ESD); pressure switch.)

**INTENSITY.** The amount or energy of any radiation incident upon (or flowing through) unit area, perpendicular to the radiation beam, in unit time. The intensity of thermal radiation is generally expressed in calories per square centimeter per second falling on a given surface at any specified instant. As applied to nuclear radiation, the term intensity is sometimes used, rather loosely, to express the exposure (or dose) rate at a given location.

**INTERCHANGEABILITY.** A condition which exists when two or more items possess such functional and physical characteristics as to be equivalent in performance and durability, and are capable of being exchanged one for the other without alteration of the items themselves, or of adjoining items, except for adjustment, and without selection for fit and performance.

**INTERCONTINENTAL BALLISTIC MISSILE (ICBM).** A ballistic missile with a range capability from about 3,000 to 8,000 nautical miles.

**INTEREST ACTIVITY.** An activity that is either an SD-I activity having an essential technical interest in a SD-I, or an SD-I activity that has a need/use for a SD-I, but does not maintain/need an expertise in the technical aspects of the document (formerly review or user activity).

**INTERFACE CONTROL DOCUMENT (ICD).** A document between NNSA, and the Services that exchanges warhead and delivery vehicle information, including changes in new production, to resolve interface design problems and to ensure adequate interface control between the delivery system and NNSA components.

**INTERIM HAZARD CLASSIFICATION (IHC).** The mechanism used by the DOE to allow transportation of Class 1 material in the United States when the item's FHC process has not been completed and the item is not yet on file with the DOT. A temporary hazard classification is assigned in accordance with 49 CFR 173.56(b)(3).

**INTERMAGAZINE SEPARATION DISTANCES.** The distances used to provide an acceptable degree of assurance that detonation of the high explosives contents of one group of weapons will not cause the detonation of the explosives of adjacent weapons. Intergroup distances are identical to above ground intermagazine distances.

**INTERNAL CARRIAGE.** The carriage of a detachable item such as a bomb, fuel tank, missile, etc., on the inside of an aircraft. (See external carriage.)

**INTERNAL RADIATION.** Nuclear radiation (alpha and beta particles and gamma radiation) resulting from radioactive substances in the body. Important sources are iodine-131 in the thyroid gland, and strontium-90 and plutonium-239 in bone.

**INTERPROJECT GROUP (IPG).** All of the materiel for one major assembly that is to be delivered from one DOE production agency to another production agency in accordance with the NNSA master planning and scheduling documents.

**INTERSTAGE COUPLING.** Transferring the energy produced by a nuclear stage to a physically separate stage.

**INTERVAL TIME.** The time between peak radiation reactions of two weapon stages.

**INTRINSIC RADIATION (INRAD).** Ionizing radiation emitted through the weapon surface or directly from exposed weapon components.

**INVENTORY CONTROL.** That phase of military logistics which includes managing, cataloging, requirements determination, procurement, distribution, overhaul, and disposal management, and supply management.

**INVENTORY CONTROL POINT (ICP).** An organizational unit or activity within a DoD supply system that is assigned the primary responsibility for the materiel management of a group of items either for a particular Service or for the DoD as a whole. Materiel inventory management includes cataloging direction, requirements computation, procurement direction, distribution management, disposal direction and generally, rebuild direction.

**INVERSE SQUARE LAW.** The law which states that when radiation (thermal or nuclear) from a point source is emitted uniformly in all directions, the amount received per unit area at any given distance from the source, assuming no absorption, is inversely proportional to the square of that distance.

**IONIZATION.** The separation of a normally electrically neutral atom or molecule into electrically charged components. The term is also employed to describe the degree or extent to which this separation occurs. In the sense used in this book, ionization refers especially to the removal of an electron (negative charge) from the atom or molecule, either directly or indirectly, leaving a positively charged ion. The separated electron and ion are referred to as an ion pair. (See ionizing radiation.)

**IONIZING RADIATION.** Electromagnetic radiation (gamma rays or X-rays) or particulate radiation (alpha particles, beta particles, neutrons, etc.) capable of producing ions, i.e., electrically charged particles, directly or indirectly, in its passage through matter. (See nuclear radiation.)

**IONOSPHERE.** The region of the atmosphere, extending from roughly 40 to 250 miles altitude, in which there is appreciable ionization. The presence of charged particles in this region profoundly affects the propagation of long-wavelength electromagnetic radiations (radio and radar waves).

**ISODAMAGE CURVE.** A plot of the radius of effect versus height of burst for a given weapon yield, target, and degree of damage.

**ISODOSE LINE.** A term applied to an imaginary contour in a radioactive field on which the total accumulated radiation dosage is the same.

**ISODOSE RATE LINE.** (See dose rate contour line.)

**ISOINTENSITY CONTOUR.** (See dose rate contour line.)

**ISOTOPES.** Forms of the same element having identical chemical properties but differing in their atomic masses (due to different numbers of neutrons in their respective nuclei) and in their nuclear properties (e.g., radioactivity, fission etc.). For example, hydrogen has three isotopes, with masses of 1 (hydrogen), 2 (deuterium), and 3 (tritium) units, respectively. The first two of these are stable (nonradioactive), but the third (tritium is a radioactive isotope. Both of the common isotopes of uranium, with masses of 235 and 238 units, respectively, are radioactive, emitting alpha particles, but their half-lives are different. Furthermore, uranium-235 is fissionable by neutrons of all energies, but uranium-238 will undergo fission only with neutrons of high energy. (See nucleus (or atomic nucleus).)

**ITEM.** Includes materials, parts, components, subassemblies, equipment, accessories, and attachments.

**ITEM MANAGER.** An individual within the organization of an inventory control point or other such organization assigned management responsibility for one or more specific items of materiel.

**ITEM OF SUPPLY (IOS).** An IOS may be a single item of production or two or more items of production that are functionally interchangeable or that may be substituted for the same purpose and that are comparable in terms of use.

**ITEM REDUCTION STUDY.** An analysis to identify unneeded items currently in the supply system that involves a technical review of duplicating or overlapping items. It leads to a reduction in number of similar items.

**ITEM STANDARDIZATION CODE.** The coding structure that identifies items as either “authorized for acquisition” or “not authorized for acquisition.

# J

**JOINT ATOMIC INFORMATION EXCHANGE GROUP (JAIEG).** A DoD Agency under DTRA that sets forth the policies and procedures governing disclosures of atomic information to foreign and regional defense organizations.

**JOINT CHIEFS OF STAFF (JCS) RESERVE.** Weapons allocated to and operationally controlled by the JCS and normally stored at an operational storage site (OSS), or Navy Service storage facility (SSF), or overseas operational storage site (OOSS).

**JOINT CONFIGURATION WORKING GROUP (JCWG).** A meeting convened by NNSA upon receipt of Service design requirements to define Service Type unit definition, development, configuration and qualitative requirements.

**JOINT DOD-DOE FLIGHT TESTING.** Operational test flights of a DoD delivery aircraft or missile with a DOE joint test assembly (JTA).

**JOINT FLIGHT TEST (JFT) PROGRAM.** A DOE-DoD flight test program intended to verify weapon system capability to function in a variety of stockpile-to-target environments and to demonstrate continuing compatibility between DOE and DoD subsystems. The program consists of the following two categories of test:

**a.** **NEW MATERIAL FLIGHT TESTS (NMFT).** Joint DOE-DoD flight tests conducted during the production period, using randomly selected, newly produced material.

**b.** **STOCKPILE FLIGHT TESTS (SFT).** Joint DOE-DoD flight tests conducted periodically on weapon systems randomly selected from the stockpile.

**JOINT NUCLEAR ACCIDENT COORDINATING CENTER (JNACC).** A combined Department of Defense Special Weapons Agency and Department of Energy centralized agency for exchanging and maintaining information concerned with radiological assistance capabilities and coordinating that assistance in response to an accident or incident involving radioactive materials. These centers are separated geographically, but linked by direct communications networks.

**JOINT NUCLEAR WEAPONS PUBLICATION SYSTEM (JNWPS).** The JNWPS is a system of technical publications on nuclear weapons and associated materiel designed and developed by the DOE; and related components designed and developed by DoD agencies; and such supplemental information or data determined appropriate by either the DOE or DoD in connection with the general field of nuclear weapons. The JNWPS exists as a means of providing DOE, DTRA, and the respective military departments of the DoD, authoritative instructions, processes and data to supplement existing publications systems of the participating agencies. Publications to be included in the JNWPS are limited to

those which are authenticated by two or more participating agencies and include general and materiel publications.

**JOINT TASK GROUP (JTG).** An operation designed to provide SNL with an evaluation of a complete bomb, warhead, ancillary equipment, or change thereto, from an operational viewpoint. The task group is scheduled by DTRA/SNL in conjunction with the Services, at a time consistent with hardware, equipment, and procedure availability, the evaluation is convened with full military participation, the military providing evaluation team members, consultants, and any required Service hardware.

**JOINT TEST ASSEMBLY (JTA).** A DOE developed configuration based on DOE-DoD requirements for use in a joint flight test program, comprised of a joint test subassembly (JTS) and WR weapon components. The physical appearance and characteristics of a JTA will approximate a WR configuration to the extent practicable. JTAs are produced in two ways:

**a.** **PREBUILD.** JTAs for weapon systems whose design or test program requires the JTAs to be completely prebuilt as new production.

**b.** **REBUILD.** JTAs using components from stockpile WR weapons and/or a JTS from new production.

**JOINT TEST SUBASSEMBLY (JTS).** A DOE assembly or components designed, developed, and procured specifically for DOE-DoD joint flight test programs, normally comprised of a test bed and an instrumentation package.

**JOINT TEST UNIT (JTU).** A configuration for use in the DOE-DoD joint flight test programs, comprised of a JTA, DoD WR material, and, where appropriate, other instrumentation packages including range safety components. The physical appearance and characteristics of a JTU will approximate a WR configuration to the extent practicable.

**JOINT TEST WORKING GROUP (JTWG).** A group comprised of DOE and DoD representatives whose purpose is to technically plan and coordinate implementation of a joint flight test program for a specific DOE weapon/DoD carrier system.

# K

**KEY.** Cryptographic entity used in conjunction with an algorithm to accomplish encryption and decryption.

**KILO ELECTRON VOLT (KEV).** An amount of energy equal to 1,000 electron volts.

**KILOTON (KT).** Energy equivalent to that released by the explosion of 1,000 tons of trinitrotoluene (TNT), $10^{12}$calories, or 4.18 X $10^{12}$ joules, a measure of yield.

**KILOTON ENERGY.** Defined strictly as $10^{12}$ calories (or 4.2 x $10^{19}$ ergs). This is approximately the amount of energy that would be released by the explosion of 1 kiloton (1,000 tons) of TNT (See TNT equivalent,)

**KILOTON WEAPON.** A nuclear weapon, the yield of which is measured in terms of thousands of tons of trinitrotoluene explosive equivalents, producing yields from 1 to 999 kilotons. (See nominal weapon; nuclear yields; subkiloton weapon.)

# L

**LABORATORY TASK GROUP (LTG).** The LTG, a NNSA activity, conducts the preliminary assembly of military technical publication operations manuals for a weapon and/or ancillary equipment prior to the conduct of the final Joint Task Group (JTG) verification. Together, the activities of the LTG and JTG constitute verification of the operational use of technical publications for the weapon.

**LAYDOWN.** A concept of weapon employment. It requires weapon survival upon ground impact following release from low-flying delivery aircraft, and delayed fuzing and firing of the weapon in order to permit safe escape of the aircraft.

**LEAD STANDARDIZATION ACTIVITY (LSA).** A management activity in a military department or a defense agency that guides DoD standardization efforts for a FSG, a FSC, or a standardization area through the development of standardization program plans, authorization of standardization projects, and identification and resolution of standardization issues.

**LENS (CONVENTIONAL, AIR, OR RING).** Specially designed HE charges consisting of components with different detonation velocities, air gaps, and/or inert material that are shaped or arranged to focus the detonation wave into a properly contoured detonation front.

**LENS CHARGE.** One of a series of explosive charges comprising the outer layer of the HE sphere of an implosion weapon used to generate a spherical implosion shock wave.

**LETHAL DOSE (LD).** A dose of ionizing radiation sufficient to cause death. (See median lethal dose (nuclear).)

**LETHAL GUST ENVELOPE.** The boundary of the area in any given plane within which the gust loading effects from a detonation inflict sufficient structural damage to destroy a given aircraft.

**LETHAL NUCLEAR ENVIRONMENT.** Any quantitative definition of the minimum level of a nuclear environment that results in sure kill of the weapon system. (See nuclear environment; nuclear system.)

**LEVELS (OR ECHELONS) OF MAINTENANCE.** (See maintenance levels.)

**LEVITATED PIT.** A pit that contains a centrally suspended mass (e.g., core or ball) of fissile material.

**LIFE EXTENSION PROGRAM (LEP).** A program designed to evaluate an entire weapon system and refurbish, reuse, or replace components with the intent to extend the service life of a warhead increasing safety, improving security and addressing defects.

**LIFE-OF-TYPE PROVISIONING.** A process of determining requirements for procuring and distributing the final (closeout) increment of spares. This process provides spares support for an end item for the balance of its anticipated life, and is started approximately 8 to 12 months prior to cessation of end item production.

**LIFE-OF-TYPE PROVISIONING CONFERENCE.** Prior to the end of WR production, SNL convenes a life-of-type provisioning conference to determine life-of type base and military spares requirements. The Services, DOE, and DTRA participate in this conference. Using Service activities are notified of the conference by DTRA.

**LIMITED AREA.** A security area containing one or more security interests. Within the area, guards or internal controls, depending on the nature of the activity, can prevent access by unauthorized persons to the security interests. (See controlled area; exclusion area.)

**LIMITED-LIFE COMPONENT (LLC).** A nuclear weapon component that deteriorates in some respect over time, and must be replaced periodically during weapon stockpile life; principal classes of LLC are reservoirs, neutron generators, and parachutes.

**LIMITED-LIFE COMPONENT EXCHANGE (LLCE).** The operation that replaces a limited-life component.

**LIMITED-LIFE COMPONENT EXCHANGE (LLCE) CYCLE.** The period of time between planned LLCE operations for a given warhead type.

**LIMITED-LIFE COMPONENT KIT.** A package containing LLCs needed to replace one "weapon's worth" of LLCs that have expired or are about to expire.

**LIMITED-LIFE NEUTRON GENERATOR.** (See Neutron Generator.)

**LIMITED MANEUVERABILITY.** Movement of those wheel or caster mounted containers which are not intended to be towed. These containers can be pulled or pushed by manpower over any hard surface that will support the casters and are level enough to be manageable. Two-high, stacked configurations shall be moved by hand.

**LIMITED STOCKPILE ITEM.** A nuclear weapon for which conformance to the approved military characteristics has not been satisfactorily demonstrated to the DoD and on which the DoD desires further DOE development effort on the nuclear warhead, bomb, or associated DOE-developed components. (See standard stockpile item.)

**LIMITED RIGHTS.** The rights to use, duplicate, or disclose technical data in whole or in part by or for the Government, with the express limitation that such technical data may not be released outside the Government, or used, duplicated or disclosed in whole or in part, for manufacture or acquisition. The Service Nuclear Ordnance Cataloging Activity (SNOCA) and DTRACA will review any subsequent reference number changes proposed for the item, and the DTRACA will withdraw the DOE reference number when advised by the SNOCA that it is no longer applicable. The DTRACA will ensure that the DOE reference numbers are withdrawn from the item and will submit a search by reference number transaction (LSR) on CAGE code 32345 semi-annually to determine status of National Item Identification Numbers (NIINs).

**LIMITED SEARCH REFERENCE (LSR).** A transaction used to submit reference numbers to be screened against the FLIS database to determine if the reference number is related to an existing item identification.

**LIMITED TRY.** That feature of a coded switch which permits insertion of code possibility only up to an established number; code tries in excess of an established number may result in a delay or lockout.

**LIMITED TRY COUNT (LTC).** A weapon coded switch feature that limits the number of incorrect attempts to access the coded switch.

**LINE-OF-SIGHT (LOS) PIPE.** A pipe, which may include closure mechanisms, that permits "viewing" of radiation from a source for diagnostic purposes, or that conveys radiation to effects experiments.

**LIP HEIGHT.** The height above the original surface to which earth is piled around the crater formed by an explosion. (See crater.)

**LIVE PIT.** A fissile component, or set of components, designed to fit in the central cavity of an implosion system and which if placed therein, will create a nuclear explosive.

**LLC TURNAROUND TIME.** The time from the shipment of LLCs from the DOE contractor plant to the time of receipt of the replaced LLCs at the DOE contractor plant.

**LOADED EQUIPMENT SECTION (LES).** That portion of a multiple reentry system which operates after inflight separation from the missile to place each reentry vehicle in its proper trajectory.

**LOADING.** The force on an object or structure or element of structure. The loading due to blast is equal to the net pressure in excess of the ambient value multiplied by the area of the loaded object, etc. (See diffraction, drag loading.)

**LOCK (LOCKING).** Locking is an operation by which the combination lock or coded switch of a weapon is operated to a condition that precludes weapon assembly and/or arming.

**LOCK WIRE.** A heavy twisted wire used to secure parts against inadvertent opening in all areas of high vibration such as the engine compartment. Electric connectors are lock-wired in high-vibration areas which are normally inaccessible for periodic maintenance and inspection. (See safety wire; seal wire; shear wire.)

**LOFT BOMBING.** A method of bombing in which the delivery plane approaches the target at a very low altitude, makes a definite pullup at a given point, releases the bomb at a predetermined point during the pullup, and tosses the bomb onto the target.

**LOGISTIC MOVEMENT.** The transport of WR nuclear weapons by any appropriate noncombatant delivery vehicle outside a permanent limited/exclusion area. (See ferry shipment; tactical ferry.)

**LOGISTIC SYSTEM.** The organizations, vehicles, and support equipment employed for the loading, movement, and transfer of nuclear weapons and nuclear components, except LLCs, but explicitly excluding nuclear-capable combat delivery vehicles.

**LOGISTIC TRANSPORTATION.** The movement of nuclear weapons in DoD custody associated with deployment requirements, maintenance, quality assurance, and reliability. Logistic transportation of U.S. nuclear weapons includes, but is not limited to:

- **a.** Movements to and from MFDs, operational bases, or storage facilities.
- **b.** Movements between operational bases and storage locations.
- **c.** Movements between ships.
- **d.** Movements between ship and shore.

**LOGISTICAL EVALUATION EXERCISE (LEE).** A series of demonstrations designed to disclose logistical and technical deficiencies in the storage, assembly, maintenance, test, handling, transportation, monitoring control, and delivery of Navy nuclear weapon systems.

**LOGISTICAL EVALUATION GROUP (LEG).** A team specifically convened to conduct a LEE. Composition of the LEG is determined by the cognizant Naval Sea Systems Command/Project Office.

**LONGITUDINAL WAVE.** (See ground wave.)

**LONG RANGE DETECTION.**

- **a.** The discovery and disclosure of radiation and determination of its intensities in a contaminated locality (on ground, in water, or in air) by methods which allow the investigating and measuring personnel to remain at a distance from the region of radioactivity.

**b.** The process of determining, from long distances from the source, that a nuclear detonation has taken place.

**LOW AIRBURST.** The fallout safe height of burst for a nuclear weapon which maximizes damage to or casualties on surface targets.

**LOW ALTITUDE BOMBING SYSTEM (LABS).** A low-level aircraft delivery system consisting of a low-level run-in, a 4-G pullup (during which automatic release of the bomb occurs), and escape maneuver.

**LOW ANGLE DROGUE DELIVERY (LADD).** A low-level delivery technique for airburst and contact burst of retarded bombs. The delivery method is a 4-G pullup to an approximate $45^{o}$ flight path with automatic release occurring 5 to 12 seconds later.

**LOW EXPLOSIVE (LE).** An explosive, which, when used in its normal manner, deflagrates or burns, rather than detonates. (See high explosive (HE).)

# M

**MACH FRONT.** (See mach stem.)

**MACH REGION.** The region below the triple-point path in which mach or irregular reflection occurs.

**MACH STEM.** The shock front formed by the fusion of the incident and reflected shock fronts from an explosion. The term is generally used with reference to a blast wave, propagated in the air, reflected at the surface of the Earth. In the ideal case, the mach stem is perpendicular to the reflecting surface and slightly convex (forward), also called (mach front.)

**MAIN CHARGE.** The high explosive whose explosive energy is designed to implode the pit, or the nonexplosive materials substituted for the high explosive.

**MAIN CHARGE EXPLOSIVE.** A secondary explosive that can be initiated only by a strong shock wave from a primary or intermediate explosive and reacts in the detonation mode, not as a deflagration.

**MAIN LINE.** Detonating cord to which branch lines are attached.

**MAINTENANCE BAY.** A room or structure within a maintenance facility where nuclear weapons are maintained, assembled, disassembled, or tested. It is designed to meet the explosive and nuclear safety criteria for nuclear weapons.

**MAINTENANCE CODE.** Code used in some PAL devices to implement specific weapon operations.

**MAINTENANCE FACILITY.** A building or structure comprising one or more maintenance bays, each capable of fully supporting one or more nuclear weapons maintenance operations.

**MAINTENANCE LEVELS.** Joint Chiefs of Staff promulgated levels of maintenance for all equipment.

**a.** **ORGANIZATIONAL MAINTENANCE.** Maintenance which is the responsibility of, and performed by, using organizations on its assigned equipment. Its phases normally consist of inspecting, servicing, lubricating, adjusting, and the replacing of parts, minor assemblies, and subassemblies.

**b.** **INTERMEDIATE MAINTENANCE.** Maintenance which is the responsibility of, and performed by, designated maintenance activities for direct support of using organizations. Its phases normally consist of calibration, repair or replacement of damaged or unserviceable parts, components, or assemblies; the emergency manufacture of nonavailable parts when authorized; and providing technical assistance to using organizations.

**c.** **DEPOT MAINTENANCE.** Maintenance performed on material requiring major overhaul or a complete rebuild of parts, assemblies, subassemblies, and end items, including the manufacture of parts when authorized, modifications, testing and reclamation as required. Depot maintenance serves to support lower categories of maintenance by providing technical assistance and performing maintenance beyond their responsibility. Depot maintenance provides stock of serviceable equipment by using more extensive facilities and repair than are available in lower level maintenance activities.

**MAINTENANCE REQUIREMENT CARD (MRC).** A card defining a planned maintenance system (PMS) requirement for a specific piece of test or handling equipment for the Navy. Uses procedures from SWOPs as source data; however, data not in SWOPs may be acquired from other approved sources.

**MAJOR ASSEMBLY.** A completely assembled item or product entity, which is capable of performing a specific operational function either as a weapon, such as a bomb or a warhead, or as a separate item which may be assembled with other items into prescribed configurations of weapons. The term major assembly is also used for stockpile entities such as fuzes, noses, etc., that are not weapons, but are separately defined and identified.

**MAJOR ASSEMBLY RELEASE (MAR).** A MAR is a SNL prepared, NNSA approved statement that WR weapon material is satisfactory for release on a designated effective date to the DoD for specified uses which are qualified by exceptions and limitations.

**MAJOR COMPONENT (MC).** An assembly of components, piece parts, hardware, material, and the like, designed to perform a specific operational function for which the developing agency specifies the design and performance requirements, and delineates manufacturing processes to the extent necessary to assure conformance to the design factor.

**MAJOR IMPACT REPORT (MIR).** A report published by the DOE, as a part of the Phase 2 (Feasibility Study) for any nuclear weapon program, which identifies those aspects of the program which could be significant factors (including nuclear physics design, testing, production processes, or resource availability) affecting the schedule or technical risk of the development or production of the nuclear weapon.

**MAJOR ORGANIZATIONAL ENTITY (MOE) RULE.** Applies to the Primary Inventory Control Activity having management responsibilities of an Item of Supply (IOS).

**MAJOR TEST, HANDLING AND TRAINING ITEMS.** Includes all TYPE weapons and joint test assemblies (JTAs) funded and procured by the Services and all other items except war reserve (WR) and military spares.

**MANEUVER.** (See nuclear weapon maneuver.)

**MANEUVERABLE.** Towing limited to on-base movement less than 2 miles and at speeds not to exceed 5 miles per hour (MPH) over hard surfaces such as shop and bay floors, aprons around buildings and storage areas, shop decks, and primary roads of concrete, bituminous macadam, or sheet asphalt. Two-high, stacked configurations shall be moved by hand.

**MANEUVERABLE REENTRY VEHICLE (MARV).** A reentry vehicle capable of performing preplanned flight maneuvers during the reentry phase. (See multiple independently targetable reentry vehicle; multiple reentry vehicle; reentry vehicle (RV).)

**MANUAL FILE CONFERENCE.** A meeting convened by DTRA when data from two or more agencies are involved. This meeting identifies the proposed publications and the writing agency for each publication. Any required Source Data and the originator are identified and the scope data and acquisition milestones mutually agreed upon. DTRA will record and transmit the agreement to all participants.

**MANUFACTURE-THROUGH-EMPLOYMENT SEQUENCE (MES).** The MES supplements the UCC and defines the physical environments involved in the shipping, transport, storage, and use of use control equipment. The MES is approved by the NWCSSC.

**MANUFACTURER'S IDENTIFICATION ELEMENTS.** An alpha-numeric series assigned to major components (MC-), test (T-), and handling (H-) items and to certain cables and other components. The manufacturer's identification elements consist of the two- or three-letter manufacturer's designation and one or more of the following elements: serial number, date code, and lot number. The date code may occur in one of four forms: "A3" or "A73" (standing for January 1973); "7314" (standing for the 14th week of 1973); or "Feb 73."

**MANUFACTURING NUMBER.** (See manufacturer's identification elements.)

**MANUFACTURING SPECIFICATION.** A complete and specific instruction for the manufacture of a special design item of weapon materiel. The production agency may, at its discretion, issue a manufacturing specification, but in no case will the requirements of the product specification be altered by such manufacturing specifications without prior approval of the development agency.

**MARK PROGRAM NUMBER.** An Arabic numeral identifying a major assembly.

**MARK QUALITY MATERIEL.** Those items of weapons materiel which are produced in accordance with and conform to applicable design specification. Interchangeability of the same WR quality items may be assumed.

**MASK.** A value that, when combined with a pair of memory phrases, reconstructs a cryptographic key.

**MASTER KEY.** An encryption key used to perform secure rekey weapon operations.

**MATERIEL (NUCLEAR).** (From the French “matériel” for equipment or hardware, related to the word material). Materiel is a term used in English to refer to the equipment and supplies in military and commercial supply chain management. This does not cover substance covered by DOE Order 470.4-6 (Source and Special [SS] as well as Special Nuclear Material [SNM]).

**MATERIEL TRANSFER ORDER (MTO).** A communication issued by DTRA, as the authority for transfer of custody of weapons and components between the DOE and a designated command of the DoD or from one designated command to another. Transfer of custody between subordinate commands under the control of a single CC does not require an MTO.

**MEAN FREE PATH.** The average path distance a particle (neutron or photon) travels before undergoing a specified reaction (with a nucleus or electron) in matter.

**MEAN LETHAL DOSE.** (See median lethal dose (nuclear).)

**MECHANICAL COMBINATION LOCKS.** PAL devices utilizing combination locks designed to operate with a five-digit split code to be compatible with the PAL code management system.

**MECHANICAL SAFING AND ARMING DETONATOR (MSAD).** A detonator that has an electro-mechanical safing subsystem that maintains the initiator/detonator in an out of line position in the firing train to prevent inadvertent detonation until a unique signal to arm the detonator is received.

**MEDIAN LETHAL DOSE (NUCLEAR).** The amount of radiation over the whole body which would be fatal to 50 percent of the animals or organisms in question in a given period of time. (See lethal dose (LD).)

**MEGACURIE.** One million curries. (See curie.)

**MEGATON (MT).** Energy equivalent to that released by the explosion of 1,000,000 tons of trinitrotoluene (TNT), $10^{15}$ calories, or 4.18 X $10^{15}$ joules; a measure of yield.

**MEGATON ENERGY.** Defined strictly as $10^{15}$ calories (or 4.2 X $10^{22}$ ergs). This is approximately the amount of energy that would be released by the explosion of 1,000 kilotons (1,000,000 tons) of TNT. (See TNT equivalent.)

**MEGATON WEAPON.** A nuclear weapon, the yield of which is measured in terms of millions of tons of TNT explosive equivalents.

**MEMORY PHRASE PAIR.** A pair of English text phrases (usually designated A and B) that, when combined with a mask, yields a cryptographic key.

**MICROCURIE.** A one-millionth part of a curie. (See curie.)

**MICRON.** A one-millionth part of a meter (i.e., $10^6$ meter or $10^4$ centimeter); it is roughly four one-hundred-thousandths ($4x10^5$) of an inch.

**MILITARILY SIGNIFICANT FALLOUT.** Radioactive contamination capable of inflicting radiation doses on personnel which may result in a reduction of their combat effectiveness.

**MILITARY CHARACTERISTICS (MC) FOR NUCLEAR WEAPONS.** A DoD document submitted to the DOE that specifies performance requirements and physical characteristics for a nuclear warhead, bomb, or basic assembly to be compatible with a specific weapon system or systems. NWCSSC approved MCs are forwarded to DTRA for publication/distribution.

**MILITARY FIRST DESTINATIONS (MFDS).** Designated military CONUS locations which receive and accept into the DoD stockpile, direct shipments of nuclear ordnance material from the DOE contractor plants. (See acceptance inspection).

**MILITARY INTER-DEPARTMENTAL PURCHASE REQUEST (MIPR).** The funding document provided which establishes a Procurement Defense Agency (PDA) appropriation for requirements of the Services for DOE-produced military spares, TYPE weapons, test weapons, major-items, repairs and associated transportation costs.

**MILITARY REQUIREMENT.** An established need justifying the transport of a nuclear weapon to accomplish approved logistic actions such as deployment, maintenance, quality assurance and reliability testing, or retirement.

**MILITARY SPARES.** Parts and components authorized in the spare part list published by SNL, funded for, procured, and owned by the DoD, and required for support of DOE or DoD produced training weapons, and all CT, DE, test (T), and handling (H) equipment except those DOE-owned items supplied to the DoD with the WR weapon. (See spare parts list (SPL).)

**MILLION ELECTRON VOLT (MEV).** A unit of energy commonly used in nuclear physics. It is equivalent to 1.6 $x10^6$ erg. Approximately 200 MeV of energy are produced for every nucleus that undergoes fission.

**MILLIRAD.** A one-thousandth part of a rad. (See radiation absorbed dose (RAD).)

**MILLIREM.** A one-thousandth part of a rem. (See Roentgen Equivalent Man/Mammal (REM).)

**MILLIROENTGEN.** A one-thousandth part of a roentgen. (See roentgen.)

**MINIMUM NORMAL BURST ALTITUDE.** The altitude above terrain below which air defense nuclear warheads are not normally detonated.

**MINIMUM RESIDUAL RADIOACTIVITY (MRR) WEAPON.** A nuclear weapon designed to have optimum reduction of unwanted effects from fallout, rainout, and burst site radioactivity.

**MINIMUM SAFE DISTANCE (NUCLEAR).** The sum of the radius of safety and the buffer distance.

**MINIMUM WARNING TIME (NUCLEAR).** The sum of system reaction time and personnel reaction time.

**MINOR CHANGE RETROFIT ORDER.** A field change procedure that is exempt from the basic product change proposal working procedures. The change does not involve weapon nomenclature, identification, alphabetical suffix change to test and handling equipment, or correct a condition on WR materiel which would result in hold order action or in amendment to the major assembly release for the materiel concerned. The change does not affect weapon function, safety, reliability (as related to premature or dud probabilities), or its use including assembly, interchangeability, storage, handling, or delivery.

**MIRROR POINT.** A point at which a charged particle, moving (in a spiral path) along lines of magnetic field, is reflected back as it enters a stronger magnetic field region. The actual location of the mirror point depends on the direction and energy of motion of the charged particle and the ratio of the magnetic field strengths. As a result, only those particles satisfying the requirements of the existing situation are reflected.

**MISSION CODE.** Unclassified PAL code used with JTA weapons selected for expenditure.

**MISSION COMPLETION.** As used by the Air Force, the level of damage which the system can sustain and still be assured of having the capability to complete its assigned mission. (See mission kill; sure kill; sure safe.)

**MISSION KILL.** As used by the Air Force, the level of damage which assures that a system cannot complete its assigned mission. (See mission completion; sure kill; sure safe.)

**MOCK HE.** A nondetonable material, colored pink, and used to simulate one or more properties of HE.

**MODE (NUCLEAR).** Refers to the protected condition (Lock) or the unprotected condition (Unlock) of the PAL system.

**MODERATE RISK (NUCLEAR).** A degree of risk where anticipated effects are tolerable, or at worst a minor nuisance. (See degree of risk; emergency risk (nuclear); negligible risk (nuclear).)

**MODIFICATION (MOD).** Any alteration of a permanent nature made after production to an end item, component, or assemblage of materiel which results in a change to the MCs that impacts weapon employment, fuzing, ballistics, or logistics.

a. **DELIVERY (EMPLOYMENT OR UTILIZATION).** A change which adds or deletes applications for the weapon, such as compatibility with certain delivery vehicles, environmental criteria, inflight monitoring operations, or significantly different carrier-to-weapon separation characteristics.

**b.** **FUZING**. A change which adds or deletes a fuzing option, such as contact, laydown, airburst, retarded or nonretarded, underwater, delayed action, or control by remote command or preprogrammed devices. A change in the method by which an existing fuzing option was accomplished would not be classified a modification change.

**c.** **BALLISTICS**. A change in the physical characteristics; i.e., weight, shape, center of gravity, or moment of inertia, which significantly alters the flight characteristics of the delivery vehicle for warheads.

**d.** **LOGISTICS**. A change affecting the logistical support of weapon, such as adding or deleting from a major assembly a component affecting its compatibility with another major assembly, or a change that significantly alters the handling safety of a weapon so that logical control is necessary.

**MONITOR FILE.** A file that contains a compilation of audit records resulting from executed weapon-specific operations.

**MONITOR SCHEME.** The combined hardware design feature and procedures employed using that feature to observe the status or condition of nuclear weapon components. (See monitoring; monitor system.)

**MONITOR SYSTEM.** A design feature incorporated in a nuclear weapon for the purpose of allowing an observation of the status or condition of a weapon component(s). (See monitor scheme; monitoring.)

**MONITORING.**

**a.** The act of listening, carrying out surveillance on, and/or recording the emissions of one's own or allied forces for the purposes of maintaining and improving procedural standards and security, or for reference, as applicable.

**b.** The act of listening, carrying out surveillance on, and/or of enemy emissions for intelligence purposes.

**c.** The act of detecting the presence of radiation and the measurement thereof with radiation measuring instruments, also called radiological monitoring.

**MORTALITY RANGE (MR).** The distance at which one percent of the personnel, standing in the open when the warhead HE detonates, would die from the overpressure.

**MULTILEVEL PRODUCT.** A component that contains one or more subassemblies or piece parts defined by SNL drawings.

**MULTIPLE CODE CODED SECURITY SWITCH (MCCSS).** The MCCSS is a code control device that provides for selective locking/unlocking through the use of multiple 12-digit codes.

**MULTIPLE CODE CODED SWITCH ENCRYPTION TRANSLATOR (MET).** The MET is a code control device capable of receiving encrypted communications. The MET is designed for compatibility with the existing MCCS and thus providing end-to-end encryption capabilities.

**MULTIPLE CODE CODED SWITCH (MCCS).** A coded switch that provides selective locking/unlocking through the use of multiple codes. The MCCS is an electronic design which interacts with an electromechanical output device.

**MULTIPLE INDEPENDENTLY TARGETABLE REENTRY VEHICLE.** A reentry vehicle carried by a delivery system which can place one or more reentry vehicles over each of several separate targets. (See maneuverable reentry vehicle (MARV); multiple reentry vehicle; reentry vehicle (RV).)

**MULTIPLE REENTRY VEHICLE.** The reentry vehicle of a delivery system which places more than one reentry vehicle over an individual target. (See maneuverable reentry vehicle (MARV); multiple independently targetable reentry vehicle; reentry vehicle (RV).)

**MULTIPLYING CHAIN REACTION.** (See chain reaction.)

**MULTIPOINT DETONATION SYSTEM.** A system which, because of detonation at a large number of points, produces a properly contoured detonation front.

**MUNITIONS DUMMY UNIT (MDU).** An Air Force device used as a practice or training munition, usually a warhead trainer.

**MUNITIONS SQUADRON (MUNS).** An Air Force unit whose functions include the receipt, storage, issue, modification, storage monitoring, and technical supply of nuclear weapons; the calibration and maintenance of technical equipment required for nuclear weapons inspection and assembly. A MUNS is trained to perform the functions enumerated for type of nuclear weapons maintained in the Air Force inventory; in addition, it is capable of dispatching a part of its own organization as a small, forward technical organization, as the need arises.

# N

**NATIONAL LABORATORIES.** A phrase that generically encompasses Sandia National Laboratory/New Mexico, Sandia National Laboratory/California, Lawrence Livermore National Laboratory, and Los Alamos National Laboratory.

**NATIONAL STOCK NUMBER (NSN).** A NSN or NATO number is assigned by the U.S. Government or a NATO member government to an IOS for inclusion into government logistics systems. This number consists of a four-digit FSC and a nine-digit NIIN.

**NAVAL ATOMIC PLANNING, SUPPORT, AND CAPABILITIES (NAPSAC).** The Department of the Navy document listing assembly and maintenance capabilities of all Navy nuclear-capable units. This document is classified Confidential Formerly Restricted Data (CFRD) and has a limited distribution.

**NAVY SHOCK CRITERIA.** The shock which an item must withstand when aboard ship, determined by the shock created by near misses.

**NAVY TECHNICAL PROFICIENCY INSPECTION (NTPI).** A technical inspection conducted by Navy inspectors of Navy nuclear weapons activities to determine their capabilities, as appropriate, in the storage, testing, assembly, maintaining, handling, and loading of nuclear weapons.

**NAVY TEST ASSEMBLY (NTA).** The NTA is a DOE-built test unit used in a Navy-only quality assurance service test (QAST) program. NTA is a Navy configuration of a JTA with resettable relays vice explosive switches and is purchased/owned by the Navy.

**NEED TO KNOW.** A criterion used in security procedures that requires the custodians of classified information to establish, prior to disclosure, that the intended recipient must have access to the information to perform his or her official duties.

**NEGLIGIBLE RISK (NUCLEAR).** A degree of risk where personnel are reasonably safe, with the exceptions of dazzle or temporary loss of night vision. (See degree of risk; emergency risk (nuclear); moderate risk (nuclear).)

**NEUTRON.** A neutral particle (i.e., with no electrical charge) of approximately unit mass, present in all atomic nuclei, except those of ordinary (light) hydrogen. Neutrons are required to initiate the fission process, and large numbers of neutrons are produced by both fission and fusion reactions in nuclear (or atomic) explosions.

**NEUTRON GENERATOR.** A source of neutrons that uses an electromagnetic linear accelerator rather than fission. The accelerator typically accelerates deuterons into a tritium target. The resulting deuterium tritium fusion reaction produces 14 MeV neutrons. Portable neutron generators have been used in oil well logging. Miniature neutron generators are also used in contemporary nuclear weapons to furnish neutrons at a precise instant to begin fission reactions in fissile cores.

**NEUTRON INITIATOR.** A special component that is used to start neutron fission chain reactions in nuclear weapons. This can be a radioactive initiator which produces neutrons by a nuclear reaction resulting from mixing an alpha emitter with a light element such as beryllium. A neutron initiator can also be in the form of a particle accelerator which produces a burst of neutrons by the electrical acceleration of ions.

**NEVADA TEST SITE.** The continental area for the conduct of nuclear tests, under the control of the DOE, located northwest of Las Vegas, Nevada, within the boundaries of the Las Vegas Bombing and Gunnery Range, formerly called Nevada Proving Grounds.

**NEW MATERIEL FLIGHT TESTS (NMFT).** (See joint flight test (JFT) program.)

**NEW MATERIEL LABORATORY TESTS (NMLT).** Laboratory tests conducted on DOE weapon systems randomly selected from production. (See stockpile laboratory tests (SLT).)

**NICKNAME.** A word approved by the DOE as an official unclassified identifier for something in the weapon program, e.g., nuclear device or stage, nuclear test event, special project, weapon material, or hardware. (See designator.) The terms *designator* and *nickname* have sometimes been used interchangeably and both are in use throughout the DOE complex.

**NOMENCLATURE.** Anything that identifies a nuclear weapon or subassembly, component, or other part; includes all identifiers such as warhead (W), bomb (B), and MC numbers, official nicknames, word names, part or drawing numbers, etc.

**NOMINAL ATOMIC BOMB.** A term, now becoming obsolete, used to describe an atomic weapon with an energy release equivalent to 20 kilotons (i.e., 20,000 tons) of TNT. This is approximately the energy yield of the bombs exploded over Japan and in the Bikini Atoll test of 1946.

**NOMINAL WEAPON.** A nuclear weapon producing a yield of approximately 20 kilotons. (See kiloton weapon; nuclear yields; subkiloton weapon.)

**NONCONFORMING MATERIEL (NCM).** Materiel which does not meet specification requirements. (See production waiver; restricted use nonconforming materiel (NCM); unrestricted use nonconforming materiel (NCM).)

**NONLINEAR ZONE.** A wedge-shaped zone in water which increases in depth as the range from the burst point increases and within which anomalous reflections affect the underwater pressure history.

**NONNUCLEAR COMPONENT.** A part of a nuclear weapon which does not contain fissionable or fusionable material.

**NONNUCLEAR PARTS OF NUCLEAR WEAPONS.** Those parts specially designed for nuclear weapons, are not in general use in other end products, and are not made in whole or in part of special nuclear material.

**NONNUCLEAR SAFING.** (See safing.)

**NONNUCLEAR TESTING.** Testing of nuclear weapons and their parts that does not involve a nuclear explosion; includes flight, environmental, field, laboratory, production, quality assurance, simulation, testing, etc.

**NONNUCLEAR VERIFICATION (NNV).** The verification of the nonnuclear status of a NELA by measurement with a radiation-detecting instrument that confirms the absence of Special Nuclear Material.

**NONREPAIRABLE PRODUCT.** A component that is not repairable by field or depot units. A component, no part of which is shipped separately as a spare in DoD commerce.

**NONSTRATEGIC NUCLEAR FORCES.** Those nuclear-capable forces located in an operational area with a capability to employ nuclear weapons by land, sea or air forces against opposing forces, supporting installations, or facilities. Such forces may be employed, when authorized by competent authority, to support operations that contribute to the accomplishment of the commander's mission within the theater of operations.

**NONSUSTAINING CHAIN REACTION.** (See chain reaction.)

**NONVIOLENT DISABLEMENT (NVD).** Nuclear weapons disablement which, through the destruction or disassociation of one or more key components, temporarily destroys a weapon's ability to be used in its intended mode. NVD may not preclude the weapon's use in other than its intended mode. The effects of NVD are confined to the weapon case or the weapon shipping and storage container. Methods of NVD include:

**a.** Disassociation

**b.** Destruction of Components

**c.** Command Disablement (CD)

**NONWAR RESERVE MATERIEL.** Weapon materiel which is not designated for the WR stockpile, but is to be used by the DOE or delivered to the DoD for the purpose of training, testing, and evaluating WR materiel.

**NONWEAPON ACTIVITIES.** Activities engaged in peacetime application of nuclear energy.

**NONWEAPONS APPLICATION.** Material required to support DoD peacetime applications. This may be material formerly employed/utilized in support of the nuclear weapons stockpile. (See nonweapon activities.)

**NORMAL ENVIRONMENT.** (See environment.)

**NORMAL KEY.** An encryption key used to encrypt weapon operations.

**NORMAL NUCLEAR WEAPON.** A term used by DoD to designate a nuclear weapon which does not incorporate special design features to enhance or minimize fission products or other radioactivity resulting from its detonation.

**NORMAL URANIUM.** (See Uranium (U).)

**NORTH ATLANTIC TREATY ORGANIZATION (NATO).** Military alliance of democratic states in Europe and North America. The organization establishes a system of collective security whereby its member states agree to mutual defense in response to an attack by any external party.

**NOSE (N).** A major assembly that may complete the ballistic shape for a weapon and may contain functional components.

**NUCLEAR ACCIDENT.** (See nuclear weapon(s) accident.)

**NUCLEAR ACCIDENT RESPONSE PROCEDURES (NARP).** This manual summarizes DoD responsibilities and provides procedural guidance for a joint response to accidents involving nuclear weapons or components thereof in the United States and its territories or possessions. General guidance for overseas areas is included.

**NUCLEAR AIRBURST.** The explosion of a nuclear weapon in the air, at a height greater than the maximum radius of the fireball. (See nuclear exoatmospheric burst; nuclear surface burst; nuclear underground burst; nuclear underwater burst.)

**NUCLEAR AMMUNITION SUPPLY POINT (NASP).** A mobile supply point where nuclear ammunition is stored and issued to delivery units.

**NUCLEAR ARMING.** The sequence of events required to configure the nuclear system to obtain desired design yield.

**NUCLEAR ARMING SYSTEM.** (See arming system.)

**NUCLEAR ASSEMBLY SYSTEM (NAS).** Gun-Assembled (GA) Weapons: the gun barrel, propellant assembly and igniter, nuclear components, initiator, and tamper. IA Weapons: the HE, pit (including nuclear components and internal initiator, if present), nuclear safing system, and detonators, but not fuzing components, firing sets, cables, external initiators, or reservoirs.

**NUCLEAR BOMB.** An item designed to be dropped from an aircraft and to produce a nuclear explosion. It includes all the components of a nuclear warhead, arming and fuzing system, and the complete outer case. It is fitted for or includes nuclear components. (See nuclear weapon (or bomb).)

**NUCLEAR CAPABLE UNIT.** A unit or an activity assigned responsibilities for employing, assembling, maintaining, transporting, or storing WR nuclear weapons, their associated components and ancillary equipment.

**NUCLEAR CARGO.** Nuclear warheads prepared for logistics movement.

**NUCLEAR CLOUD.** An all-inclusive term for the volume of hot gases, smoke, dust, and other particulate matter from the nuclear bomb itself and from its environment, which is carried aloft in conjunction with the rise of the fireball produced by the detonation of the nuclear weapon.

**NUCLEAR COLUMN.** A hollow cylinder of water and spray thrown up from an underwater burst of a nuclear weapon, through which the hot, high-pressure gases formed in the explosion are vented to the atmosphere. A somewhat similar column of dirt is formed in an underground explosion. (See base surge; crater; crown; plume.)

**NUCLEAR COMPONENTS.** Weapon components composed of fissionable or fusionable materials that contribute substantially to nuclear energy released during detonation.

**NUCLEAR COMPONENT SHIPPING AND STORAGE CONTAINER.** A reusable noncollapsible item of any configuration so designed as to provide protection for a specific item(s) to be enclosed against impact, vibration, climatic conditions, and the like, during handling, shipment and storage. It has integral fastening or shock absorbing media and it may be capable of being pressurized or hermetically sealed. The item may include a compartment(s) for component parts and accessories which are of a supplementary nature to the item which it accommodates. It is usually equipped with attachments for handling by a hoist, forklift truck, or by skidding.

**NUCLEAR COORDINATION.** A broad term encompassing all the actions involved with planning nuclear strikes, including liaison between commanders, for the purpose of satisfying support requirements or because of the extension of weapons effects into the territory of another.

**NUCLEAR COUNTERMEASURE.** A nuclear environment generated to prevent a system from accomplishing its designated mission.

**NUCLEAR DAMAGE (LAND WARFARE).**

**a.** **LIGHT DAMAGE**. Damage which does not preclude or prevent the immediate use of an item or equipment for its intended purpose. Some repair required to make full use of the item or equipment. Authorization for repair of light damage may be required.

**b.** **MODERATE DAMAGE**. Damage which prevents use of the item or equipment for its intended purpose and requires extensive repairs before it can be used again for its intended purpose.

**c.** **SIGNIFICANT DAMAGE**. Damage which prevents use of equipment permanently or requires complete reconstruction of the item before it can be used again for its intended purpose.

**NUCLEAR DAMAGE ASSESSMENT.** The determination of the damage effect to the population, forces, and resources resulting from actual nuclear attack. It is performed during and after an attack. The operational significance of the damage is not evaluated in this assessment.

**NUCLEAR DEFENSE.** The methods, plans, and procedures involved in establishing and exercising defensive measures against the effects of an attack by nuclear weapons or radiological warfare agents. It encompasses both the training for, and the implementation of, these methods, plans, and procedures. (See radiological defense.)

**NUCLEAR DEFICIENCY.** (See nuclear weapon deficiency.)

**NUCLEAR DETONATION.** A nuclear explosion resulting from fission or fusion reactions in nuclear materials, such as that from a nuclear weapon.

**NUCLEAR DETONATION DETECTION AND REPORTING SYSTEM.** A system deployed to provide surveillance coverage of critical friendly target areas, and indicate place, height of burst, yield, and ground zero of nuclear detonations. (See bomb alarm system.)

**NUCLEAR DEVICE.** Nuclear fission (or fission and fusion), together with the arming, fuzing, firing, chemical explosive, canister, and diagnostic measurement equipment, that have not reached the development status of an operational nuclear weapon.

**NUCLEAR DIRECTED ENERGY WEAPON (NDEW).** Weapon systems in which a portion of the energy produced by a nuclear explosion is converted into a different form or energy spectrum which is preferentially directed. An example is the nuclear driven X-ray laser.

**NUCLEAR DUD.** A nuclear weapon which, when launched at or emplaced on a target, fails to provide any explosion of that part of the weapon designed to produce the nuclear yield.

**NUCLEAR EFFICIENCY.** The ratio (expressed as a percentage) of the number of atoms that fission or fusion to the total number of atoms originally present in the nuclear material in a nuclear weapon.

**NUCLEAR ENERGY.** All forms of energy released in the course of a nuclear fission or nuclear transformation.

**NUCLEAR ENVIRONMENT.** The environment resulting from a nuclear weapon detonation. (See free-field environment; lethal nuclear environment; nuclear system.)

**NUCLEAR EXOATMOSPHERIC BURST.** The explosion of a nuclear weapon above the sensible atmosphere (above 120 kilometers) where atmospheric interaction is minimal. (See nuclear accident.)

**NUCLEAR EXPLOSIVE.** Any assembly containing fissionable and/or fusionable materials and main charge HE parts capable of producing a nuclear detonation.

**NOTE**

Examples of assemblies which may qualify as NELAs are: weapon types, JTAs, flight test units (FTUs), laboratory test units (LTUs), development test units, parachute test vehicles, drop test units, and laboratory nonnuclear test devices.

**NUCLEAR EXPLOSIVE-LIKE ASSEMBLY (NELA).** An assembly which represents a nuclear explosive in its basic configuration (main charge and pit) and any subsequent level of assembly up to its final configuration, or which represents a weaponized nuclear explosive such as a warhead, bomb, reentry vehicle, or artillery shell. A NELA in any configuration does not contain an arrangement of high explosive and fissile material capable of producing a nuclear detonation.

**a.** To qualify as a NELA in the basic nuclear explosive configuration, the assembly must:

**(1)** Resemble the main charge and pit configuration to the degree that it can be mistaken for a nuclear explosive, and

**(2)** Possess two or more physical properties of a nuclear explosive, (a) shape and size, (b) mass, (c) moment of inertia.

**b.** To qualify as a NELA in the weaponized nuclear explosive configuration, the assembly must:

**(1)** Resemble a weapon configuration to the degree that it can be mistaken for a weaponized nuclear explosive, and

**(2)** Possess two or more physical properties of a weaponized nuclear explosive, (a) shape and size, (b) mass, (c) moment of inertia.

**NUCLEAR FISSION.** (See fission.)

**NUCLEAR FRATRICIDE.** Disablement of a friendly weapon(s) system resulting from a nuclear environment generated by friendly weapons.

**NUCLEAR FUSION.** (See fusion.)

**NUCLEAR GEOMETRY.** The configuration of the nuclear material in a nuclear weapon.

**NUCLEAR-HARDENING CRITERIA.** A quantitative description of the nuclear environment where components and systems are required to survive.

**NUCLEAR INCIDENT.** An unexpected event involving a nuclear weapon, facility, or component, resulting in any of the following, but not constituting a nuclear weapon(s) accident:

**a.** An increase in the possibility of explosion or radioactive contamination.

**b.** Errors committed in the assembly, testing, loading, or transportation of equipment, and/or the malfunctioning of equipment and materiel which could lead to an unintentional operation of all or part of the weapon arming and/or firing sequence, or which could lead to a substantial change in yield, or increased dud probability.

**c.** Any act of God, unfavorable environment, or condition resulting in damage to the weapon, facility, or component. (See bent spear.)

**NUCLEAR INVENTORY MANAGEMENT AND CATALOGING SYSTEM (NIMACS).** The NIMACS is a classified DoD database that stores logistics data or NUOR items of supply.

**NUCLEAR MATERIEL VERIFICATION.** A final assembly inspection must be made by gamma spectrometry on all assemblies, except WR, before shipment from the PA. The inspection may be made at any time after basic weapon configuration has been achieved up to immediately prior to shipment. The purpose of this inspection is to verify the presence or absence of nuclear material. The permanent marking must agree with this verification. This requirement applies to weapon types, joint test assemblies, and development test units shipped by a DOE plant. A gamma spectrometry inspection will be performed on all assemblies, except WR, received by a PA. The PA shall retain records by date and serial number indicating the presence or absence of nuclear material.

**NUCLEAR ORDNANCE ACTIVITY (NOA).** DTRACA and two military services cataloging activities responsible for control and maintenance of NUOR items.

**NUCLEAR ORDNANCE AIR FORCE MATERIEL (NOAM).** Items procured by the Air Force and which are peculiar by application or original design to the Air Force nuclear weapons program.

**NUCLEAR ORDNANCE CATALOGING OFFICE (NOCO).** The cataloging activity within DTRA acts as the agent of the DLIS for all NUOR items. The NOCO maintains the official database of all NUOR items at DTRA and is the activity authorized to submit NUOR data to DLIS. The NOCO is the sole activity authorized to disseminate data on NUOR items.

**NUCLEAR ORDNANCE CONTROLLED MANAGEMENT (NOCM).** Base or Military Spares used on or with any nuclear weapons, which must be specifically controlled because of design, security, or quality control requirements.

**NUCLEAR ORDNANCE CONTROL ACTIVITY (NOCA).** An activity within each Service which has been designated as the organization within that Service to act as the sponsor of a NATO country or FG when requesting NUOR cataloging data.

**NUCLEAR ORDNANCE (NUOR) ITEMS.** All items used on or with nuclear weapons which must be specifically controlled because of design, security, or quality control requirements. These include “DOE special design items,” “DOE controlled commercial items,” “Military Service special design items,” and “Military Service controlled commercial items.” (See base spares; military spares; special equipment.)

**a.** **DOE SPECIAL DESIGN ITEMS**. End items, assemblies, components and parts (including testing and handling equipment) designed or manufactured by DOE or design controlled by DOE for use specifically in the nuclear ordnance field. These items are available only from the DOE through DTRA and may be categorized as “war reserve quality,” “training quality,” or “single quality.” They may be security classified or nonsecurity classified and may be commodity classified in federal supply group (FSG) 11.

**b.** **DOE CONTROLLED COMMERCIAL ITEMS**. End items, assemblies, components and parts (including testing and handling equipment), which are standard commercial items used on or with nuclear weapons but which due to the nuclear weapons reliability concept, require special testing or DOE control for quality assurance. These items are available only from the DOE through DTRA and are all of “WR quality” or “single quality.” They may be security classified or nonsecurity classified and may be commodity classified in FSG 11. (See Sandia apparatus (SA).)

**c.** **MILITARY SERVICE SPECIAL DESIGN ITEMS**. End items, assemblies, components and parts (including testing and handling equipment), designed or manufactured by a Military Service, or design controlled by a Military Service, for use specifically in the nuclear ordnance field. The items or the data for the items are available only from the design controlling military activity; they may be categorized as “WR quality,” “training quality,” or “single quality.” They may be security classified or nonsecurity classified and may be commodity classified in FSG 11.

**d. MILITARY SERVICE CONTROLLED COMMERCIAL ITEMS**. End items, assemblies, components and parts (including testing and handling equipment), which due to the nuclear weapons reliability concept, require special testing or control for quality assurance. The items or the data for the items are available only from the design controlling military activity; they may be categorized as "WR quality" or "single quality." They are not security classified and are not commodity classified in FSG 11.

**NUCLEAR ORDNANCE SHIPPING SCHEDULE (NOSS).** An Air Force monthly forecast of logistic movements of nuclear and nuclear-related cargo.

**NUCLEAR ORDNANCE WAR RESERVE (NOWR) MATERIEL.** Items procured by the DOE and furnished to the Air Force in support of weapons owned by DOE and deployed to the custody of the Air Force.

**NUCLEAR PILOT PRODUCTION (NPP).** The quantity of WR quality products required to support a LLNL engineering evaluation. Some or all of the products may be expended during evaluation while the remainder will be assigned to support the directive schedule given an approved qualification evaluation release (QER). These parts will be submitted to the DOE nuclear QAIA for acceptance.

**NUCLEAR PROXIMITY-SURFACE BURST.** An explosion of a nuclear weapon at a height less than the maximum radius of its fireball, but low enough to facilitate cratering and/or the propagation of a shock wave into the ground.

**NUCLEAR QUALITY ASSURANCE AGENCY (NQAA).** A DOE organization responsible for providing adequate assurance that products designated by the organization as meriting acceptance are of satisfactory quality and in conformance with design intent.

**NUCLEAR RADIATION.** Particulate and electromagnetic radiation emitted from atomic nuclei in various nuclear processes. The important nuclear radiations, from the weapon standpoint, are alpha and beta particles, gamma rays, and neutrons. All nuclear radiations are ionizing radiations, but the reverse is not true; X-rays for example, are included among ionizing radiations, but they are not nuclear radiations since they do not originate from atomic nuclei.

**NUCLEAR RADIATION ENVIRONMENT.** The portion of the nuclear environment that includes photons (gamma rays and X-rays), neutrons, and alpha and beta particles.

**NUCLEAR RADIATION YIELD.** That portion of the total energy of a nuclear explosion which appears as neutrons, and alpha, beta, gamma, and X-ray radiation. This energy is measured in calories or kilotons. (See yield (or energy yield).)

**NUCLEAR-RELATED CARGO.** Nuclear training and test weapons, nonnuclear components of nuclear weapons, limited-life components and equipment associated with the logistic movement of nuclear weapons.

**NUCLEAR SAFETY LINE.** A line selected, if possible, to follow well-defined topographical features and used to delineate levels of protective measures, degrees of damage or risk to friendly troops, and/or to prescribe limits to which the effects of friendly weapons may be permitted to extend.

**NUCLEAR SAFETY RULES.** Procedural safeguards for nuclear weapon systems that are derived from safety studies or operational safety reviews, are developed and processed under DoD Directive 3150.02, 31 March 2015, and are approved by the Secretary of Defense.

**NUCLEAR SAFETY SURVEY.** The Air Force and Navy conduct evaluations to determine the effectiveness of a command nuclear safety program including the following areas: command emphasis; nuclear safety management; personnel reliability program; command control; safety rules; operations and training; maintenance and materiel; deficiency reporting; disaster preparedness; civil engineering; and security.

**NUCLEAR SAFING.** The prevention of nuclear yield if the high explosive (HE) is accidentally detonated in an implosion-assembled weapon, or the propellant is accidentally ignited in a gun-assembled weapon.

**NUCLEAR SAFING SYSTEM.** (See arming system.)

**NUCLEAR SHOT.** An explosion of a nuclear weapon or nuclear device, in either combat or test; also called an atomic shot. (See shot; events; burst.)

**NUCLEAR SUPPORT.** The use of nuclear weapons against hostile forces in support of friendly air, land, and naval operations.

**NUCLEAR SURETY INSPECTION (NSI).** A technical inspection made to determine an organization's capability to perform technical operations involving nuclear weapons and associated equipment, to provide a safe and secure environment for nuclear weapons, and to provide essential administrative and logistical support in accomplishing its nuclear weapons mission. (See Navy technical proficiency inspection (NTPI).)

**NUCLEAR SURFACE BURST.** An explosion of a nuclear weapon at the surface of land or water; or above the surface, at a height less than the maximum radius of the fireball. (See nuclear airburst; nuclear underwater burst; nuclear underground burst.)

**NUCLEAR SURVIVABILITY.** (See survivability (nuclear).)

**NUCLEAR SURVIVABILITY LEVEL.** A quantitive description of the maximum values of nuclear environment parameters which a system can be exposed to without suffering abortive impairment of its ability to accomplish its designated mission.

**NUCLEAR SUSCEPTIBILITY.** The characteristics of a system or a component which will render it unable to perform its design function or mission in a nuclear environment.

**NUCLEAR SYSTEM.** The fissionable or fusionable material in a nuclear weapon, plus related components required to convert the nuclear system from the safe condition to an explosion upon receipt of the proper signal. The fuzing system of the weapon is specifically excluded. (See free-field environment; lethal nuclear environment; nuclear environment.)

**NUCLEAR TEST.**

**a.** DOE TEST

**(1)** ONE POINT SAFETY TEST. A safety test conducted to verify that the detonation of the high explosive of a nuclear weapon by initiation at any one point has a probability of no greater than one in one million of producing a nuclear yield in excess of four pounds of TNT equivalent.

**(2)** PROOF TEST. A test conducted to determine or verify the yield of nuclear weapons or to ascertain the performance of the various weapon components. These weapons are those that are already in the stockpile or are candidates for stockpiling.

**(3)** WEAPON DEVELOPMENT TEST. A test that is basically a physics experiment. It is conducted to verify new theories and techniques associated with a particular device and to obtain a deeper insight into nuclear weapon design phenomenology.

**b.** DOD TEST

**(1)** NUCLEAR WEAPON EFFECTS TEST (NWET). A test conducted to determine:

**(a)** The effects of nuclear detonations upon environments, materials, equipment, structures, and personnel or,

**(b)** The effects of environments on nuclear weapons or detonations.

**(2)** OPERATIONAL SYSTEMS TEST. A test conducted to check the functioning of a military system in the system's own nuclear environment in which it is designed to operate. The objectives are to establish confidence in the system and to provide information for development of tactics and doctrine associated with the system.

**NUCLEAR TEST DEVICE.** Any device intended to release nuclear energy designed for use as, or for development of, a weapon; may range in completeness from a rudimentary proof-of-principle test assembly to a fully weaponized version.

**NUCLEAR THREAT.** An enemy capability through use of nuclear weapons to prevent a friendly system from accomplishing its designated mission. It is frequently described in terms of a specific weapon, or as a spectrum of weapons with associated yield and CEP.

**NUCLEAR UNDERGROUND BURST.** The explosion of a nuclear weapon in which the center of the detonation lies at a point beneath the surface of the ground. (See nuclear airburst; nuclear surface burst; nuclear underwater burst.)

**NUCLEAR UNDERWATER BURST.** The explosion of a nuclear weapon in which the center of the detonation lies at a point beneath the surface of the water. (See nuclear airburst; nuclear surface burst; nuclear underground burst.)

**NUCLEAR VULNERABILITY.** The inability of a system to withstand a nuclear environment caused by enemy or friendly action and continue to perform acceptably and to accomplish its designated mission. It is arrived at by knowledge of the components or system nuclear susceptibility in a defined nuclear environment. (See vulnerability (nuclear)).

**NUCLEAR WARHEAD.** An item which normally consists of the explosive system, the nuclear system, and electrical circuitry. It is usually designed to be mounted in a missile or projectile. (See nuclear weapon (or bomb))

**NUCLEAR WARNING MESSAGE.** A warning message which must be disseminated to all affected friendly forces anytime a nuclear weapon is to be detonated if effects of the weapon will have impact upon those forces.

**NUCLEAR WASTE.** The radioactive by-products formed by fission and other nuclear processes in a reactor. It is separated from irradiated fuel in a processing plant. It may also be waste from radioisotope production and use.

**NUCLEAR WEAPON (OR BOMB).** A general name given to any weapon in which the explosion results from the energy released by reactions involving atomic nuclei, either fission or fusion or both. Thus, the A- (or atomic) bomb and the H- (hydrogen) bomb are both nuclear weapons. It would be equally true to call them atomic weapons, since it is the energy of atomic nuclei that is involved in each case. However, it has become more-or-less customary, although it is not strictly accurate, to refer to weapons in which all the energy results from fission as A-bombs or atomic bombs. In order to make a distinction, those weapons in which part, at least, of the energy results from thermonuclear (fusion) reactions of the isotopes of hydrogen have been called H-bombs or hydrogen bombs.

**a.** **ATOMIC ENERGY ACT OF 1954**. An “atomic weapon” is any device utilizing atomic energy, exclusive of the means for transporting or propelling the device (where such means is a separable and divisible part of the device), the principal purpose of which is for use as, or for development of, a weapon, a weapon prototype, or a weapon test device.

**b.** **DESIGNATED (SPECIFIED)**. A nuclear weapon identified by warhead (W), mark (Mk), or bomb (B) number (e.g., B61, W80) or by nomenclature, capabilities, delivery system, or components unique to the system, including MC numbers, 6-digit part numbers, or TP line item numbers.

**c.** **GUN ASSEMBLED.** One in which subcritical nuclear components are rapidly assembled, usually by a propellant, to form an uncompressed supercritical mass.

**d.** **IMPLOSION-ASSEMBLED**. One in which a subcritical mass of fissile material is rapidly compressed to super criticality by a high explosive (HE) implosion.

**e.** **PHYSICAL CHARACTERISTICS**. The dimensions, weight, and external configuration or appearance of a weapon; included are mass characteristics, center of gravity, and moments of inertia.

**f.** **PURE FUSION WEAPON OR DEVICE**. One that produces a thermonuclear detonation without the need for fission energy.

**g.** **STAGED.** One in which energy from its primary initiates the explosion of a secondary.

**h.** **TAILORED OUTPUT**. One designated so that selected output - thermal, blast, gamma, neutron, or x-ray is enhanced or suppressed.

**i.** **THERMONUCLEAR (TN).** One that releases a significant fraction of its yield from the fusion process.

**j.** **UNDESIGNATED (UNSPECIFIED)**. Nuclear weapons in general, or one or more weapons not identifiable by specific warhead (W), Mark (MK), or bomb (B), numbers or by unique nomenclature, capabilities, components, delivery systems, or identifiers (including MC numbers), 6-digit part numbers, or TP line item numbers.

**NUCLEAR WEAPON(S) ACCIDENT.** An unexpected event involving nuclear weapons or radiological nuclear weapon components that results in any of the following:

**a.** Accidental or unauthorized launching, firing, or use by United States Forces or United States supported allied forces, of a nuclear-capable weapon system which could create the risk of an outbreak of war;

**b.** Nuclear detonation;

**c.** Nonnuclear detonation or burning of a nuclear weapon or radiological nuclear weapon component;

**d.** Radioactive contamination;

**e.** Seizure, theft, loss, or destruction of a nuclear weapon or radiological nuclear weapon component, including jettisoning;

**f.** Public hazard, actual or implied.

**NUCLEAR WEAPON ASSOCIATED MATERIEL (NWAM).** Tooling, gauges, fixtures, handling gear, DOE certified containers (H-gear number containers used for the storage and transportation with 6 digit DOE part numbers), and test equipment intended for use in nuclear weapon production development, production engineering, deployment, surveillance, or dismantlement. Also includes TYPE weapons, JTAs, NELAs and specification-defined supplies that come in direct contact with the above.

**NUCLEAR WEAPON COMPONENT.** Any DOE or DoD designed component that is a part of the ultimate user (UU) package.

**NUCLEAR WEAPON DEFICIENCY.** A situation or condition which degrades or could degrade nuclear safety but is not serious enough to be a nuclear weapon accident or nuclear weapon incident. (See dull sword.)

**NUCLEAR WEAPON EFFECTS RESEARCH (NWER).** Theoretical and laboratory research designed to obtain the effects of nuclear weapons on an interaction with various environments, materials, and systems by simulation, development of models, and correlation of actual tests with theory and laboratory experiments.

**NUCLEAR WEAPON EFFECTS TEST (NWET).** A test conducted to measure the response of objects to the energy output of a weapon.

**NUCLEAR WEAPON EXERCISE.** An operation not directly related to immediate operational readiness. It includes removal of a weapon from its normal storage location, preparing for use, delivery to an employment unit, and the movement in a ground training exercise to include loading aboard an aircraft or missile and return to storage. It may include any or all of the operations listed above, but does not include launching or flying operations. Typical exercises include aircraft generation exercises, ground readiness exercises, ground tactical exercises, and various categories of inspections designed to evaluate the capability of the unit to perform its prescribed mission. (See immediate operational readiness; nuclear weapon maneuver.)

**NUCLEAR WEAPON EXPERIMENTAL MATERIEL (NWEM).** Hardware or devices and any special tooling, gauges, or fixtures intended for use in experiments for verification during nuclear weapon development and engineering.

**NUCLEAR WEAPON MANEUVER.** An operation not directly related to immediate operational readiness. It may consist of all those operations listed for a nuclear weapon exercise and is extended to include flyaway in combat aircraft, but does not include expenditure of the weapon. Typical maneuvers include nuclear operational readiness maneuvers and tactical air operations. (See immediate operational readiness; nuclear weapon exercise.)

**NUCLEAR WEAPON MOVEMENT .** The phase of a transport operation in which a nuclear weapon is physically conveyed from one location to another location.

**NUCLEAR WEAPON-RELATED MATERIEL (NWRM) (DOE).** Tooling, gages, fixtures, handling gear, and test equipment intended for use in nuclear weapon development, engineering, production, surveillance, or dismantlement. Also includes TYPE weapons.

**NUCLEAR WEAPON SUBSYSTEM (NWSS).** The configuration of DOE and Service developed systems and components addressed by the nuclear weapon subsystem test plan (NWSSTP) for the specific weapon system. (See nuclear weapon subsystem test plan (NWSSTP).)

**NUCLEAR WEAPON SUBSYSTEM TEST PLAN (NWSSTP).** A jointly coordinated DOE-DoD plan that identifies and describes the DOE and Service post-development test activities which support reliability assessment of each nuclear weapon subsystem throughout its stockpile life; and which provides for an evaluation of the test activities' contributions to the overall reliability picture. (See nuclear weapon subsystem (NWSS).)

**NUCLEAR WEAPON SUBSYSTEM TEST PLAN GROUP (NWSSTPG).** A group comprised of DOE, cognizant Service, and DTRA personnel which prepares the NWSSTP, and evaluates the test activities' contributions to the overall reliability picture.

**NUCLEAR WEAPON SURETY.** Materiel, personnel, and procedures that contribute to the security, safety, and reliability of nuclear weapons and to the assurance that there will be no nuclear weapon accidents, incidents, unauthorized weapon detonations, or degradation in performance at the target.

**NUCLEAR WEAPON SYSTEM.** A nuclear weapon and the means to deliver it to its target, with associated support equipment, facilities, procedures, personnel, and any vehicles peculiar to the system used for nuclear weapon transport.

**NUCLEAR WEAPON SYSTEM SURETY GROUP (NWSSG).** This group conducts the Pre-Operational Safety Study, ISS, PSS, INSS, POSS, SSS and OSR which examines safety procedures for new or modified nuclear weapons systems and aspects of the concept of operations that affect the safety to determine if DoD nuclear weapon system surety standards are met. The group proposes new weapon system safety rules and recommends changes to existing weapon system safety rules to maximize system surety consistent with operational requirements.

**NUCLEAR WEAPONS ACCEPTANCE INSPECTION (NWAI).** A Navy inspection of:

**a.** A prospective nuclear capable unit,

**b.** A unit assigned a new capability, or

**c.** A unit previously decertified. This inspection is conducted by Navy inspectors to determine a unit's readiness to perform those technical, administrative, and logistical procedures directly related to nuclear weapons. Successful completion is a prerequisite to handling weapons.

**NUCLEAR WEAPONS COUNCIL (NWC).** A high-level joint DoD-DOE council, established by Public Law 99-661 and Section 179 of Title 10 of the U.S. Code, with specific responsibilities for national-level stockpile management, including preparing the annual Nuclear Weapons Stockpile Memorandum to the President, developing stockpile options and costs, and coordinating programming and budget matters between the DoD and the DOE for nuclear weapons programs.

**NUCLEAR WEAPONS EFFECTS.** Effects associated with the explosion of a nuclear weapon, including blast, heat, x-rays, prompt nuclear radiation, and electro-magnetic pulse.

**NUCLEAR WEAPONS EN ROUTE.** Those weapons which have been reported as being in shipment from one location to another. The weapons remain en route until the gaining organization reports that the weapons have been received.

**NUCLEAR WEAPONS MATERIEL (NWM).** Comprises all materiel used in connection with nuclear weapons. This materiel consists of nuclear ordnance items, commercial items, and standard Service items. (See commercial items; standard service item.)

**NUCLEAR WEAPONS-RELATED MATERIEL (NWRM) (OSD DEFINITION).** Classified or unclassified assemblies and subassemblies (containing no fissionable or fusionable material) identified by the Military Departments that comprise or could comprise a standardized war reserve nuclear weapon (including equivalent training devices) as it would exist once separated/removed from its intended delivery vehicle. A delivery vehicle is the portion of a weapon system that delivers a nuclear weapon to its target. This includes cruise and ballistic missile airframes as well as delivery aircraft.

**NUCLEAR WEAPONS STOCKPILE MEMORANDUM (NWSM).** A document sent annually to the President to obtain approval on the proposed Nuclear Weapons Stockpile Plan.

**NUCLEAR WEAPONS STOCKPILE PLAN (NWSP).** A table of quantities of warheads approved by the President and programmed to be in the stockpile, by warhead type and by year, for a six-year period.

**NUCLEAR WEAPONS STORAGE LOCATION.** The geographical or shipboard location of those custodial or reporting units that have nuclear weapons responsibilities. Storage locations are listed in CJCS Instruction 3150.04.

**NUCLEAR WEAPONS TECHNICAL INSPECTION (NWTI).** A Service inspection of a nuclear-capable unit conducted to examine nuclear weapons technical assembly, maintenance, storage functions, logistic movement, handling, and safety and security directly associated with these functions. The NWTI is encompassed with the following inspections:

**a.** Oversight conducted by DTRA.

**b.** NTPI and NWAI conducted by the Navy.

**c.** NSI and INSI conducted by the Air Force, Joint Nuclear Surety Inspection (JNSI) conducted by the Service inspection teams.

(See Defense Nuclear Surety Inspection (DNSI); nuclear surety inspection (NSI); Navy technical proficiency inspection (NTPI); nuclear weapons acceptance inspection (NWAI).)

**NUCLEAR WEAPONS TECHNICAL MANUAL (NWTM).** NWTMs are DOE and DTRA Technical Publications (TPs), Army Technical Manuals (TMs) Navy Special Weapons Ordnance Publications (SWOPs), and Air Force Technical Orders (T.O.s) included in JNWPS. The usage of NWTM refers to all of these publications.

**NUCLEAR YIELDS.** The energy released in the detonation of a nuclear weapon, measured in terms of the kilotons or megatons of TNT required to produce the same energy release. Yields are categorized as:

**VERY LOW.** Less than 1 kiloton.

**LOW.** 1 kiloton to 10 kilotons.

**MEDIUM.** Over 10 kilotons to 50 kilotons.

**HIGH.** Over 50 kilotons to 500 kilotons.

**VERY HIGH.** Over 500 kilotons. (See kiloton weapon; nominal weapon; subkiloton weapon.)

**NUCLEUS (OR ATOMIC NUCLEUS).** The small, central, positively charged region of an atom which carries essentially all the mass. Except for the nucleus of ordinary (light) hydrogen, which is a single proton, all atomic nuclei contain both protons and neutrons. The number of protons determines the total positive charge, or atomic number, this is the same for all the atomic nuclei of a given chemical element. The total number of neutrons and protons, called a mass number, is closely related to the mass (or weight) of the atom. The nuclei of isotopes of a given element contain the same number of protons, but different numbers of neutrons. They thus have the same atomic number, and so are the same element, but they have different mass numbers (and masses).The nuclear properties (e.g., radioactivity, fission, neutron capture, etc.) of an isotope of a given element are determined by both the number of neutrons and the number of protons. (See atom, element, isotopes, neutron, proton.)

**NUCLIDE.** An atomic species distinguished by the composition of its nucleus (i.e., by the number of protons and the number of neutrons). In isomeric nuclides the nuclei have the same composition but are in a different energy state. (See atom, neutron, proton.)

# O

**OBLITERATION.** Removing or defacing the permanent marking on a nuclear explosive or nuclear explosive-like assembly, when the marking is no longer valid. Authentication of the obliteration is accomplished by the use of a DOE-controlled die stamp or template of a unique pattern to show that obliteration of a permanent marking is authorized.

**OBSOLETE.** Materiel or specifications which are no longer suitable, and which are no longer in use.

**OFF-SCHEDULE REQUIREMENTS.** Those materiel requirements, not included in schedule requirements (equipment requirements schedule and NNSA directive schedule), which are submitted to a production organization as the need arises.

**OFFSET DISTANCE (NUCLEAR).** The distance the desired ground zero or actual ground zero is offset from the center of an area target or from a point target.

**ON-CALL TARGET (NUCLEAR).** A planned nuclear target other than a scheduled nuclear target for which a need can be anticipated but which will be delivered upon request rather than at a specific time. Coordination and warning of friendly troops and aircraft are mandatory.

**ONE-POINT DETONATION.** A detonation of HE which is initiated as a single point. This type of detonation may be intentionally initiated in certain self-destruct systems.

**ONE-POINT SAFE.** A nuclear weapon is one-point safe if, when the HE is initiated and detonated at any single point, the probability of producing a nuclear yield exceeding 4 pounds of TNT equivalent is less than 1 in $10^6$.

**ONE-SHOT BATTERY.** (See thermal battery.)

**OPACITY.** A measure of the frequency-integrated effect of the interaction between radiation and matter, usually expressed as a function of a material’s temperature and density.

**OPEN STORAGE.** Weapons stored in the open or in above ground non-earth-covered structures that do not meet the requirements for an earth-covered igloo or underground structure.

**OPERATIONAL AVAILABILITY DATE (OAD).** The date on which a specified number of the first WR weapons in a specific weapon project becomes available for immediate operational use or stockpile.

**OPERATIONAL EMPLOYMENT TEST (OET).** Test applied to aircraft nuclear weapons subsystems and conducted to obtain data to enhance operational capability and use of existing forces, develop the most effective tactics, techniques and procedures, and provide training in the use of existing forces and equipment.

**OPERATIONAL ENVIRONMENT (NUCLEAR).** When operational codes are contained within the PAL equipment.

**OPERATIONAL PERMISSIVE ACTION LINK (PAL) CODE/COMBINATION.** A split-knowledge or no-knowledge numerical code/combination or alphabetical code derived from effective PAL/coded switch (CS) cipher material and used to unlock or allow arming of WR nuclear weapons. Such codes/combinations are used within a unified or specified command in operationally deployed weapons.

**OPERATIONAL PRESSURE.** The equilibrium pressure in a transfer system.

**OPERATIONAL SAFETY REVIEW (OSR).** A nuclear safety study that is conducted to reexamine the following:

**a.** Adequacy and suitability of the safety features in nuclear weapon system safety design;

**b.** Procedures affecting nuclear safety throughout the stockpile-to-target sequence; and

**c.** Adequacy of the safety rules.

**OPERATIONAL STATUS.** The status of a weapon system as being ready to discharge its prime function.

**OPERATIONAL STORAGE SITE (OSS).** A Service storage facility located within the CONUS and specifically designated by the Services to provide for storage and maintenance of allocated undeployed nuclear weapons and/or JCS allocated weapons.

**OPERATIONAL TRANSPORT.** The movement of nuclear weapons and nuclear weapon systems primarily associated with employment, employment preparation and maintenance activities conducted by the responsible DoD organization. Operational transport includes, but is not limited to:

**a.** Aircraft generation.

**b.** Missile generation (movements from operational bases to missile silos).

**c.** Force generation exercises.

**d.** Ballistic missile submarine deployments.

**e.** Movements between operational bases and forward-deployed sites.

**OPTIMUM AIMING POINT.** The point on the ground which provides the highest probability of damage to a target complex. It is selected as recommended ground zero.

**OPTIMUM DEPTH OF BURST (OR BURIAL).** That depth which produces, under prevailing condition, the most favorable combination of crater dimensions for accomplishing the purpose of the intended crater.

**OPTIMUM HEIGHT OF BURST.** For nuclear weapons and for a particular target (or area), the height at which it is estimated a weapon of a specified energy yield will produce a certain desired effect over the maximum possible area.

**ORALLOY.** Uranium metal enriched in the isotope U235. When no specific enrichment is mentioned, it usually means uranium enriched to a nominal 93.5 percent weight.

**ORDNANCE IGLOO.** (See storage structure.)

**OTHER MAJOR ASSEMBLIES (OMAS).** OMAs are items similar to war reserve (WR) weapons in physical characteristics, but are used for training, testing, and evaluation purposes. These items may or may not contain Source and Special (SS) nuclear material or reportable LLCs, which is accounted for by the DOE and DoD IAW TP 100-4.

**OUTPUT SWITCH.** Performs the function of completing or interrupting the weapon arming circuits in response to a signal.

**OVERINITIATION.** A condition in a nuclear warhead which may occur during or immediately after exposure to a neutron fluence, such as that resulting from a nearby nuclear detonation. This is the phenomenon wherein there is an excess of neutrons present

in the fissile material at the time first criticality is achieved, which will result in disassembly before the required degree of super criticality is attained by the implosion. The result of overinitiation is a reduction in the nuclear yield, the degree of which is dependent upon the fission density in the nuclear material at the time of the intended detonation.

**OVERLAND PALLETIZED UNIT SHIPPER (OPUS).** OPUS is a system to ship all vertical and horizontal warhead shipping containers containing WR weapons, JTAs, and TYPE weapons. Materiel is loaded into the OPUS Overpack and then loaded onto rollerized track SGTs and locked into place for shipment.

**OVERPRESSURE.** The transient pressure, usually expressed in pounds per square inch, exceeding the ambient pressure, manifested in the shock (or blast) wave from an explosion. The variation of the overpressure with time depends on the energy yield of the explosion, the distance from the point of burst, and the medium in which the weapon is detonated. The peak overpressure is the maximum value of the overpressure at a given location and is generally experienced at the instant the shock (or blast) wave reaches that location. (See shock wave.)

**OVERSEAS OPERATIONAL STORAGE SITE (OOSS).** A Service storage facility located outside the Continental United States (OCONUS) and specifically designated by the Service to provide for storage and maintenance of allocated nuclear weapons.

# P

**PAIR PRODUCTION.** The process whereby a gamma-ray (or X-ray) photon, with energy in excess of 1-02 MeV in passing near the nucleus of an atom is converted into a positive electron and a negative electron. As a result, the photon ceases to exist. (See photon.)

**PAL MANAGEMENT CONTROL TEAM (PMCT).** A team composed of four U.S. Military personnel responsible for the management and control of the unified or specified command PAL program. The team will be divided into A and B members. At least one member of each PMCT will be a commissioned or warrant officer. Noncommissioned officers in the grade of E7 and above may participate as one-half of an A or B team as required.

**PARACHUTE DATA CARD.** A form (AFTO Form 94) which indicates the parachute system serial number, the repack date, and other identification information.

**PART NUMBER.** A six-character (alphanumeric) drawing number followed by a two-digit suffix, designating a DOE-designed item.

**PART NUMBER SUFFIX.** The two-digit character string following the six-character drawing number for DOE-designed items. The suffix is normally controlled or changed only by the production agency; other changes are normally reflected either by an ALT number and/or a rework (drop) number.

**PARTIAL STORAGE MONITORING.** A periodic inspection of major assemblies or components for nuclear weapons, consisting mainly of external observation of humidity, temperatures, and visual damage or deterioration during storage. This type of inspection is also conducted prior to and upon completion of a movement. (See storage monitoring.)

**PARTIALLY CONTROLLED ENVIRONMENT.** (See environment.)

**PARTICULATE RADIATION.** Radiation in the form of particles (i.e., neutrons, electrons, alpha particles, beta particles) as opposed to electromagnetic radiation.

**PARTICIPATING ACTIVITY.** The activity designated by its DepSO to represent the DoD component in collaborative standardization effort usually for the purpose of planning within a FSC or area in support of the assigned LSA.

**PARTITION OF ENERGY.** The distribution of the total energy released in the detonation of a nuclear weapon among the various effects mechanisms; e.g., nuclear radiation, thermal radiation, and blast. This distribution is dependent upon the design of the weapon and the medium in which it is fired, and it varies with the time after the instant of detonation. (See yield (or energy yield).)

**PASSIVE PROTECTION FEATURES.** Nonactive design features designed specifically for use control purpose that delay unauthorized nuclear detonation.

**PASSIVE PROTECTION SYSTEM.** In nuclear weapon use control applications, includes mechanical locks, PAL devices and other inert use control features.

**PAYLOAD.** The warhead section in a military missile.

**PENALTY RESPONSE.** Prescribed actions initiated by sensing elements or by command which, to a prescribed degree, prevent the using of the protected element.

**PENETRATION AIDS.** Techniques and/or devices employed by offensive aerospace weapon systems to increase the probability of penetration of enemy defenses.

**PERFORMANCE DECREMENT (PD).** Reduction of efficiency in performance of a required task such as increased reaction time, increased performance time, and increased error rate. (See incapacitation.)

**PERIODIC INSPECTION.** An inspection performed at prescribed intervals to determine the suitability of materiel for return to or retention in stockpile. (See storage monitoring.)

**PERMANENT COMPLETE INCAPACITATION (PCI).** The inability to perform any task as the result of a physical or mental disability which will not subsequently improve. (See incapacitation.)

**PERMANENT MARKING.** A durable method of indicating, normally by metal deformation, on an external area of an assembly whether it is a nuclear explosive or NELA. It permits quick and accurate identification of such configurations. Permanent markings are required for WR weapons, weapon types, JTAs, development test units, and other NELAs.

**PERMISSIBLE DOSE.** (See tolerance dose.)

**PERMISSIVE ACTION LINK (PAL).** A device included in or attached to a nuclear weapon system to preclude arming and/or launching until the insertion of a prescribed discrete code or combination. It may include equipment and cabling external to the weapon or weapon system to activate components within the weapon or weapon system.

**PERMISSIVE ARMING AND PROTECTION SYSTEM (PAPS).** A system which prevents to a high probability the unauthorized detonation of a nuclear weapon by means of enclosing portions of the nuclear system, its associated firing components, the permissive action link (PAL), and protection elements within a protective membrane.

**PERSONNEL RELIABILITY PROGRAM (PRP).** A program aimed at all personnel who control, handle, have access to, or control access to nuclear weapons or nuclear weapons systems. The program covers selection, screening, and continuous evaluation of the personnel assigned to various nuclear duties. The program seeks to ensure that personnel coming under its purview are mentally and emotionally stable and reliable.

**PETA.** The scientific term for $1 \times 10^{15}$ (i.e., 1,000,000,000,000,000).

**PHASE (NUCLEAR).** A DOE-DoD designation accompanied by an Arabic numeral which is used to identify and authorize the various activities undertaken in a weapon project. There are seven phases occurring in chronological order; however, some phases may merge with another, and in some cases, by DOE and DoD agreement, certain phases may be omitted or deferred. Activity during the seven phases is normally as shown below:

**a.** **PHASE 1 (WEAPON CONCEPTION)**. Studies by DOE and DoD, either jointly or independently, which may result in the decision that a weapon concept warrants a formal program study.

**b.** **PHASE 2 (PROGRAM FEASIBILITY STUDY)**. If the results of phase one indicate such is warranted, a joint DOE-DoD phase two feasibility study is conducted, chaired by the appropriate Service. If a development program appears likely, the following will usually be accomplished: DOE-DoD agreement on the division of responsibilities for development and procurement, and preparation of military characteristics for DoD transmission to the DOE.

**c.** **PHASE 2A (JOINT DESIGN DEFINITION AND COST STUDIES)**. After the completion of the phase two report, and before a decision to request a phase three project, the Under Secretary of Defense for Research and Engineering (USDR&E) may also request, through the Nuclear Weapons Council, that the DOE join the DoD in forming a Project Officers Group (POG) to conduct a phase 2A study. The DoD request shall include a Military Department to provide the lead project officer and shall include a projected date for the beginning of a phase three project, a projected initial operation capability, and a proposed production schedule. The DoD phase 2A request shall ask that the DOE identify information on costs, production schedules, options, and trade offs, including those involving safety, security, survivability, and control features for the weapon system.

**d.** **PHASE 3 (DEVELOPMENT ENGINEERING)**. Development program, based upon required military characteristics, is undertaken and culminates in release of complete design information by the development agencies.

**e.** **PHASE 4 (PRODUCTION ENGINEERING)**. Production agencies proceed with adapting a development design into a manufacturing system. This includes product engineering, process engineering, tooling, prototype procurement and inspection, and test and handling procedures.

**f.** **PHASE 5 (FIRST PRODUCTION)**. Manufacture of the weapon according to product specifications is initiated and quality control and inspection procedures are implemented. This culminates in an authorization which releases materiel for specified uses.

**g.** **PHASE 6 (QUANTITY PRODUCTION AND STOCKPILE).** Production facilities will produce weapons at the level required to meet stockpile needs. Various programs such as inspection and quality assurance are pursued to ensure adherence to specifications. There is continuing appraisal of weapon performance so that technical advances and improvements may be incorporated.

**h.** **PHASE 7 (RETIREMENT)**. In this final phase, a program for the physical elimination from stockpile of a nuclear weapon or major assembly is initiated.

**PHASE-STABILIZED PLUTONIUM.** (See plutonium (PU).)

**PHOTOELECTRIC EFFECT.** The process whereby a gamma-ray (or X-ray) photon, with energy somewhat greater than that of the binding energy of an electron in an atom, transfers all its energy to the electron which is consequently removed from the atom. Since it has lost all its energy, the photon ceases to exist. (See photon.)

**PHOTON.** A unit or "particle" of electromagnetic radiation, carrying a quantum of energy which is characteristic of the particular radiation. If v is the frequency of the radiation in cycles per second and l is the wavelength in centimeters, the energy quantum of the photon in ergs is hv or hc/1, where h is Planck's constant, 6.62 $x10^{-27}$ erg-second and c is the velocity of light (3.00 $x10^{10}$ centimeters per second). For gamma rays, the photon energy is usually expressed in million electron volt (MeV) units (i.e., 1.24 $x10^{-10/l}$ where l is in centimeters or $1.24x10^{-2/l}$ if l is in angstroms).

**PHYSICAL CHARACTERISTICS.**

**PHYSICAL SECURITY.** Part of security concerned with physical measures designed to safeguard personnel; to prevent unauthorized access to equipment; installations, material and documents; and to safeguard them against espionage, sabotage, damage, and theft.

**PIT.** (See PLUTONIUM PIT).

**PLANNED MAINTENANCE SYSTEM (PMS).** Periodic maintenance that has been systematically prearranged. (See maintenance requirement card (MRC).)

**PLANNED TARGET (NUCLEAR).** A nuclear target planned on an area or point in which a need is anticipated. A planned nuclear target may be scheduled or on call. Firing data for a planned nuclear target may or may not be determined in advance.

**PLASTIC RANGE.** The stress range in which a material will not fail when subjected to the action of a force, but will not recover completely, so that a permanent deformation results when the force is removed. Plastic deformation refers to dimensional changes occurring within the plastic range. (SEE elastic range.)

**PLASTIC ZONE.** The region beyond the rupture zone associated with crater formation in which there is no visible rupture but in which the ground is permanently deformed and compressed to a higher density. (See crater, elastic zone, rupture zone.)

**PLUME.** A relatively broad jet or spout of water which disintegrates into a spray as it travels through the air. It always has a dense fluid core. As it falls back into the water, it forms a radioactive pool as well as the base surge. Emission plumes occur in the deep part of the intermediate depth range and in the deep and very deep burst depths. (See base surge; crown; nuclear column.)

**PLUTONIUM (PU).** A heavy, man-made, radioactive metallic element. The most important isotope is plutonium-239, which is the primary isotope in weapons. Plutonium can also be used for reactor fuel. Reactor-grade plutonium produced in a nuclear power reactor, has a high plutonium-240 content, usually in the range of 15-25 percent. Because of its high rate of spontaneous fission, the presence of plutonium-240 increases the change of pre-initiation. Weapons-grade plutonium usually contains 7 percent or less plutonium-240. Commercial applications of plutonium include radionuclide batteries for pacemakers. Plutonium-238 is used for heat and power sources in U.S. satellites. Plutonium is a bone-seeking radiation hazard, and can be lethal depending on the dose and exposure time.

> **PHASE-STABILIZED.** Plutonium that has material added when it is above room temperature so that, upon cooling, it retains the metallic structure normal to the highest temperature.
>
> **REACTOR-GRADE.** Plutonium containing more than 8 percent $Pu^{240}$.
>
> **WEAPON-GRADE.** Plutonium containing 8 percent or less $Pu^{240}$. Nominally 6 percent $Pu^{240}$, 0.5 percent $Pu^{241}$, some $Pu^{238}$, remainder $Pu^{239}$.

**PLUTONIUM-239.** A fissile isotope produced by the neutron capture in uranium-238. It is used in the core of nuclear weapons and can be used for reactor fuel.

**PLUTONIUM DISPERSAL.** The aerosolization and transport of plutonium by a driving force, such as fire, high explosive deflagration, or high explosive detonation.

**PLUTONIUM PIT.** The core element of a nuclear weapon's "primary" or fission component. Pits are made of plutonium-239 and surrounded by some type of casing.

**POINT TARGET (NUCLEAR).** A target in which the ratio of radius of damage to target radius is equal to or greater than five.

**POSITIVE MEASURES.** Design features, safety rules, procedures, or other controls, including physical security and coded systems, used collectively or individually, to reduce the likelihood, severity, or consequences of an accident, unauthorized act, or deliberate threat involving a nuclear weapon or nuclear weapon system.

**POSTMORTEM.** A laboratory analysis of DOE designated material, requested by the DOE, to determine the cause of a reported defect. The results of this analysis will normally be furnished to the DoD.

**POSTSTRIKE DAMAGE ESTIMATION.** A revised target analysis based on new data such as actual weapon yield, burst height, and ground zero obtained by means other than direct assessment.

**POWER SUPPLY.** A group of one or more subassemblies or major components which constitute the basic integral source of electrical energy required for the operation of a nuclear weapon.

**PRACTICE BOMB.** An item which conforms to the configuration of a nuclear bomb. It may be a modification of the bomb or be designed specifically for practice. It is used in training associated with dropping operations. It may contain an explosive. (See ballistic shape; bomb dummy unit (BDU).)

**PREARMED.** The configuration of a weapon system in which arming, launching, firing, or releasing of the weapon will initiate the sequence necessary to produce a nuclear detonation. (See armed (nuclear).)

**PRECAUTIONARY LAUNCH.** The launching of nuclear loaded aircraft under imminent nuclear attack so as to preclude friendly aircraft destruction and loss of weapons on the ground/carrier.

**PRECISION SHIPMENT.** A shipment, funded for by the DOE in freight train service.

**PRECURSOR FRONT.** An air pressure wave which moves ahead of the main blast wave for some distance as a result of a nuclear explosion of appropriate yield and low burst height over a heat-absorbing (or dusty) surface. The pressure at the precursor front increases more gradually than in a true (or ideal) shock wave, so that the behavior in the precursor region is said to be nonideal.

**PREFIRE MONITORING.** Prefire monitoring is a variance of storage monitoring conducted on the completely assembled weapon in the ready condition or in preparation for firing. (See storage monitoring.)

**PREINITIATION.** The initiation of the fission chain reaction in the active material of a nuclear weapon at any time earlier than that at which either the designed or the maximum compression or degree of assembly is attained.

**PRELIMINARY PLANNING SCHEDULE (PPS).** (See schedule.)

**PRE-OPERATIONAL SAFETY STUDY.** Initiated by the Service and conducted by the NWSSG, this study examines safety procedures for refurbished systems, and aspects of the concept of operations that will affect the safety of the nuclear weapon system to determine if the DoD nuclear weapon system surety standards are met. This is the first opportunity to draft weapon system safety rules for a refurbished system. The study focuses principally on the procedural aspects of handling, transporting and storing nuclear weapons.

**PREPARING ACTIVITY.** The DoD activity or the civilian agency responsible for preparation, coordination, issuance, and maintenance of standardization documents.

**PREPLANNED DEPLOYMENT CONFIGURATION.** A modification of existing operational storage configurations to expedite the air shipment of certain weapons in compliance with the pressing operational requirements of a particular deployment plan. Weapon protection and reliability are optimized with a minimum modification to existing weapon configurations.

**PREPLANNED NUCLEAR SUPPORT.** Nuclear support planned in advance of operations.

**PREPRODUCTION MATERIEL.** Items which may be delivered to ultimate users in exceptional cases to fulfill special requirements. It is functionally satisfactory for certain selected uses but it does not necessarily meet interchangeability, environmental, and similar requirements.

**PRESCRIBED NUCLEAR LOAD.** A specified quantity of nuclear weapons to be carried by a delivery unit. The establishment and replenishment of this load after each expenditure is a command decision and is dependent upon the tactical situation, the nuclear logistical situation, and the capability of the unit to transport and utilize the load. It may vary from day to day and among similar delivery units.

**PRESHIPMENT INSPECTION.** An inspection which consists of ensuring the unit has been properly configured and packaged for shipment, and all documentation has been properly prepared, assembled, and secured to the container or unit as required. (See acceptance inspection; receipt inspection; verification inspection.)

**PRESSURE SWITCH.** A switch which is actuated by changes in pressure of any gas or liquid acting upon its sensing element. (See environmental sensing device (ESD); integrating accelerometer.)

**PRESSURE TEST RECORD (PTR).** A form packed with pressurized nuclear weapons major assemblies. The pressure test record (PTR) provides a historical record of significant information pertaining to pressure checks, pressure tests, and pressurization.

**PRIMARY.** A fission device that is the initial source of nuclear energy, coupled to a secondary stage.

**PRIME NUCLEAR AIRLIFT FORCE (PNAF).** The aircraft and aircrews that provide peacetime logistical airlift support for the movement of nuclear weapons or nuclear components.

**PRODUCT ACCEPTANCE SPECIFICATION.** A specification that basically defines acceptance criteria for a product.

**PRIORITY UR.** A UR relating to conditions of safety or security, causing a work stoppage, or being hazardous to the environment.

**PRODUCT.** Includes materials, parts, components, assemblies, subassemblies, and equipment. The term product will also encompass a family of products. A family of products is defined as all products of the same design, construction, material, and type which are produced with the same production facilities, processes, and quality of material, under the same management and quality controls, but having the acceptable variety of physical and functional characteristics defined and specified in the applicable government specification.

**PRODUCT CHANGE PROPOSAL (PCP).** A formal recommendation for changes of the following types:

**a.** All proposed retroactive changes to WR and training weapons, and associated test and handling equipment;

**b.** All in-process changes requiring modification or alteration identification of WR and training weapons materiel; and

**c.** All in-process changes to field test, handling and use control equipment resulting in an alphabetical suffix identification, or complete redesign.

**PRODUCTION PROGRAM DEFINITION.** Five separate DOE documents describing a specific nuclear weapon and its related DOE production and retirement assignments. (See evaluation support document; rebuild support definition; retirement disposal instruction (RDI); weapon program description; weapon program support definition.)

**PRODUCTION WAIVER.** A DOE design agency recommendation and DOE-approved authorization covering the use of materiel which departs from product specifications in a manner that affects functioning, reliability, interchangeability, assembly operations, storage life, completeness of assembly, etc., and imposes a limitation or caution upon the use of storage of the major assembly or ancillary equipment incorporating the materiel. (See nonconforming materiel (NCM); restricted use nonconforming materiel (NCM); unrestricted use nonconforming materiel (NCM).)

**PROGRAM CONTROL DOCUMENT.** A DOE prepared document that implements current production and retirement directives as they relate to a specific weapon, and provides related programming and administrative guidance.

**PROGRAM MANAGEMENT DOCUMENT.** A single controlled DOE source of programming information required by DOE to procure, produce, and deliver material for interproject support, ultimate use, and retirement. The document consists of the production program definition and the program control document.

**PROGRAMMATIC INFORMATION.** All nontechnical information involved in a nuclear weapon program; includes status, planning, scheduling, logistics, administrative and financial data, nomenclature, production quantities, etc.

**PROJECT OFFICERS GROUP (POG).** A group of DOE-DoD personnel assigned to coordinate the development and compatibility assurance of a designated nuclear weapon system and its associated interfaces. POGs are chaired by the cognizant Service.

**PROJECT OFFICERS MEETING (POM).** A formal meeting of a joint DoD-DOE warhead POG to discuss any fiscal, technical or programmatic issue for that warhead category.

**PROJECTILE ASSEMBLY (NUCLEAR).** One of the two internal elements of active material in a nuclear weapon of the gun-type, which together with the target assembly, comprises a core unit. The projectile assembly is stored in a separate carrying case (nuclear) and is designated by three numbers followed by the letters “P-W” or “P-Z.”

**PROLIFERATION (NUCLEAR WEAPONS).** The process by which one nation after another comes into possession of, or into the right to determine the use of nuclear weapons, each potentially able to launch a nuclear attack upon another nation.

**PROMPT RADIATION.** The gamma rays produced in fission and as a result of other neutron reactions and nuclear excitation of the weapon materials appearing within a second or less after a nuclear explosion. The radiations from these sources are known either as prompt or instantaneous gamma rays.
(See Initial Nuclear Radiation; residual radioactivity.)

**PROOF PRESSURE.** Pressure to which vessels are subjected to access structural integrity, in the absence of a time-dependent failure mode.

**PROTECTED PERIOD.** A period of time specified in years, for a given warhead type, during which most or all of the Quality Assurance and Reliability Testing (QART) samples will be rebuilt and returned to the stockpile.

**PROTECTIVE MATERIALS.** Materials that form a barrier between a contaminant and a protected material, or that, by sacrificial or competing chemical reaction, prevent unwanted chemical attack.

**PROTON.** A particle of mass (approximately) unity carrying a unit positive charge; it is identical physically with the nucleus of the ordinary (light) hydrogen atom. All atomic nuclei contain protons. (See nucleus (or atomic nucleus).)

**PROVISIONING.** The process of determining the range and quantity of items (e.g., spares and repair parts, special tools, and DOE-designed special equipment) required to support and maintain an end item of materiel for an initial period of service. It includes the identification of items of supply, the establishing of data for catalog, TPs, and allowance list preparation and the preparation of instructions to assure delivery of the necessary support items with related end items.

**PROVISIONING SCREENING.** An operation within the provisioning process whereby manufacturers' part numbers (P/Ns) are screened against data maintained in the master Federal Catalog Files for purposes of revealing their association with existing National Stock Numbers (NSNs). Provisioning screening also provides for the screening of data files on assets in long supply for materiel utilization purposes.

**PURE FUSION WEAPON OR DEVICE.**

**PUSHER, IMPLOSION.** A component in the form of a hollow shell that surrounds the tamper in an implosion system. Its purpose is to smooth and transmit the shock wave to nuclear components.

# Q

**QUALIFICATION ACCEPTANCE EQUIPMENT RELEASE (QAER).** This document releases the result of a LLNL acceptance equipment evaluation. This evaluation includes observation of all controlled and reviewed gages and production agency procedures used to inspect and certify product. The QAER must be released prior to or simultaneously with the QER. (See engineering release (ER).)

**QUALIFICATION EVALUATION RELEASE (QER).** A release which issues the results of an evaluation of product, processes, or acceptance equipment, and if the evaluation results are satisfactory, authorizes submittal of product to DOE, and delivery or use by the production agency in support of directive schedules. (See engineering release (ER).)

**QUALITY ASSURANCE (QA).** A continuing program of test and evaluation to determine whether weapons materiel is of satisfactory quality, to determine the degree of conformance to design intent, and to determine the status of functional stockpile readiness through the use of periodic inspection reports and other checks.

**QUALITY ASSURANCE AND RELIABILITY TESTING (QART).** A quality assurance program that is part of a joint DoD-DOE stockpile evaluation program. It consists of nonnuclear laboratory and flight tests and nuclear component evaluations essential in detecting problems in components that affect assessments for warhead safety validation and qualified reliability estimates. It consumes a number of warheads from the stockpile each year.

**QUALITY ASSURANCE AND RELIABILITY TESTING (QART) REPLACEMENT.** Warheads retained in the inactive stockpile to replace active stockpile warheads withdrawn for the QART program.

**QUALITY ASSURANCE INSPECTION AGENCY (QAIA).** An operational organization responsible for the determination of product acceptability in accordance with DOE quality assurance criteria.

**QUALITY ASSURANCE INSPECTION PROCEDURES (QAIP).** A standardized DOE document which specifies to the QAIA:

**a.** The weapon material; and

**b.** The criteria for determining whether or not the materiel is nonconforming

**QUALITY ASSURANCE PROCEDURES (QAP).** The basic DOE quality assurance documents that prescribe principles, policies, organizational relationships, and provide instructions for carrying out the quality assurance program.

**QUALITY ASSURANCE SERVICE TEST (QAST) PROGRAM.** A DOE-United States Navy (USN) joint flight test program for Navy-used nuclear weapons.

**QUALITY ASSURANCE TEST INSTRUCTIONS (QATI).** Operating instructions prepared for each application of special quality test equipment specified by QAIPs). The QATI always accompanies the applicable QAIP upon release.

**QUANTITY/DISTANCE (QD) SAFETY STANDARDS.** Directives pertaining to the amount and kinds of explosives that can be stored and the proximity of such storage to buildings, highways, railways, magazines, or other installations.

**QUICK REACTION ALERT (QRA).** The configuration of a nuclear weapon system which enables the force to initiate the accomplishment of its assigned mission in a minimum specified time.

# R

**RADIAC DOSIMETER.** An instrument used to measure the ionizing radiation absorbed by that instrument. (See chemical dosimeter; film badge.)

**RADIANT EXPOSURE.** The total amount of thermal radiation energy received per unit area of exposed surface; it is usually expressed in calories per square centimeter.

**RADIATION.**

- **a.** CAS. An envelope, opaque to X-rays, used to confine radiation in a staged weapon.
- **b.** CHANNEL. Space within the radiation case through which radiation flows and surrounds the secondary.
- **c.** COUPLING. The use of X-rays from a fission primary to transport energy for compressing and imploding a secondary.

**RADIATION ABSORBED DOSE (RAD).** Unit of absorbed dose of radiation. It represents the absorption of 100 ergs of nuclear (or ionizing) radiation per gram of the absorbing material or tissue.

**RADIATION DOSE.** The total amount of ionizing radiation absorbed by material or tissues, expressed in centigrays. The term radiation dose is often used in the sense of the exposure dose expressed in roentgens, which is a measure of the total amount of ionization that the quantity of radiation could produce in air. This could be distinguished from the absorbed dose, also given in rads, which represents the energy absorbed from the radiation per gram of specified body tissue. Further, the biological dose, in rems, is a measure of the biological effectiveness of the radiation exposure.

**RADIATION DOSE RATE.** The radiation dose (dosage) absorbed per unit of time. A radiation dose rate can be set at some particular unit of time (e.g., H + 1 hour) and would be called H + 1 radiation dose rate.

**RADIATION EXCLUSION (RADEX PLOT).** The predicted or observed distribution of radioactivity in the air at a specified altitude or on the Earth's surface.(See air radex.)

**RADIO FREQUENCY, RADIO, OR RADAR BLACKOUT.** Complete disruption of radio frequency (RF) signals over large areas caused by ionization from the radiative output of a high-altitude nuclear explosion.

**RADIOACTIVE CARGO (RAC) SHIPMENT.** RAC flights in DOE contractor operated aircraft.

**RADIOACTIVE CLOUD.** (See nuclear cloud.)

**RADIOACTIVE CONTAMINATION.** Radioactive material that is disbursed in or on objects or places where it is undesirable, and at levels or concentrations that exceed Service directives.

**RADIOACTIVE DECAY.** The process in which a radioactive nucleus emits radiation and changes to a different isotope or element. A number of different particles can be emitted by decay. The most typical are alpha or beta particles.

**RADIOACTIVE MATERIAL.** Any material, or combination of materials, which spontaneously emits ionizing radiation. Materials in which the estimated specific activity is not greater than 0.002 MicroCurie per gram of material, and in which the radioactivity is essentially uniformly distributed are not considered to be radioactive materials.

**RADIOACTIVE OUTPUT.** Forms of radiation emitted almost instantaneously by a nuclear explosion; they include thermal radiation, X-ray, neutrons, and gamma rays.

**RADIOACTIVE WASTE.** Disposable, radioactive materials resulting from nuclear operations. Wastes are generally classified into two categories: high-level waste, that is, having radioactivity concentrations of hundreds to thousands of curies per gallon or cubic foot; and low-level wastes which are in the range of one MicroCurie per gallon or cubic foot.

**RADIOACTIVITY.** The spontaneous emission of radiation, generally alpha or beta particles, often accompanied by gamma rays, from the nuclei of an (unstable) isotope. As a result of this emission the radioactive isotope is converted (or decays) into the isotope of a different (daughter) element which may (or may not) also be radioactive. Ultimately, as a result of one or more stages of radioactive decay, a stable (nonradioactive) end product is formed. (See isotopes.)

**RADIOACTIVITY, DETECTION, INDICATION AND COMPUTATION (RADIAC).** An acronym derived from the words “radioactivity, detection, indication and computation” and used as an all-encompassing term to designate various types of radiological measuring instruments or equipment. (This word is normally used as an adjective.)

**RADIO BLACKOUT.** The complete disruption of radio (or radar) signals over large areas caused by the ionization accompanying a high-altitude nuclear explosion, especially above 40 miles.

**RADIOCHEMICAL DETECTOR.** A usually nonradioactive element (generally a stable isotope) made radioactive by a nuclear explosion and used as a measure of certain output characteristics.

**RADIOCHEMICAL TRACER.** A usually radioactive element (generally long-lived) neither produced nor consumed by the nuclear explosion, used to indicate what fraction of the whole test device is represented by the debris sample.

**RADIOISOTOPE.** A radioactive isotope. (See isotopes, radioactivity.)

**RADIOISOTOPE/RADIOISOTOPIC THERMOELECTRIC GENERATOR (RTG).** A device that converts the energy from radioactive decay to electrical energy. It is used in applications where long life is a requirement.

**RADIOLOGICAL ACCIDENT.** A loss of control over radiation or radioactive material that presents a hazard to life, health, or property or that may result in any member of the general population exceeding exposure limits for ionizing radiation.

**RADIOLOGICAL DEFENSE.** Defensive measures taken against the radiation hazards resulting from the employment of nuclear and radiological weapons. (See nuclear defense.)

**RADIOLOGICAL WARFARE.** The use of radioactive material to deny areas to military and civilian populations.

**RADIONUCLIDE.** A radioactive nuclide (or radioactive atomic species). (See nuclide.)

**RADIUS OF DAMAGE.** The distance from ground zero at which there is a 0.50 probability of achieving the desired damage.

**RADIUS OF INTEGRATION.** The distance from ground zero which indicates the area within which the effects of both the nuclear detonation and conventional weapons are to be integrated.

**RADIUS OF SAFETY.** The horizontal distance from ground zero beyond which the weapon effects on friendly troops are acceptable.

**RAINFALL (NUCLEAR).** The water that is precipitated from the base surge clouds after an underwater burst of a nuclear weapon. This rain is radioactive and presents an important secondary effect of such a burst.

**RAINOUT.** Radioactive material in the atmosphere brought down by precipitation.

**REACTION HISTORY.** The time sequence of the fission or fusion reaction in a weapon, usually measured by the gamma ray and/or neutron flux from the weapon as a function of time.

**REACTIVE MATERIALS.** Materials that undergo a chemical reaction as part of weapon functioning or disablement.

**REACTOR-GRADE PLUTONIUM.** (See plutonium (PU).)

**READINESS DATE.** A date, used for planning purposes as a “target milestone,” when an event should be ready for detonation.

**READINESS EXERCISE.** The process of removing a weapon from its normal storage location, preparing for use, delivering to the employment unit, loading and unloading by the employment unit, and returning to proper storage configuration and storage location, all conducted at one storage location without transfer of custody. At the discretion of the commander of the conducting agency, the exercise may be limited to any sequence of operations less than the total exercise as defined above.

**REBUILD SUPPORT DEFINITION.** One of five DOE documents comprising the DOE Production Program Definition. The Rebuild Support Definition (PPD-C-XX), commonly referred to as the “C” document, is a directive schedule for the production of nuclear and nonnuclear rebuild support material.

**RECEIPT INSPECTION.** An inspection which consists of a visual observation of the container to determine that it has not been damaged in shipment, seals are present, the container has been properly marked, the container markings reflect the item as described in the shipping document, and if applicable, other requirements specified in technical manuals have been met. This inspection may be combined with the verification inspection of the container contents. (See acceptance inspection; preshipment inspection; verification inspection.)

**RECERTIFICATION.** Action taken by specific Navy activities following reject, retrofit, or stockpile evaluation and reliability assessment (SEARA). Program testing of a system or component to verify that the system or component meets applicable reliability, safety, and quality standards and requirements for its intended end use configuration. Recertification can be accomplished on WR and training (TR) material, as well as on test (T) and handling (H) equipment. (See certification.)

**RECODE.** An operation that changes a combination or code previously set into a PAL/CS/positive enable (PE) device so that the PAL/CS/PE device will unlock or enable when the new combination or code is subsequently inserted.

**RECODE EQUIPMENT.** Equipment which stores, transmits, or processes code information.

**RECODER.** A type of controller that is capable of generating the recode message and/or checking stored codes.

**RECOMMENDED ALLOWANCE LIST (RAL).** Navy's support of community's recommendations to Type Commanders, and other approving authorities on the minimum SWOPs required to assure adequate nuclear safety and weapon reliability. Each RAL is formulated by weapon and by level of maintenance therein. RALs appear in SWOP 0-1B.

**RECORD OF ASSEMBLY (ROA).** A historical weapon record maintained by Sandia National Laboratories that reflects currently installed component data. The ROA is based on information provided by the production agencies or by DoD elements through WIRs and includes updates from retrofits and/or reworks throughout a weapon's stockpile lifetime. The ROA is the only complete record available to track installed components for quality programs.

**RECORD OF DISASSEMBLY (ROD).** A record required by, and unique to, the design agency.

**REENTRY BODY (RB).** A term used by the Navy to identify that part of a ballistic missile or other vehicle which reenters the Earth's atmosphere after flight above the sensible atmosphere. When used as a general term by the Navy, it implies that the body contains a warhead and its associated components, and is mission is to ultimately detonate on a predetermined target. (See reentry vehicle (RV).)

**DELTA REENTRY BODY (RB).** An inert, specially instrumented flight test head RB designed to measure accurately the velocity of separation when it is deployed from the missile carrier.

**DEVELOPMENT WARHEAD (DW).** A term used to describe an instrumented RB flown in support of the DOE development of the nonnuclear portions of the RB.

**INERT HEAD (IH).** A Navy-built nonnuclear, non-instrumented RB used for missile flight tests. It is representative of the tactical RB in size; inertial, and aerodynamic characteristics.

**TELEMETRY HEAD (TH).** A Navy-built nonnuclear RB instrumented to obtain data on flight dynamics and component operation during missile flight tests.

**TYPE 2F.** A nonnuclear flight test RB built by DOE and instrumented to telemeter various arming, fuzing, and firing functions and limited flight dynamics information for use in reliability assessment. (See weapon type.)

**REENTRY SYSTEM (RS).** An Air Force and Navy term to identify that portion of a ballistic missile designed to place one or more reentry vehicles or bodies on terminal trajectories so as to arrive at selected targets. Penetration aids, spacers, development modules, and associated programming control and sensing devices are included in the RS.

**REENTRY VEHICLE (RV).** That part of a space vehicle designed to reenter the Earth's atmosphere in the terminal portion of its trajectory. (See maneuverable reentry vehicle (MARV); multiple independently targetable reentry vehicle; reentry body (RB).)

**REENTRY VEHICLE, NUCLEAR.** An Air Force term to identify an item which is a component of a space vehicle, guided missile, projectile, rocket, or the like and which is designed to reenter the Earth's atmosphere. It may include, or form, a portion of the outer case of the weapon of which it is a component. It may include or be designed to include a nuclear warhead, fuzing, arming, and triggering devices. It may include devices for

programming, correlating, sequencing, deployment, survival, target sensing, safing, and vehicle-booster separation. It may have the capability of trajectory attitude and stabilization control. (See warhead (W).)

**REFLECTED SHOCK WAVE.** When a shock wave traveling in a medium strikes the interface between this medium and a denser medium, part of the energy of the shock wave induces a shock wave in the denser medium and the remainder of the energy results in the formation of a reflected shock wave that travels back through the less dense medium.

**REFLECTED PRESSURE.** The total pressure which results instantaneously at the surface when a shock (or blast) wave traveling in one medium strikes another medium (e.g., at the instant when the front of a blast wave in air strikes the ground or structure). If the medium struck (e.g., the ground or a structure) is more dense than that in which the shock wave is traveling (e.g., air) the reflected pressure is positive (compression). If the reverse is true (e.g., when a shock wave in the ground or water strikes the air surface) the reflected pressure is negative (rarefaction or tension).

**REFLECTION FACTOR.** The ratio of the total (reflected) pressure to the incident pressure when a shock (or blast) wave traveling in one medium strikes another.

**REFLECTOR.** A material surrounding a critical system for the purpose of scattering neutrons back into the active material of the core, thus reducing the rate of neutron loss and increasing the fission rate. In nuclear weapons it is called a tamper because it performs the additional function of delaying the expansion of the exploding mass. (See pusher, implosion; tamper.)

**REFURBISHMENT.** Refurbishment refers to all nuclear weapon modifications to address life extension, and other warhead modernization activities due to revised military requirements at the system, subsystem or component level. It encompasses current policy to utilize warhead manufacturing, component reuse, and component replacement. These refurbishments will be assigned a new alteration or modification number for stockpile management purposes.

**REJECT MATERIEL.** Materiel which does not meet specifications for war reserve use. If functional, such materiel may be incorporated into training weapons or used for other purposes. (See D-tested materiel.)

**REKEY.** An operation that replaces the Master key, or the Normal key, or both.

**RELATIVE BIOLOGICAL EFFECTIVENESS (RBE).** RBE is the ratio of the dose in radiation (radiation absorbed dose (RAD)) of X-rays or gamma rays to the dose in RADs of a given type of radiation which produces the same biological effect. By definition then: Dose (REM) = RBE X Dose (RAD).

**RELEASING COMMANDER (NUCLEAR WEAPONS).** A commander who has been delegated authority to approve the use of nuclear weapons within prescribed limits.

**RELIABILITY.** The probability, without regard to countermeasures, that a nuclear weapon, subassembly, component, or other part will perform in accordance with its design intent or requirements. Statements of functionability, as well as dud or other failure probabilities, are included.

**RELIABILITY REPLACEMENT.** Warheads retained in the inactive stockpile that provide the assets to replace active stockpile warheads should reliability or safety problems develop.

**REMOTE LOCATION.** A storage or operational facility located at a distance of at least four statute miles from civilian habitation not under government control.

**RENDER SAFE PROCEDURES (RSP).** (See explosive ordnance disposal procedures.)

**RENEWED INTERIM HAZARD CLASSIFICATION (R-IHC).** This is the renewal of an IHC while the item is in the testing phase that will ultimately lead to an FHC. Like an IHC, an R-IHC is effective for one year.

**REORDER POINT.** That point at which time a stock replenishment requisition would be submitted to maintain the predetermined or calculated stockage objective.

**REPAIRABLE ITEM.** Components and DOE-designed special equipment authorized for repair.

**REPAIRED MATERIEL.** Any DOE components or assembly of weapons materiel which, in sequence, has been:

**a.** Accepted by DOE and shipped as WR to DoD;

**b.** Found defective during routine inspection or subject to accidental damage;

**c.** Returned to a production agency because field repair is not authorized;

**d.** Repaired (defectiveness or damage corrected); and

**e.** Submitted for DOE acceptance

**REQUISITIONING OBJECTIVE.** The maximum quantities of materiel to be maintained on hand and on order to sustain current operations. It will consist of the sum of stocks represented by the operating level, safety level, and the order and shipping time or procurement lead time, as appropriate.

**RESERVE FORCE (RF).** Ten or more designated and trained personnel for response in support of on-duty security force personnel.

**RESERVOIR.** A container for DT that permits its transfer as a gas to the nuclear assembly system (NAS).

**RESIDUAL CONTAMINATION.** Contamination which remains after steps have been taken to remove it. These steps may consist of nothing more than allowing the contamination to decay normally. (See contamination.)

**RESIDUAL RADIATION.** Fission products and radioactive debris from a nuclear explosion, including radioactivity induced in the surrounding environment.

**RESIDUAL RADIOACTIVITY.** Nuclear radiation that results from radioactive sources and which persist for longer than one minute. Sources of residual radioactivity created by nuclear explosions include fission fragments and radioactive matter created primarily by neutron activation, but also by gamma and other radiation activation. Other possible sources of residual radioactivity include radioactive material created and dispersed by means other than nuclear explosion. (See contamination; induced radiation; Initial Nuclear Radiation; prompt radiation.)

**RESPIRABLE AIR.** The atmosphere external to a weapon case or container.

**RESTRICTED DATA (RD).** All data (information) concerning design, manufacture, or utilization of atomic weapons; the production of special nuclear material; or the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the restricted data category pursuant to Section 142 of the Atomic Energy Act (Section 11w, Atomic Energy Act of 1954, as amended). (See formerly restricted data (FRD).)

**RESTRICTED USE NONCONFORMING MATERIEL (NCM).** NCM which can be used with no effect on operability, reliability, interchangeability, assembly, storage life, safety, or completeness of assembly only it is limited or controlled during manufacturing and DOE surveillance activities, but ultimate user will not be affected. (See nonconforming materiel (NCM); production waiver: unrestricted use nonconforming materiel (NCM).)

**RETARDATION DEVICE.** A system, such as a parachute, rotochute, dive-brakes, drogue or retrorocket, used to delay or impede the progress of a bomb and thus increase the time of fall or decrease the impact velocity.

**RETENTIVE MATERIALS.** Materials that are unnecessary for weapon functioning but that combine chemically with and retain other materials needed for weapon functioning.

**RETIREMENT DISPOSAL INSTRUCTION (RDI).** One of five DOE documents comprising the DOE Production Program Definition. The Retirement Disposal Instruction (PPD-D-XX), commonly referred to as the RDI or "D" document, defines the logistics of all components removed from a WR weapon during retirement.

**RETIREMENT PROGRAM.** The program for physical elimination from stockpile of nuclear weapons or major assemblies. (See phase (nuclear) (phase 7)).

**RETROFIT ITEM.** An item used for modification of nuclear weapons, test and handling equipment, or associated spare parts.

**RETROFIT KIT.** Two or more items combined into kit form and issued for use on modification of nuclear weapons, test and handling equipment, or associated spare parts.

**RETROFIT ORDER (RO).** A publication authorizing rework of nuclear weapons materiel. Retrofit orders contain all the required technical, supply, and administrative instructions for rework of nuclear weapons and ancillary equipment.

**RETROFIT PROGRAM.** A program to make approved specified changes to existing nuclear weapons or parts; may be carried out at production, assembly, storage, or deployment sites.

**RETROFIT SPARES.** Spare parts which may be required for maintenance during the performance of retrofit procedures. The applicable retrofit order (RO) will identify each retrofit spare by name, P/N, and NSN and will indicate the source of supply.

**RETURN MATERIAL AUTHORIZATION (RMA).** A control number required for material returned to DOE/NSC.

**REVERSE CONE.** A thick-walled section of pipe located near the zero room to aid in ground shock closure.

**REVERSE UR.** A UR initiated by DOE/NNSA that identifies a discrepancy or reportable condition that requires an action and response from the DoD or provides information to the DoD. DTRA will evaluate and assign the action as necessary to the Service.

**REWORK.** A general term meaning the repair, modification, or alteration of any weapon materiel or ancillary equipment.

**REWORK NUMBER.** A number assigned that reflects any rework activity to DOE weapons or materiel based on a specific, procedural-driven repair, modification, or alteration. The number may or may not be associated with an Alteration Code. A rework number is also referred to as a “drop number” because of its location immediately below the item part number.

**REWORK NUMBER SEQUENCE (RNS).** The complete listing of all rework numbers (in the order of accomplishment) associated with a DOE weapon or equipment. Normally referred to and reported on the Weapon Information Report (WIR) form exactly as listed on the item (and IRC, as applicable), such as: RNS is: 2, 4, 5, 3, 7.

**RING-IN.** Activation of the radar firing system of a weapon from any cause.

**RING-LENS.** (See lens (conventional, air, or ring).)

**ROADABILITY, LIMITED.** Towing on primary roads not to exceed five MPH. Temperature of casters after continuous towing for approximately two miles determines when towing may be resumed. If, at the end of this distance, no part of the caster is hotter than can be tolerated by the bare hand for a minimum of five seconds, the container may be towed another two miles. If the temperature exceeds the “bare hand” test, the caster must be allowed to cool. Two-high stacked configurations shall be moved by hand or by forklift.

**ROADABLE.** Towing on wheels/casters on paved and improved unpaved surfaces at speeds not to exceed 20 MPH on paved surfaces and 10 MPH on improved unpaved surfaces. Two high-stacked configurations shall be moved by hand or by forklift.

**ROENTGEN.** A unit of exposure dose of gamma (or X) radiation. It is defined precisely as the quantity of gamma (or X) rays that will produce electrons (in ion pairs) with a total charge of 2.5 x $10^4$ coulomb in 1 kilogram of dry air. An exposure of 1 roentgen results in the deposition of about 94 ergs of energy in 1 gram of soft body tissue. Hence, an exposure of 1 roentgen is approximately equivalent to an absorbed dose of 1 rad in soft tissue. (See dose, radiation absorbed dose (RAD).)

**ROENTGEN EQUIVALENT MAN/MAMMAL (REM) .** A unit of biological dose of radiation; the name is derived from the initial letters of the term "roentgen equivalent man (or mammal)." The number of rems of radiation is equal to the number of rads absorbed multiplied by the RBE of the given radiation (for a specified effect). The rem is also the unit of dose equivalent, which is equal to the product of the number of rads absorbed and the "quality factor" of the radiation. (SEE dose, dose equivalent, radiation absorbed dose (RAD), Relative Biological Effectiveness (RBE),)

**RUDIMENTARY STRUCTURE.** (See storage structure.)

**RUPTURE ZONE.** The region immediately adjacent to the crater boundary in which the stresses produced by the explosion have exceeded the ultimate strength of the ground medium. It is characterized by the appearance of numerous radial (and other) cracks of various sizes. (See crater, Plastic Zone

# S

**SAFE BURST HEIGHT.** The height of burst at or above which the level of fallout, or damage to ground installations is at a predetermined level acceptable to the military commander.

**SAFE HAVEN (NUCLEAR).** Temporary storage provided DOE classified shipment transporters at DoD facilities in order to assure safety and security of nuclear material and/ or nonnuclear classified material during civil disturbances, natural disasters, and/or other conditions which could affect the safety or security of the DOE shipment. The particulars of the storage are established in a DOE-DoD memorandum of understanding.

**SAFE SECURE TRAILER (SST).** (See safeguards transporter (SGT).)

**SAFE SEPARATION TIME.** The minimum time, measured from the time of release, at which a weapon can be detonated without significant hazard to friendly personnel or equipment.

**SAFEGUARDS TRANSPORTER (SGT).** The SGT is a modified semitrailer used for highway transit of special nuclear materials, including nuclear weapons. It is armored and includes penetration-sensing and -deterrent materials. The SGT is owned and operated by the DOE.

**SAFETY.** The positive measures used to protect public health and the environment from accidental or inadvertent actions involving nuclear weapons that may result in detonation (high explosive or nuclear) or in dispersal or release of hazardous or radioactive materials.

**SAFETY CERTIFICATION OF EQUIPMENT AND PROCEDURES (NUCLEAR).** A determination by the applicable Service based on an engineering evaluation that equipment and/or procedures meet required nuclear safety criteria and are approved for use with a nuclear weapon.

**SAFETY RULES.** (See nuclear safety rules.)

**SAFETY WIRE.** The general method of wiring various types of removable or movable fastenings (other than self-locking types) to prevent loosening by vibration, or to indicate tampering or use. Safety wiring methods include lock wiring, seal wiring, and shear wiring. (See lock wire; seal wire; shear wire.)

**SAFING.**

> **NONNUCLEAR.** Measures taken to prevent operation of the firing system until a nuclear detonation is desired.
>
> **NUCLEAR.** The prevention of nuclear yield if the HE is accidentally detonated in an implosion-assembled weapon, or the propellant is accidentally ignited in a gun-assembled weapon.

**SAFING SYSTEM.** (See arming system.)

**SALTED WEAPON.** A nuclear weapon which has, in addition to its normal components, certain elements or isotopes which capture neutrons at the time of the explosion and produce radioactive products over and above the usual radioactive weapon debris.

**SALVAGE FUZING.** A fuzing option which causes normal detonation of a nuclear weapon when the sensing elements of the fuzing system detect an environment which will be able to cause a weapon failure.

**SALVAGE NUCLEAR ORDNANCE.** Those items of nuclear ordnance which are in such a worn, damaged, deteriorated, or incomplete condition that repair is obviously uneconomical.

**SANDIA APPARATUS (SA).** A commercial-type item of proprietary or special design which is defined as to function and performance by a product acceptance specification. The specification is complete only to the extent required to control the performance of the item.

**SANDIA PART DRAWING.** A DOE engineering drawing identified by a six character number which controls the definition of a part or assembly and specifies the part number.

**SANDIA PART SUPPORT DRAWING.** A DOE engineering drawing identified by an eight-character number, six characters with a two-letter suffix, or a seven-digit number which supports the part drawing by expressing additional essentials, i.e., graphics and specifications.

**SCALING LAW.** A mathematical relationship which permits the effects of a nuclear explosion of given energy yield to be determined as a function of distance from the explosion (or from ground zero) provided the corresponding effect is known as a function of distance for a reference explosion, e.g., of 1-kiloton energy yield. (See cube root law.)

**SCALING WIND.** An idealized representation of the winds aloft in the atmosphere used to draw the fallout contours for contamination bursts.

**SCATTERER.** A substance, usually made of low-Z materials, in a suitable geometry for scattering direct radiation at reduced levels over large areas onto effects experiments.

**SCATTERING.** The diversion of radiation, including radio, radar, thermal, and nuclear, from its original path as a result of interactions (or collisions) with atoms, molecules, or larger particles in the atmosphere or other medium between the source of radiations (e.g., a nuclear explosion) and a point at some distance away. As a result of scattering, radiations (especially gamma rays and neutrons) will be received at such a point from many directions instead of only from the direction of the source.

**SCAVENGING.** The elective removal of material from the radioactive cloud from a nuclear explosion by inert substances, such as earth and water, introduced into the fireball. The term is also applied to the process of removal of fallout particles from the atmosphere by precipitation. (See rainout, snowout, washout.)

**SCHEDULE.**

**AUTHORIZATION PLANNING SCHEDULE.** A document prepared and issued by the NNSA, Weapons Production Division, placing a weapon program in phase 4 (production engineering). It will authorize tooling and material procurement and fabrication to meet a specified portion of the total requirements for the war reserve production program and the total requirements stated on the DTRA equipment requirements schedule. It will also authorize appropriate spares, supporting assemblies, and field test and handling equipment. It will assign the allocation of responsibilities for procurement, production, assembly and interproject and ultimate use deliveries.

**DIRECTIVE SCHEDULE.** A document prepared and issued by the NNSA, Office of Nuclear Weapons Stockpile, including all information from the latest authorization planning schedule and establishing firm first production delivery dates. It will confirm or extend the authorized procurement period for 12-18 months from the date of issuance.

**EQUIPMENT REQUIREMENTS SCHEDULE (ERS).** A periodic statement of DoD requirements for nuclear weapons program materiel as compiled and submitted by DTRA to DOE. These requirements are in turn included in NNSA directive schedules.

**PRELIMINARY PLANNING SCHEDULE (PPS).** A document prepared and issued by the NNSA, Office of Nuclear Weapon Stockpile, containing preliminary information regarding phases 3, 4, 5, and 6 of the weapons program. It will contain a general statement of the planned allocation of responsibilities for procurement, production, assembly and interproject and ultimate use deliveries, and estimates of product release dates for procurement, production, and delivery to ultimate users.

**SCHEDULED TARGET (NUCLEAR).** A planned target on which a nuclear weapon is to be delivered at a specific time during the operation of the supported force. The time is specified in terms of minutes before or after a designated time or in terms of the accomplishment of a predetermined movement or task. Coordination and warning of friendly troops and aircraft are mandatory.

**SCREEN.** An orthogonal or linear array of attenuating wires or bars used to uniformly reduce X-ray fluence without spectral modification.

**SEAL WIRE.** A thin, easily breakable wire used as a seal on fire extinguishers, oxygen regulators, and other emergency devices which must be quickly released for use, and to indicate whether these devices have been tampered with or used. (See lock wire; safety wire; shear wire.)

**SEALED PIT.** One that is hermetically closed to protect nuclear materials from the external environment.

**SEALED WEAPON CASE.** A weapon case capable of maintaining a given internal pressure level.

**SECONDARY.** A nuclear stage physically separate from the primary.

**SECURITY ALERT TEAM.** Two or more security force members who form the initial reinforcing element responding to security alarms, emergencies, or irregularities.

**SECURITY CONTAINER SYSTEM (SCS).** A container system, the unauthorized penetration of which denies use of the contained nuclear weapon for a specified period of time.

**SECURITY FORCE (SF).** Those persons whose primary duties are to protect nuclear weapons.

**SEISMIC DETECTION.** The recognition of low amplitude vibrations in the Earth's crustal layer as a means of identifying the detonation of a nuclear explosion.

**SEISMIC WAVE.** (See ground wave.)

**SEMIANNUAL INVENTORY REPORT (SIR).** A report submitted semiannually based upon a physical inventory conducted to provide a reconciliation of records and a verification of the stockpile. Requirements for this report are covered in detail in CJCSI 3150.04.

**SENSITIVE USE CONTROL INFORMATION (SUCI).** Information concerning nuclear weapons use control design, procedures, capabilities or limitations of a special nature which, if compromised, could lead to a loss of control, unauthorized use, or unauthorized detonation of a nuclear weapon. This information will be split between Sigma 14 and Sigma 15 weapon data categories.

**SERIOUS DAMAGE.** Damage sufficient to render a nuclear weapon or component unsafe or nonoperational to an extent which requires major rework or complete replacement.

**SERVICE CENTER (SC).** A SC is a designated office of the Military Service who functions to support one or more field units and is responsible for coordinating nuclear weapon URs between Service activities and DTRA.

**SERVICE DESIGNED ITEM.** (See nuclear ordnance (NUOR) items.) Military Service special design items.

**SERVICE NUCLEAR ORDNANCE CATALOGING ACTIVITY (SNOCA).** An activity within each Service which has been designated as the sole organization within that Service for processing NUOR data into the FCS.

**SERVICE STAR.** An Air Force program for reliability assessment of operational ballistic missile reentry systems.

**SERVICE STORAGE FACILITY (SSF).** A Service operated and controlled facility which stores and maintains nuclear weapons or components.

**SETTING CURRENT.** Electrical current introduced into a weapon to change or select operational settings pertaining to target or delivery data.

**SHALL.** Whenever the word “shall” appears in the Joint Nuclear Publication System (JNWPS), it shall be construed to mean the requirement is binding.

**SHAPE COMPONENT (SC).** A major assembly which when assembled with other major assemblies determines the weapon configuration.

**SHEAR WALL.** A wall (or partition) designed to take a load in the direction of the plane of the wall, as distinct from lateral loads perpendicular to the wall. Shear walls may be designed to take lateral loads as well. (See bearing wall.)

**SHEAR (WIND).** Unless the term “velocity shear” is used, wind shear refers to differences in direction (directional shear) of the wind at different altitudes.

**SHEAR WIRE.** A light, single-strand wire used to secure parts which may be subject to periodic disconnection, maintenance and inspection, or for parts which must be quickly removed. (See lock wire; safety wire; seal wire.)

**SHELF-LIFE CODE.** A one-character alpha/numeric code that indicates the storage time period or perishability of an item of supply.

**SHELF-LIFE ITEM.** An item of supply possessing deteriorative or unstable characteristics to the degree that a storage time period must be assigned to assure that the item will perform satisfactorily in service. There are two types of shelf-life items; type I and type II:

> **TYPE I, SHELF-LIFE ITEM.** An item of supply which is determined through an evaluation of technical test data and/or actual experience to be an item with a definite nonextendable period of shelf-life.
>
> **TYPE II, SHELF-LINE ITEM.** An item of supply having an assigned shelf-life time period which may be extended after the completion of prescribed inspection/test/restorative action.

**SHIELDING.**

- **a.** Material of suitable thickness and physical characteristics used to protect personnel from radiation during the manufacture, handling, and transportation of fissionable and radioactive materials.
- **b.** Obstructions which tend to protect personnel or materials from the effects of a nuclear explosion. (See transmission factor (nuclear).)

**SHOCK.** A shield placed between a high-explosive component and a component that must function after the HE detonates.

**SHOCK FRONT (OR PRESSURE FRONT).** The fairly sharp boundary between the pressure disturbance created by an explosion (in air, water, or earth) and the ambient atmosphere, water, or earth) respectively. It constitutes the front of the shock (or blast) wave. (See shock front (or pressure front).)

**SHOCK STRENGTH.** The ratio of the peak blast wave overpressure plus ambient pressure to the ambient pressure.

**SHOCK TUBE.** A hollow cylindrical or rectangular duct, in which a shock wave is generated for the purpose of investigating the effects of concussion phenomena similar to those produced by a blast from a nuclear explosion including reflection, refraction, diffraction, mach stem formation, etc. Existing tubes are constructed of metal, have circular or rectangular cross sections, vary from several feet to 250 feet in length, and utilize compressed gas for the generation of shock. The tubes may be built of other materials and the shock may be generated by other means (i.e., by solid or gaseous explosives). (See shock wave.)

**SHOCK WAVE.** A continuously propagated pressure pulse (or wave) in the surrounding medium which may be air, water, or earth, initiated by the expansion of the hot gases produced in an explosion. A shock wave in air is generally referred to as a blast wave, because it resembles and is accompanied by strong, but transient, winds. The duration of a shock (or blast) wave is distinguished by two phases. First there is the positive (compression) phase during which the pressure rises very sharply to a value that is higher than ambient and then decreases rapidly to the ambient pressure. The positive phase for the dynamic pressure is somewhat longer than for overpressure, due to momentum of the moving air behind the shock front. The duration of the positive phase increases and the maximum (peak) pressure decreases with increasing distance from an explosion of given energy yield. In the second phase, the negative (suction, rarefaction, or tension) phase, the pressure falls below ambient and then returns to the ambient value. The duration of the negative phase may be several times the duration of the positive phase. Deviations from the ambient pressure during the negative phase are never large and they decrease with increasing distance from the explosion. (See dynamic pressure, overpressure.)

**SHOT.** (See nuclear shot.)

**SHOULD.** Whenever the word “should” appears in the JNWPS, it shall be construed to mean the requirement is non-mandatory. Normally the word “should” is used to express non-mandatory but desired or preferred method of accomplishment.

**SIEVE.** A geometric array of holes in a material, suitably arranged to attenuate fluence without modifying the X-ray spectrum.

**SIGNIFICANT FINDING INVESTIGATION (SFI).** The SFI system provides timely reporting of the occurrence and subsequent treatment of defects and degrading trends observed in DOE material which may indicate that stockpile reliability or safety is, or will be, impaired. It constitutes a formal information channel for prompt notification to all concerned organizations, including DTRA, of significant findings observed, the progress of investigations into their cause and seriousness, and the actions taken to maintain or

restore stockpile quality. As a formal channel, it backs up the numerous informal communications required for responsive problem resolution and for reliability assessment of stockpiled weapons, and documents communications among the concerned organizations. This is done using the Significant Finding Investigation Report (SFIR).

**SIGNIFICANT NUCLEAR YIELD.** The energy released through fission or fusion equivalent to or greater than the energy released by detonation of four pounds of TNT. (See yield (or energy yield).)

**SILO.** An underground launch facility for a missile.

**SIMULATION TESTING.** Generation of simulated nuclear explosion output and effects, usually to investigate the vulnerability of hardness characteristics of exposed items; includes HE tests that simulate nuclear explosions.

**SIMULATOR.** Any device, machine, or reactor that simulates a nuclear weapon output or effect to which samples can be exposed.

**SKYSHINE.** Radiation, particularly gamma rays from a nuclear explosion, reaching a target from many directions as a result of scattering by the oxygen and nitrogen in the intervening atmosphere.

**SLANT RANGE.** The distance from a given location, usually on the earth's surface, to the point at which the explosion occurred.

**SLICK.** The trace of an advancing shock wave seen on the surface of reasonably calm water as a circle of rapidly increasing size apparently darker than the surrounding water. It is observed, in particular, following an underwater explosion. (See crack.)

**SLAPPER DETONATOR.** One that initiates HE by shocking it with a "flyer" or "slapper." The slapper, either a dielectric or a dielectric and a conductor, is driven across a gap by explosive vaporization of a flat conductor and, in some instances, by magnetic forces.

**SNEAK CIRCUIT.** A circuit, accidentally produced in a system, which may permit operations which were not intended.

**SNOWOUT.** The removal of radioactive particles from a nuclear cloud by precipitation when this cloud is within a snow cloud. (See rainout.)

**SOFT TARGET.** A military objective which is considered to have a minimal capability for resisting weapon effects.

**SOURCE AND SPECIAL (SS) NUCLEAR MATERIAL.** Two categories of essential substances used in the production of nuclear components for nuclear weapons, listed in the Atomic Energy Act of 1954 as "Source Material" and "Special Nuclear Material." (See below:)

**Source Material. Means:**

**a.** "Uranium, thorium, or any other material which is determined by the DOE pursuant to the provisions of section 61 to be source material; or

**b.** Ores containing one or more of the foregoing materials, in such concentration as the DOE, from time to time, may determine to be regulation." Atomic Energy Act (Chapter 2, section 11s).

**Special Nuclear Material (SNM). Means:**

**a.** "Plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the DOE, pursuant to the provisions of section 51, determines to be special nuclear material, but does not include source material; or

**b.** Any material artificially enriched by any of the foregoing, but does not include source material." Atomic Energy Act (Chapter 2, section 11t.) Special nuclear material is also called active material.

**SOURCE DATA.** For publications, source data is a compilation of technical information (procedural or illustrative, or both), logistical information, operational data, etc., which is forwarded for use in preparation of publications, and is incorporated without changing its technical meaning. The actual content of source data is a matter of agreement between the forwarding and receiving activities.

**SPALLING.** A process of flaking in which pieces of uranium oxide spontaneously separate themselves (pop off) from the surface of the oxidized nuclear material.

**SPARE PARTS LIST (SPL).** A document listing all spares authorized by the design agency for the maintenance and repair of a given end item. Spare parts lists are published by SNL. (See end item (nuclear).)

**SPARE PARTS PROVISIONING MEETING.** A meeting involving contractor or government agency representatives assembled for the purpose of reviewing spare parts lists, production listings, assembly drawings, and prototypes of items to validate or perform the selection and coding of spare parts required to support an assembly or end article.

**SPARES.** (See base spares; military spares.)

**SPECIAL ASSIGNMENT AIRLIFT REQUIREMENTS.** Airlift requirements, including JCS-directed/coordinated exercises, that require special consideration due to the number of passengers involved, weight or size of cargo, urgency of movement, sensitivity, or other valid factors that preclude the use of channel airlift.

**SPECIAL EQUIPMENT.** DOE designed and manufactured CT, DE, test (T), and handling (H) equipment, funded for and procured and owned by the DoD, and required by special equipment lists (SEL) for field use to provide operational and maintenance support for WR and/or training weapon systems. (See special equipment list (SEL).)

**SPECIAL EQUIPMENT LIST (SEL).** A list of DOE special design equipment required for field use with a specific weapon system. The list is issued by SNL sufficiently in advance of the FPU to facilitate procurement and distribution of the items to the field. (See commercial equipment list (CEL); special equipment.)

**SPECIAL INSTRUCTION ENGINEERING RELEASE (SIER).** A release which issues special engineering information against a specific item of weapon product or acceptance equipment and authorizes specific actions by the production agency or provides information regarding the fabrication, testing, use, etc., of the specific item. (See engineering release (ER).)

**SPECIAL NUCLEAR MATERIAL (SNM).** (See source and special (SS) nuclear material.)

**SPECIAL PROCEDURE (SP).** A Special Procedure is a joint DoD/DOE document which authorizes a time sensitive repair, verification, evaluation, inspection, or measurement involving nuclear weapons in DoD custody. An SP usually originates as a Unsatisfactory Report (UR), field inspection by a DOE team, or as an offshoot to a retrofit. Special procedures may be used in conjunction with other technical publications and may apply to one or more serial-numbered weapons, major assemblies, or ancillary gear. The Services and the DOE jointly determine the need and scope of an SP.

**SPECIAL TEST ASSEMBLY.** The special test assembly is a DOE-built test unit used primarily in the TOMAHAWK flight and firing program. It includes Type 2F (Navy test assembly), Type 6E (shipboard command disable (SBCD)), developmental joint test assembly (DJTA), TOMAHAWK joint flight developmental (TJFD), TOMAHAWK joint flight special (TJFS), and mass mockup.

**SPECIAL WEAPONS.** A term sometimes used to indicate weapons grouped for special procedures, for security, or other reasons. Specific terminology, e.g., nuclear weapons, guided missiles, is preferable.

**SPECIAL WEAPONS MATERIEL.** (See nuclear weapons materiel (NWM).)

**SPECIAL WEAPONS ORDNANCE PUBLICATION (SWOP).** SWOPs take precedence over all other technical directives (operating procedures (OPs), operating directives (ODs), etc.); further, SWOPs on specific weapons take precedence over generic (or general) SWOPs. (See technical publication (TP).)

**SPECIAL WEAPONS OVERFLIGHT GUIDE (SWOG).** A United States Air Force-developed guide, applicable to all elements of the DoD which delineates areas authorized for overflight by United States aircraft carrying nuclear weapons and the specific security classification for overflight of foreign countries.

**SPECIFICATION.** A document intended primarily for use in procurement which clearly and accurately describes the essential and technical requirements for items, materials or Services, including the procedures by which it will be determined that the requirements have been met. Specifications for items and materials may also contain preservation, packing, and marking requirements.

**SPECTRUM.** Energy distribution in a weapon radioactive output.

**SPHERE.** A major component of certain nuclear weapons of the implosion type, consisting of a case, HE charges, and a pit.

**SPHERICAL ERROR PROBABILITY (SEP).** A term used to designate the accuracy of a missile with respect to a target in the atmosphere or in space. It is a spherical volume analogous to the CEP (also called circular error probable), commonly used to designate the accuracy of a missile or projectile with respect to a surface target. (See circular error probable (CEP).)

**SPLIT KNOWLEDGE.** The separation of information such that no one person will have access to or knowledge of the total.

**SPRAY DOME.** The mound of water spray thrown up into the air when the shock wave from an underwater detonation of a nuclear weapon reaches the surface.

**SQUASH.** Generic nickname used to denote secondaries.

**SQUIB.** A small pyrotechnic device that may be used to fire the igniter in a rocket or for some similar purpose. Not to be confused with a detonator that explodes. (See electric match.)

**SR WEAPON.** (See suppressed radiation (SR) weapon.)

**SS MATERIAL.** (See source and special (SS) nuclear material.)

**STANDARD.** A document that establishes engineering and technical requirements for processes, procedures, practices, and methods that have been adopted as standard. Standards may also establish requirements for selection, application, and design criteria for materiel.

**STANDARD IGLOO MAGAZINE.** An earth-covered, or similar earth-covered, arch-type or other magazine, with or without a separate door barricade, constructed according to approved standard drawings identified in DoD Manual 6055.9-STD.

**STANDARD SERVICE ITEM.** An item used in a nuclear weapons system which is not peculiar in design in the nuclear weapons program. Such items are usually procured or stocked by the Services. (See commercial items; nuclear weapons materiel (NWM).)

**STANDARD STOCKPILE ITEM.** A nuclear weapon which meets the approved military characteristics to the extent that the DoD desires no further DOE development effort on the nuclear warhead, bomb, or associated DOE-developed components. (See limited stockpile item.)

**STANDARDIZATION.** The process of developing and agreeing on (by consensus or decision) uniform engineering criteria for products, processes, practices, and methods.

**STANDARDIZATION AREAS.** Standardization categories for engineering technologies, disciplines, and practices that do not fall under a FSC or a FSG.

**STANDARDIZATION DIRECTORY (SD-1).** A publication that identifies standardization responsibility assignments by FSCs, FSGs, and standardization areas. It also includes addresses, telephone numbers, and points-of-contact for the military offices, civilian agencies, and Non-Government Standard (NGS) bodies participating in the DSP.

**STANDARDIZATION DOCUMENTS.** A generic term for a document used to standardize an IOS, process, procedure, method, data, practice, or engineering approach. Standardization documents include military specifications, standards, handbooks, and bulletins; Federal specifications and standards; guide specifications; Commercial Item Descriptions (CIDs); and NGSs.

**STANDARIZATION MANAGEMENT ACTIVITY (SMA).** A generic term to describe any organization listed in the SD-1 that functions as a Lead Standardization Activity (LSA).

**STANDARDIZATION PROJECT.** A standardization effort approved by the cognizant LSA to develop, update, cancel, or adopt a standardization document, or conduct an item reduction study or an engineering practice study.

**STATE.** The condition of the active protection feature (OFF/TEST/ON).

**STOCK.** A supply of materiel maintained on hand at storage points in a supply system to meet anticipated demands for it. Items issued for actual use are not considered to be in stock.

**STOCKPILE.** Weapons and components, the custody of which has been transferred from DOE to DoD with the following exceptions:

- **a.** Weapons and components, the custody of which has been transferred by DoD to DOE; or
- **b.** Weapons and components which have been placed by the DoD in retired status; or
- **c.** Weapons and components which have been dropped from accountability due to expenditure or loss.

**STOCKPILE EMERGENCY VERIFICATION (SEV).** A process of accounting and reporting the inventory of nuclear weapons for a specific warhead type or types, within a short time period.

**STOCKPILE EVALUATION AND RELIABILITY ASSESSMENT (SEARA) PROGRAM.** This program provides the Navy with comprehensive information on the current quality, reliability, and safety of the Navy stockpile of nuclear weapons.

**STOCKPILE EVALUATION QUALIFICATION RELEASE (SEQR).** A release which issues the results of a LLNL evaluation of stockpile evaluation operations and procedures, and if the LLNL evaluation is satisfactory, authorizes the production agency to perform NMLT/SLT and surveillance testing of the LLNL product.

**STOCKPILE FLIGHT TEST (SFT).** (See joint task group (JTG).)

**STOCKPILE LABORATORY TESTS (SLT).** Laboratory tests conducted on DOE weapon systems randomly selected from stockpile. (See new materiel laboratory tests (NMLT).)

**STOCKPILE-TO-TARGET SEQUENCE (STS).** (1) The order of events involved in removing a nuclear weapon from storage, and assembling, testing, transporting, and delivering it on the target; and (2) a document that defines the logistical and employment concepts and related physical environments involved in the delivery of a nuclear weapon from the stockpile to the target. It may also define the logistical flow involved in moving nuclear weapons to and from the stockpile for quality assurance testing, modification and retrofit, and the recycling of limited life components.

**STOPPING ALTITUDE.** The altitude in the vicinity of which a specified ionizing radiation coming from above (e.g., from a high-altitude nuclear explosion) deposits most of its energy by absorption in the atmosphere. The stopping altitude varies with the nature of the ionizing radiation.

**STORAGE.** The placing of nuclear weapons or their components in a storage structure, generally for an extended period of time.

**STORAGE ACTIVITY (SA).** The organizational element of a distribution system which is assigned responsibility for physical handling of materiel incident to its check-in and inspection (receipt); its keeping and surveillance in a warehouse, or open area (storage); and its selection and shipment (issue).

**STORAGE IGLOO.** (See storage structure.)

**STORAGE INSPECTION (SI).** (See periodic inspection.)

**STORAGE MONITORING.** The periodic inspection of materiel in stockpile or operational storage to detect indications of deterioration or damage. It does not include functional testing of assemblies or components as done in stockpile re-acceptance, storage inspection, or assembly tests. It may be limited to external visual examination of the packaged materiel or may include humidity, pressure, or go-no-go electrical (continuity) checks. Pressure checks may be of the pressure within the storage packaging or within sealed portions of the materiel. Electrical checks are to determine that selected safety features are still present and that certain critical components are still connected and intact. Detailed requirements for storage monitoring differ between individual warheads, warhead sections, and complete weapons. (See partial storage monitoring; periodic inspection.)

**STORAGE STRUCTURE.** An individual magazine at a storage site in which nuclear weapons or their components are placed and held for safekeeping.

**a.** "A" STRUCTURE. An especially constructed structure for storage of nuclear components.

**b.** CONTROLLED STRUCTURE. A structure in which a controlled environment is maintained. (See environment.)

**c.** IGLOO. A type of magazine for storage of weapons or components of weapons. As used in the military field of nuclear energy, this term is applied to storage structures both under ground and above ground.

**d.** ORDNANCE IGLOO. Any storage structure structurally equivalent to rear site storage facilities can be considered an ordnance igloo with respect to storage inspection practices.

**e.** RUDIMENTARY STRUCTURE. Any structure such as a tent tarpaulin, cut and cover, Quonset or Jamesway, not equivalent to an ordnance igloo.

**STRATOSPHERE.** A relatively stable layer of the atmosphere between the tropopause and a height of about 30 miles in which temperature changes very little (in polar and temperature zones) or increases (in the tropics) with increasing altitude. In the stratosphere clouds of water never form and there is practically no convection. (See tropopause, troposphere.)

**SUBCRITICAL.** The state of a given fission system when the specified conditions are such that a less than critical mass of active material is present. (See criticality; supercritical.)

**SUBCRITICAL MASS.** An amount of fissionable material insufficient in quantity or of improper geometry to sustain a fission chain reaction.

**SUBKILOTON WEAPON.** A nuclear weapon producing a yield below one kiloton. (See kiloton weapon; nominal weapon; nuclear yields.)

**SUBSURFACE BURST.** (See nuclear underground burst.)

**SUPERCRITICAL.** The state of a given fission system when the specified conditions are such that a greater than critical mass of active material is present. A highly supercritical system is essential for the production of energy at a very rapid rate so that an explosion may occur. (See criticality; subcritical.)

**SUPPRESSED RADIATION (SR) WEAPON.** One in which the fission yield is kept low and a large portion of the prompt neutrons generated in the fusion reactions are converted to thermal or gamma radiation by materials in the weapon. Such weapons have also been known as minimum residual radiation (MRR) and reduced residual radiation (RRR).

**SURE KILL.** As used by the Air Force, the level of response or vulnerability which results in an immediate destruction of the system. (See mission completion; mission kill; sure safe.)

**SURE SAFE.** As used by the Air Force, the level of response or vulnerability which assures that the system is able to complete its mission. (See mission completion; mission kill; sure kill.)

**SURETY.** Umbrella term for safety, security, use control, reliability, and quality of nuclear weapons.

**SURFACE BURST.** (See nuclear surface burst.)

**SURFACE WAVE.** (See ground wave.)

**SURFACE ZERO.** (See ground zero.)

**SURGE.** *(*See base surge.)

**SURVEY METER.** A portable instrument, such as a Geiger counter or ionization chamber, used to detect nuclear radiation and to measure the dose rate. (See monitoring.)

**SURVIVABILITY (NUCLEAR).** The capacity of the system to withstand a man-made hostile environment and still function in the design mode. Survivability may be achieved by a number of methods, ranging from proliferation to hardening. (See hardening; susceptibility.)

**SUSCEPTIBILITY.** The degree to which a system or component responds to a certain level of effects in an unnatural (man-made) hostile environment. (See survivability (nuclear); vulnerability (nuclear).)

**SUSTAINING CHAIN REACTION.** (See chain reaction.)

**SYNDROME, RADIATION.** The complex of symptoms characterizing the disease known as radiation injury, resulting from excessive exposure of the whole (or large part) of the body to ionizing radiation. The earliest of these symptoms are nausea, vomiting, and diarrhea, which may be followed by loss of hair (epilation), hemorrhage, inflammation of the mouth and throat, and general loss of energy. In severe cases, where the radiation exposure has been relatively large, death may occur within 2 to 4 weeks. Those who survive 6 weeks after the receipt of a single dose of radiation may generally be expected to recover.

**SYNERGISTIC TARGET RESPONSE.** A response in which the total damage to a target is more severe than the sum of the damages which would be caused by each individual nuclear effect acting separately.

**SYSTEM INTERNATIONAL D' UNITES(S/).** The international system of units.

# T

**2 W CONCEPT.** The concept that the explosion of a weapon of energy yield W on the earth's surface produces (as a result of reflection) blast phenomena identical to those produced by a weapon of twice the yield (i.e., 2 W) burst in free air (i.e., away from any reflecting surface).

**TACTICAL FERRY.** Logistic movement of weapons by tactical aircraft in which the configuration of the weapon system precludes release of a prearmed weapon. (See ferry shipment; logistic movement.)

**TACTICAL NUCLEAR WEAPON EMPLOYMENT.** The use of nuclear weapons by land, sea, or air forces against opposing forces, supporting installations or facilities, in support of operations which contribute to the accomplishment of a military mission of limited scope, or in support of the military commander's scheme of maneuver, usually limited to the area of military operations.

**TAMPER.** The portion of a fission device that surrounds fissile components and provides neutronic and inertial enhancement of the fission reaction. Not a nuclear component.

**TAMPER-EVIDENT SEAL (TES).** A DOE-procured specially weather-and chemical-resistant seal applied to a critical assembly joint of NELAs and designed to visually display evidence of tampering.

**TARGET ASSEMBLY (NUCLEAR).** One of the two internal elements of active material in a nuclear weapon of the gun-type which together with the projectile assembly comprises a core unit. The target assembly is stored in a separate carrying case (nuclear) and is designated by three or four numerals followed by the letters "T-Z." Also called target rings.

**TARGET RESPONSE (NUCLEAR).** The effect on men, material, and equipment of blast, heat, light, and nuclear radiation resulting from the explosion of a nuclear weapon.

**TAYLOR INSTABILITY.** The rapid growth of perturbations leading to the destruction of implosion symmetry. This is caused by small irregularities at the boundary between two media when a more dense medium is accelerated by a less dense medium.

**TECHNICAL DATA PACKAGE.** A technical description of an item or service adequate for use in acquisition. The description shall be sufficiently complete to control the configuration to the required degree of design disclosure and the item quality to the required level and will consist of all applicable technical data such as plans, drawings, and associated lists, specifications, purchase descriptions, standards, models, performance requirements, quality assurance provisions and packaging data.

**TECHNICAL DOCUMENT.** Any of a number of technical references used in the process of identifying an IOS for cataloging purposes. May include technical publications, engineering drawings, specifications, standards, and other publications.

**TECHNICAL KNOWLEDGE.** That knowledge, however obtained, which would allow an individual to tamper with a nuclear weapon in such a manner that such tampering would not be detected during normal prefire operations or weapons monitoring inspections and could cause, then or later, unauthorized prearming, arming, launching, firing, releasing, or detonation of a nuclear weapon or degradation of weapon performance at the target.

**TECHNICAL PUBLICATION (TP).** One of the series in the JNWPS giving procedures, information, and instructions on the technical and general aspects of nuclear weapons and associated equipment. When directive upon units other than those of DTRA, TPs are additionally designated as Army Technical Manuals (TMs), Navy Special Weapons Ordnance Publications, Air Force Technical Orders (T.O.s), and joint DOE-DTRA publications, as applicable (See special weapons ordnance publication (SWOP).)

**TELEMETRY (TM).** Transmission by RF of data from sensors in a test unit that gauge performance or monitor environmental condition. Often also refers to hardwire data transmission, and to systems that record data aboard a test vehicle for later recovery or RF transmission.

**TEMPERATE AREA.** (See area.)

**TEMPORARY STORAGE.** The placing of nuclear weapons or their components in a storage structure for a period not to exceed 60 days.

**TENTH-VALUE THICKNESS.** The thickness of a given material which will decrease the intensity (or dose) of gamma radiation to one-tenth of the amount incident upon it. Two tenth-value thicknesses will reduce the dose received by a factor of 10x10, i.e., 100, and so on. The tenth-value thickness of a given material depends on the gamma-ray energy, but for radiation of a particular energy it is roughly inversely proportional to the density of the material.

**TEST BED.** A configuration designed, developed, and procured specifically for the firing or drop test program to simulate the nuclear and HE section of a warhead and capable of accommodating an instrumentation package and WR warhead components.

**TEST DETONATION.** The firing of a nuclear test device, whether or not it produces a nuclear yield.

**TEST EQUIPMENT (T).** Specially designed items to test weapons or weapon materiel, or to be used in operations involving the testing of weapons or weapon material. They are considered entities from the standpoint of function, materiel control, and for the purpose of engineering specifications.

**TEST OF FACILITIES.** A practice operation involving nuclear weapons, the major purpose of which is to obtain an original determination of the capabilities of a base or bases, or of a naval carrier, and of the personnel and equipment involved. It is differentiated from an exercise or a maneuver principally by its major purpose.

**TEST SERIES.** An ordered group of weapon test events. Within DOE, denotes test activities on a fiscal-year basis; within DoD, denotes a group of related experiments.

**THEATER.** Term applied to the set of locations and sublocations for which a HQ CMS application is responsible. Also refers to the code and key materials normally used within these locations and sublocations.

**THERMAL BATTERY.** An item consisting of primary cell(s), electrically connected to produce an electromotive force by electrochemical action. The item is non rechargeable and completely inert until activated by a heating process which melts the electrolyte.

**THERMAL ENERGY.** The energy emitted from the fireball as thermal radiation. The total amount of thermal energy received per unit area at a specified distance from a nuclear (or other heated region), (or atomic) explosion is generally expressed in terms of calories per square centimeter. (See radiant exposure, thermal radiation, transmittance (atmospheric), x-ray pancake.)

**THERMAL ENERGY YIELD (OR THERMAL YIELD).** The part of the total energy yield of the nuclear (or atomic) explosion which is received as thermal energy usually within a minute or less. In an air burst, the thermal partition (i.e., the fraction of the total explosion energy emitted as thermal radiation) ranges from about 0.35 to 0.45. The trend is toward the smaller fraction for low yields or low burst heights and toward the higher fraction at high yields or high bursts. Above 100,000 feet burst height, the fraction increases from about 0.45 to 0.6, and then decreases to about 0.25 at burst altitudes of 160,000 to260,000 feet. At still greater burst heights, the fraction decreases rapidly with increasing altitude.

**THERMAL EXPOSURE.** The total normal component of thermal radiation striking a given surface throughout the course of a detonation; express in calories per square centimeter or megajoules per square meter.

**THERMAL LINE.** A horizontal radial line on the surface of the earth originating at ground zero, along which measurements of thermal radiation from an explosion are taken. (See blast line.)

**THERMAL NEUTRON.** A neutron with a velocity comparable to the random motions of atoms in materials. The typical energy of a thermal neutron in a material at room temperature is 0.025 eV. Thermal neutrons are produced from fast neutrons by slowing them down in a moderator.

**THERMAL PULSE.** The radiant power versus time pulse from a nuclear weapon detonation.

**THERMAL RADIATION.** Electromagnetic radiation emitted (in two pulses from an air burst) from the fireball as a consequence of its very high temperature; it consists essentially of ultraviolet, visible, and infrared radiations. In the early stages (first pulse of an air burst), when the temperature of the fireball is extremely high, the ultraviolet radiation predominates; in the second pulse, the temperatures are lower and most of the thermal radiation lies in the visible and infrared regions of the spectrum. For high-altitude bursts (above 100,000 feet), the thermal radiation is emitted as a single pulse, which is of short duration below about 270,000 feet but increases at greater burst heights.

**THERMAL X-RAYS.** The electromagnetic radiation, mainly in the soft (low energy) X-ray region, emitted by the extremely hot weapon residue in virtue of its extremely high temperature; it is also referred to as the primary thermal radiation. It is absorption of this radiation by the ambient medium, accompanied by an increase in temperature, which results in the formation of the fireball (or other heated region) which then emits thermal radiation. (See weapon residue, x-ray pancake, x-rays.)

**THERMAL YIELD.** Electromagnetic radiation from a nuclear weapon which is emitted in the wave length range from 0.2 micron in the ultraviolet through the visible to 12 microns in the infrared.

**THERMONUCLEAR (TN).** An adjective referring to the process (or processes) in which very high temperatures are used to bring about the fusion of light nuclei, such as those of the hydrogen isotopes (deuterium and tritium), with the accompanying liberation of energy. A thermonuclear bomb is a weapon in which part of the explosion energy results from thermonuclear fusion reactions. The high temperatures required are obtained by means of a fission explosion. (See fusion,)

**THERMONUCLEAR (TN) WEAPON.** A weapon in which very high temperatures are used to bring about the fusion of light nuclei such as those of hydrogen isotopes (e.g., deuterium and tritium) with the accompanying release of energy. The high temperatures required are obtained by means of fission.

**THOMAS-FERMI-DIRAC (TFD) EQUATION-OF-STATE (EOS).** A method of developing the EOS of a material on the basis of a simplified quantum statistical mechanics treatment of electrons in matter.

**THREAT TUBE.** A region of space through which attacking missiles are expected to pass when launched from a known site to a given target.

**THRESHOLD LUNG DAMAGE (TLD).** The closest distance to the HE detonation where lung damage would begin to appear in personnel, as a result of overpressure. This assumes that personnel are standing in the open, unshielded.

**TIMER DRIVER (TD).** A precision explosive timer which actuates a neutron generator.

**TN WEAPON.** (See thermonuclear (TN) weapon.)

**TNT EQUIVALENT.** A measure of the energy released from the detonation of a nuclear weapon, or from the explosion of a given quantity of fissionable material, in terms of the amount of TNT (trinitrotoluene) which could release the same amount of energy when exploded. (See yield (or energy yield).)

**TOLERANCE DOSE.** The amount of radiation which may be received by an individual within a specified period with negligible results.

**TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE).** The sum of any external radiation dose, usually measured by a thermo-luminescent dosimeter (TLD) and any Committed Effective Dose Equivalent.

**TOTAL ITEM RECORD (TIR).** The TIR is a record maintained within the NIMACS database and contains cataloging management data pertaining to a federalized IOS.

**TRAINING QUALITY ITEMS.** This term is used within the DoD to indicate that military spares supply management controls specified in TP 100-1 are required. (See military spares.)

**TRAJECTORY ARM SWITCH.** A switch which arms the weapon after having sensed a proper environment during some part of its trajectory. The differential pressure switch is one such device.

**TRAJECTORY SENSING SIGNAL GENERATOR (TSSG).** A component which arms a weapon after sensing the appropriate physical conditions corresponding with an expected wartime employment trajectory environment for that weapon type.

**TRANSMITTANCE (ATMOSPHERIC).** The fraction (or percentage) of the thermal energy received at a given location after passage through the atmosphere relative to that which would have been received at the same location if no atmosphere were present.

**TRANSFER SYSTEM.** A system for transferring gas within a weapon.

**TRANSIENT EFFECTS.** Transient effects are such that the affected component, subsystem, or system will, in principle, recover during its functional lifetime. System malfunction can result, however, since transient effects often cause permanent effects in the system.

**TRANSIENT RADIATION.** Radiation from a nuclear burst, pulsed reactor, linear accelerator, flash X-ray, or other simulation facility that produces short pulses (less than one second duration) of radiation. Transient radiation can produce both transient and permanent effects.

**TRANSIENT RADIATION EFFECTS ON ELECTRONICS (TREE).** Effects on electronics that are exposed to transient gammas, neutrons, and X-rays.

**TRANSITION ZONE.** A zone extending above the Earth's surface in which the weapon phenomenon of interest from a burst in the zone will be modified by the presence of the Earth's surface.

**TRANSMISSION FACTOR (NUCLEAR).** The ratio of the dose inside the shielding material to the outside (ambient) dose. Transmission factor is used to calculate the dose received through the shielding material. (See half thickness; shielding.)

**TRANSPLUTONIC ELEMENT.** One with an atomic number above 94.

**TRANSPORT CARRIER.** A specific, certified means of conveying a nuclear weapon from one location to another location.

**TRANSPORT MODE.** The type of conveyance (e.g., air, water, or ground) used to move a nuclear weapon from one location to another location.

**TRANSPORTATION SAFEGUARDS DIVISION (TSD).** The organization within DOE Albuquerque Operations responsible for planning, organizing, directing, coordinating, and controlling the safe, secure transportation of nuclear weapons and nuclear components and material, which is accomplished through the use of specially designed SSTs and SGTs, highly trained special agents who are federal law enforcement officers, and a secure communications and tracking system.

**TRANSSHIPMENT.** To transfer for further transportation from one ship or conveyance to another.

**TRANSVERSE WAVE.** (See ground wave.)

**TRIPLE POINT.** The intersection of the incident, reflected, and fused (or mach) shock fronts accompanying an airburst. The height of the triple point above the surface, i.e., the height of the mach stem, increases with increasing distance from a given explosion.

**TRITIUM.** A naturally occurring colorless, radioactive gaseous isotope of hydrogen used in thermonuclear weapons, and as a radioactive tracer in chemical, biochemical and biological research. Tritium also poses a radiation hazard from inhalation as particles in the lungs may be a long-term carcinogenic hazard.

**TRITIUM DETECTION.** A special application of tritium monitoring entailing measuring at a specific location or interface on a weapon to determine if detected tritium concentrations are above or below a specified level.

**TRITIUM MONITORING.** The act or process of measuring respirable air with instrumentation to evaluate the concentration of tritium within the air.

**TRITIUM WATER VAPOR.** A form of water vapor ($H_2O$) that contains tritium instead of hydrogen. Tritium water vapor can be inhaled, can condense on objects, and except for the fact that it is radioactive, behaves chemically like water vapor.

**TROOP SAFETY (NUCLEAR).** An element which defines a distance from the proposed burst location beyond which personnel meeting the criteria described under degree of risk will be safe to the degree prescribed.

**TROPIC AREA.** (See area.)

**TROPOPAUSE.** The imaginary boundary layer dividing the stratosphere from the lower part of the atmosphere, the troposphere. The tropopause normally occurs at an altitude of about 25,000 to 45,000 feet in polar and temperate zones, and at 55,000 feet in the tropics. (See stratosphere, troposphere.)

**TROPOSPHERE.** The region of the atmosphere, immediately above the earth's surface and up to the tropopause, in which the temperature falls fairly regularly with increasing altitude, clouds form, convection is active, and mixing is continuous and more or less complete.

**TRUE CRATER.** (See crater.)

**TRUE SURFACE BURST.** (See nuclear surface burst.)

**TUBALLOY (TU).** Uranium metal with no more than the natural isotopic content of $U^{235}$. Tuballoy has been used to mean either normal or depleted uranium. Depleted uranium is also called D-38. (See Uranium (U).)

**TWO-PERSON CONTROL (TPC).** The close surveillance and control of materials at all times by at least two authorized persons, each capable of detecting incorrect or unauthorized procedures with respect to the task to be performed and each familiar with established security requirements.

**TWO-PERSON RULE.** A system designed to prohibit access by an individual to nuclear weapons and certain designated components by requiring the presence at all times of at least two authorized persons each capable of detecting incorrect or unauthorized procedures with respect to the task to be performed.

**TWO-PERSON SAFE.** A safe with two, three-combination locks.

**TYPE I (UNCONDITIONAL) SHELF LIFE ITEM.** An item of supply which is determined through an evaluation of technical test data and/or actual experience to be an item with a definite non-extendible period of shelf life.

**TYPE II (CONDITIONAL) SHELF LIFE ITEM.** An item of supply having an assigned shelf life time period that may be extended after completion of inspection/test/restorative action.

**TYPE WEAPON.** (See weapon type.)

# U

**ULTIMATE USER (UU) PACKAGE.** A term used to describe the shipping configuration of any WR or TYPE weapon as it is delivered by DOE to the first military destination.

**ULTRAVIOLET.** Electromagnetic radiation of wave length between the shortest visible violet (about 3,850 Angstroms) and soft X-rays (about 100 Angstroms).

**UNAUTHORIZED ACCESS.** The capability and opportunity to obtain, alter, or substitute positive control material used in the execution or release of nuclear weapons or to obtain, alter, or substitute the internal values of such material. A person authorized to handle positive control material does not have access if the ability to obtain, alter, or substitute the internal values is prevented through observation by authorized individuals who are also authorized to handle positive control material, or by physical controls that prevent access. Physical control practices within the Defense Courier Service (DCS) and protective packaging methods employed by shippers prevent access to material by DCS and DCS-designated couriers and assistants.

**UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION (UCNI).** UCNI is certain unclassified government information prohibited from unauthorized dissemination under section 148 of the Atomic Energy Act--As amended. It concerns: 1) atomic energy defense programs which pertain to the design of production facilities or utilization facilities; security measures (including security plans, procedures, and equipment) for the physical protection of production or utilization facilities, nuclear material contained in such facilities or nuclear material in transit; 2) the design, manufacture, or utilization of any nuclear weapon component if the design, manufacture, or utilization of such weapon or component was contained in any information declassified or removed from the restricted data category by the Assistant Secretary for Defense Programs, or the head of the predecessor agency of the Department of Pursuant to section 142 of the Atomic Energy Act. The unauthorized dissemination, as determined by a controlling official, could reasonably be expected to have a significant adverse effect on the health and safety of the public or the common defense and security by significantly increasing the likelihood of illegal production of nuclear weapons or theft, diversion or sabotage of nuclear materials, equipment or facilities.

**UNCONTROLLED ENVIRONMENT.** (See environment.)

**UNDEPLOYED WEAPONS AND COMPONENTS.** (See allocated undeployed weapons and components.)

**UNDERGROUND BURST.** (See nuclear underground burst.)

**UNDERGROUND STORAGE OR PLANT STRUCTURE.** An underground storage or plant structure having sufficient earth cover to confine a high explosive (nonnuclear) detonation except for possible horizontal venting through a small area such as a door or narrow shaft.

**UNDERWATER BURST.** (See nuclear underwater burst.)

**UNIQUE ENVIRONMENT.** A specific environment applied to a nuclear weapon during flight or delivery toward a target, generally an acceleration-time profile which is characteristic only of the normal flight. Duplication in normal and credible abnormal environments is highly unlikely (See enabling stimuli.)

**UNIQUE SIGNAL.** Generally a safety-critical electrical signal consisting of a specific, unit, non secure (not classified) sequence of events in a pseudo-random pattern which contains sufficient information to assure that inadvertent or accidental generation in normal and credible abnormal environments (e.g., as a result of circuit faults) is highly unlikely. (See enabling stimuli.

**UNIT SPARES AUTHORIZATION LIST (USAL).** Quantity of base and military spares and expendable items authorized as unit stock to be utilized for War Reserve (WR) items. Use of these spares for TYPE weapons, T & H equipment, and UC equipment may only be authorized by NNSA. (Does not apply to the Navy).

**UNLIMITED RIGHTS.** The right to use, duplicate, or disclose technical data in whole or part, in any manner and for any purpose whatsoever, and to have or permit others to do so.

**UNLOCK.** Unlocking is an operation by which the combination lock or coded switch of a weapon is operated to a condition that permits weapon assembly and/or arming.

**UNLOCK CODE.** A preset code that will unlock the PAL device.

**UNRESTRICTED USE NONCONFORMING MATERIEL (NCM).** NCM which can be used as is with no effect on operability, reliability, interchangeability, assembly, storage life, safety, or completeness of assembly, and for which no changes, additions, or substitutes for current specification requirements are necessary. (See nonconforming materiel (NCM); production waiver; restricted use nonconforming materiel (NCM).)

**UNSATISFACTORY REPORT (UR).** The UR process is a method by which organizations in possession of nuclear weapons and their associated ancillary equipment and/or TPs communicate unsatisfactory or informational conditions pertaining to these items.

**URANIUM (U).** A naturally occurring radioactive element whose principal isotopes are uranium-238 and uranium-235. Natural uranium is a hard, silvery-white, shiny metallic ore that contains a minute amount of uranium-234. In its various compounds, uranium has many industrial uses, including staining glass, glazing ceramics, photographic processes, and aircraft ballast. The primary use for uranium isotopes is as a source of fuel for nuclear power reactors. It is also used in plutonium production and as feed material for gaseous diffusion plants. Uranium presents chemical and radiation hazards and exposure may occur during mining, processing of ore or production of uranium metal. Uranium and its compounds have both toxic chemical and radiation effects, depending on the dose and exposure time, as well as type of exposure, such as inhalation or skin contact.

**a.** DEPLETED URANIUM. Uranium depleted to the $U^{238}$ isotope. The composition is in the range of 99.28 to 99.85 percent $U^{238}$ and less than 0.711 percent $U^{235}$ with a trace of $U^{234}$. (See tuballoy (TU).)

**b.** ENRICHED URANIUM. Uranium which has been enriched in the $U^{235}$ isotope. Various grades of enriched uranium are used; however, oralloy is the most common. Oralloy has a composition of 92.9 to 94.0 percent $U^{235}$, 6.0 to 7.0 percent $U^{238}$,and a trace of $U^{234}$. (See oralloy.)

**c.** NORMAL URANIUM. Uranium of the composition that occurs in nature. It consists of approximately 99.28 percent $U^{238}$, 0.7115 percent $U^{235}$, and a trace of $U^{234}$. (See tuballoy (TU).)

**d.** NS-40 MATERIAL. Normal uranium depleted to 0.04 percent $U^{235}$. It was the first nuclear material made available for commercial sale on an unclassified basis. (See plutonium (PU); source and special (SS) nuclear material.)

**e.** URANIUM-233. A fissile isotope bred by neutron capture in thorium-232. In nuclear weapons use, it is similar to plutonium 239.

**f.** URANIUM-235. The only naturally occurring fissile isotope, natural uranium has 0.7 percent of uranium-235. Both in reactors and in weapons use, uranium is enriched in uranium-235 as fuel; however, weapons typically use uranium enriched to 90 percent or greater uranium-235.

**g.** URANIUM-238. A fertile isotope from which plutonium-239 can be bred, it comprises 99.3 percent of natural uranium.

**URANIUM ENRICHMENT.** The process of increasing the percentage of uranium-235 isotopes so that the uranium can be used as reactor fuel or in nuclear weapons.

**USE CONTROL.** The control of unauthorized use or detonation of a nuclear weapon. Includes passive and active protection, and disablement systems.

**USE CONTROL CHARACTERISTICS (UCC).** A DoD document submitted to the DOE that specifies DoD requirements for use control equipment. The UCC is approved by the NWCSSC.

**USE CONTROL SYSTEMS (UCS).** In nuclear weapons, includes passive protection devices, APS, and CD. Deters and/or delays the unauthorized use and/or detonation of a nuclear weapon while facilitating authorized usage. The following categories of ancillary equipment which support these systems are:

**a.** UC - Controllers, Decoders, Recoders, Verifiers

**b.** UD - Disablement Equipment

**c.** UH - Headquarters Equipment

**d.** UL - Use Control Cables, Adapters

**e.** UM - Miscellaneous Equipment

**f.** UP - Power Supplies, Chargers, Batteries, Converters, Transformers

**g.** US - Use Control software

**h.** UT - Simulators, Trainers

# V

**VALIDATION HEAD (VH).** A Navy-produced nonnuclear RB specially instrumented to telemeter normal, lateral, and axial separation and gas dynamic forces imparted to the RB at deployment from the missile carrier.

**VALIDATION AND VERIFICATION.** Two-step process whereby manuals and retrofit orders are:

**a.** Validated by contractor to ensure technical accuracy, completeness, and compatibility with the requirements of applicable military specifications and

**b.** Verified by Air Force personnel of the same skill level and grade required to operate and maintain the equipment, performed only in test and operational environment on production or production configured equipment.

**VELA.** Title of program to improve nuclear detection capability.

**VELA HOTEL.** Title of program concerned with the detection of very high altitude nuclear detonations by means of detectors mounted in satellites.

**VELA SIERRA.** Part of vela hotel program concerned with high altitude research and development on surface based detection program.

**VELA UNIFORM.** Seismic program related to systems for detection of nuclear explosions.

**VENTING.** The escape through the surface to the atmosphere of gases or radioactive products from a subsurface high explosive or nuclear detonation.

**VERIFIABLE CONTROL PROCEDURES (VCP).** Procedures designed to provide units with the capability to deter and detect hostile exploitation of nuclear weapons control (coding, recoding, and code verification) equipment.

**VERIFICATION INSPECTION.** An inspection which consists of a visual observation of the nuclear weapon or component to determine that the item is as described by the shipping document, without visual damage; and, verification of the serial number(s) as listed on the shipping document, the container, the item (permanently stamped, stenciled, or decaled) and the IRC, nuclear ordnance record card (NORC), equipment maintenance log (EML) or inspection date card. Warhead sections, projectiles, RV or bodies, or bombs shall not be disassembled to effect this verification. This inspection is normally accomplished by the ultimate consignee prior to entering the item(s) on accountable stock records. (See acceptance inspection; preshipment inspection; receipt inspection.)

**VERIFIER.** A type of controller that is capable of confirming the presence of specific PAL codes in a weapon without affecting the weapon PAL mode.

**VIOLENT DESTRUCT.** Nuclear weapon destruction achieved normally by the one-point detonation of the HE implosion system.

**VISIBILITY RANGE (OR VISIBILITY).** The horizontal distance (in kilometers or miles) at which a large dark object can just be seen against the horizon sky in daylight. The visibility is related to the clarity of the atmosphere ranging from 170 miles (280 kilometers) for an exceptionally clear atmosphere to 0.6 mile (1.0 kilometer) or less for dense haze or fog. The visibility on an average clear day is taken to be 12 miles (19 kilometers).

**VULNERABILITY (NUCLEAR).** The susceptibility of a weapon or its components to degradation from adverse environments, particularly the effects of a defense nuclear burst.

**VULNERABILITY PROGRAM.** A program to determine the degree of, and to remedy insofar as possible, any existing susceptibility of nuclear weapon systems to enemy countermeasures, accidental fire, and accidental shock

# W

**WAIVER.** (See production waiver.)

**WAR RESERVE (WR) (NUCLEAR).** Nuclear weapons and nuclear weapons “materiel” intended for use in the event of war.

**WAR RESERVE (WR) QUALITY ITEMS.** This term is used within the DoD to indicate that base spare supply management controls specified in TP 100-1 are required. (See base spares)

**WARHEAD (W).** The part of a missile, projectile, torpedo, rocket, or other munition which contains either the nuclear or TN system, HE system, chemical or biological agents, or inert materials intended to inflict damage. (See nuclear warhead; reentry vehicle (RV); warhead section (WHS).)

**WARHEAD COMPARTMENT.** The section of a missile in which the warhead installation is mounted. In some cases the warhead compartment may be part of the adaption kit.

**WARHEAD MATING.** The act of attaching a warhead section to the rocket or missile body, torpedo, airframe, motor, or guidance section.

**WARHEAD SECTION (WHS).** A completely assembled warhead including appropriate skin sections and related components. (See warhead (W).)

**WARTIME/EXERCISE/EMERGENCY REPORT (WSR-EXER/EMERG).** A high precedence report submitted by electrical means during wartime, exercise or emergency precedence report submitted by electrical means during wartime, exercise or emergency conditions, reflecting any reportable transactions which have occurred since the previous report. Reporting will be in accordance with instructions contained in CJCSI 3150.04. (See weapon status report (WSR).)

**WASHOUT.** The removal of radioactive particles from a nuclear cloud by precipitation when this cloud is below a rain (or snow) cloud. (See rainout, snowout.)

**WATER SPOUT.** (See plume.)

**WEAK-LINK/STRONG-LINK.** A safing design technique that electrically and physically isolates a weapon's firing circuits to ensure a predictable and desirable response of the electrical system in normal, abnormal, or accident environments.

**WEAPON ALLOCATION.** (See allocation (nuclear).)

**WEAPON AVAILABILITY.** A forecast of weapons, by type and quantity, which are presently or will be available for deployment by commanders of unified and specified commands at specified periods during a fiscal year.

**WEAPON DEBRIS (NUCLEAR).** The highly radioactive material, consisting of fission products, various products of neutron capture, and uranium and plutonium that have escaped fission, remaining after the explosion.

**WEAPON DEVELOPMENT REPORT (WDR).** An initial report prepared by SNL during warhead/bomb development programs. Draft WDRs are provided to each military department for review prior to convening a DRAAG.

**a.** **PRELIMINARY WEAPON DEVELOPMENT REPORT (WDR)**. An initial report issued in phase 3 to provide DOE and DoD with warhead/bomb design objectives, descriptions, proposed test programs, ancillary equipment, and programming.

**b.** **INTERIM WEAPON DEVELOPMENT REPORT (WDR)**. A report issued in phase 4 to update the preliminary WDR. This report may be omitted if both the DOE and DoD concur.

**c.** **FINAL WEAPON DEVELOPMENT REPORT (WDR).** A report issued in late phase 5 to provide warhead/bomb design objectives, description, test program results, ancillary equipment, and programming as of the time of the first production for stockpile. It updates the preliminary and interim WDRs. A supplemental final WDR can be issued in case of follow-on applications of existing warhead/bombs as a significant change to the military characteristics.

**WEAPON DISABLEMENT.** An action, such as damaging a component, that prevents a nuclear weapon from achieving a significant yield.

**WEAPON GRADE PLUTONIUM.** (See plutonium (PU).)

**WEAPON INFORMATION REPORT (WIR).** Report Form (SA5735-R(8-74)). This report is used by SNL to help determine the quality level and reliability and stockpile, and forms a basis for improving stockpile through changes in engineering design and changes in testing and processing operations.

**WEAPON-LOADED AIRCRAFT (NUCLEAR).** A combat delivery aircraft to which a nuclear bomb or a missile or rocket containing a nuclear warhead is electrically or physically attached. Authorized maintenance and weapon load changes may be conducted using Certified Technical Order procedures.

**WEAPON PARTS DESIGNATIONS.** Weapon parts requiring identification beyond that provided by the part number are assigned MC, SA, or CF designations.

**WEAPON PROGRAM DESCRIPTION.** One of five DOE documents comprising the DOE Production Program Definition. The Weapon Program Description (PPD-A-XX), commonly referred to as the "A" document, is a narrative description of the weapon, its subsystems and components, complemented with photographs and/or drawings.

**WEAPON PROGRAM SUPPORT DEFINITION.** A document prepared by SNL for the DoD and NNSA which is part of the program management document. It contains the final assembly definition, interproject group definitions for new production or factory retrofit, field retrofit kit definitions, and the retirement/disposal group definition. (See program management document; weapon program description.)

**WEAPON RELIABILITY ASSESSMENT.** The continuous application of the information relating to the performance of DOE nuclear weapons which produce the best statements of the probability of weapon success under the most severe environments specified in the normal stockpile-to-target sequence.

**WEAPON RESIDUE.** The extremely hot, compressed gaseous residues formed at the instant of the explosion of a nuclear weapon. The temperature is several tens of million degrees (Kelvin) and the pressure is many millions of atmospheres.

**WEAPON STATUS.**

**a.** **NONOPERATIONAL**. An item of nuclear weapon materiel which is either defective to the extent that the assembly is rendered unsuitable for employment, or is subject to a hold order which prohibits all operational use until a specified defect is remedied, also referred to as "red" weapon operational status.

**b.** **OPERATIONAL**. An item of nuclear weapon materiel that is in a condition suitable for employment, also referred to as "yellow" weapon operational status.

**WEAPON STATUS CHECK.** (See permissive action link (PAL).)

**WEAPON STATUS REPORT (WSR).** An electrically transmitted message that reports information about changes in status, location, or configuration of nuclear weapons by both detail serial numbers and summarized quantities. The WSRs are submitted daily by DoD units that have nuclear weapons when changes have occurred in the previous calendar day. When changes have occurred, a WSR must be submitted no later than 1200 hours local time of the next day. If no changes occur, report is not required.

**WEAPON STORAGE AND SECURITY SYSTEM ($WS^3$).** An electrical mechanical system designed to store and secure tactical nuclear weapons within a hardened aircraft shelter.

**WEAPON STORAGE VAULT (WSV).** A WSV is a below ground, surface flush structure for storage of various types of nuclear weapons. The WSV provides enhanced hardened storage against both security and survivability threats and provides for rapid weapon outload. The WSV is a major component of the Air Force $WS^3$.

**WEAPON SUPPORT DEFINITION.** One of five DOE documents comprising the DOE Production Program Definition. The Weapon Support Definition (PPD-B-XX), commonly referred to as the "B" document, defines all material required to assemble a WR bomb/ warhead and associated TYPE and JTA weapons, and assigns production/procurement responsibility within DOE for each ship entity.

**WEAPON SYSTEM.** A combination of one or more weapons with all related equipment, materials, services, personnel, and means of delivery and deployment required for self-sufficiency. (The term is not precise unless specific parameters are established).

**WEAPON TYPE.** A system for designating major assembly identified production materiel which is destined for other than WR use. Because of the numerous variations which may be required, the TYPE number is intended only as a broad category which denotes the intended application of the materiel. TYPE 1 test units are nuclear explosives. All other TYPE units, e.g., TYPE 2, 3, 4, 5, and 6, are nuclear explosive-like assemblies.

**a. TYPE UNITS FOR DoD-DOE USE**. TYPE 1 is reserved for joint DoD-DOE nuclear test weapons.

**b. TYPE UNITS FOR DoD USE**

**(1)** Flight Test Weapons.

**(a)** TYPE 2 identifies a nonnuclear weapon with live HE. It differs from the WR major assembly only as defined on configuration conferences.

**(b)** TYPE 2A is similar to TYPE 2, except that it contains a passive instrumentation package.

**(c)** TYPE 2B is similar to TYPE 2, except that it contains a radio frequency informer instrumentation package.

**(d)** TYPE 2C is similar to TYPE 2, except that it contains no HE and differs from the WR major assembly only as defined in configuration conferences.

**(e)** TYPE 2D is similar to TYPE 2C, except that it contains a passive instrumentation package.

**(f)** TYPE 2E is similar to TYPE 2C, except that it contains a radio frequency informer instrumentation package.

**(g)** TYPE 2F is similar to TYPE 2E and differs only as defined in the configuration process.

**NOTE**

If additional variations over the standardized TYPES are required by the Services, they will be designated TYPE 2G, TYPE 2H, etc., at the configuration conference. Such units may be for joint DoD-DOE use.

**(2)** Military Training Weapons.

**(a)** TYPE 3 identifies a trainer configured to provide loading, handling and limited maintenance training to operational (i.e., using unit) personnel.

**(b)** TYPE 3A identifies a trainer configured to provide for all authorized DoD operational and maintenance training.

**(c)** TYPE 3B identifies a trainer configured specifically for EOD training.

**(d)** TYPE 3C identifies a trainer configured to provide for all authorized DoD operational, maintenance, and EOD training.

**(e)** TYPE 3D WEAPON CUTAWAY (DoD) identifies a cutaway mock-up (e.g., Bxx or Wxx Weapon Cutaway) configured for general weapon orientation and training. The DOE does not support after production.

**NOTE**

If additional variations over the standardized TYPES are required by the Services, they will be designated TYPE 3E, TYPE 3F, etc., at the configuration conference.

**c.** TYPE UNITS FOR DOE USE.

**(1)** Vulnerability Test Units

**(a)** TYPE 4 identifies a category of units configured to test vulnerability effects.

**(b)** TYPE 4A identifies a unit configured to test vulnerability effects of radiation exposure.

**(2)** Training and Evaluation Weapons.

**(a)** EARLY TYPE 5 (ET5) identifies a category of units which Pantex is authorized to build prior to phase 5 first production unit (FPU). These units are for developing assembly process, tooling tryouts, personnel training, nuclear safety studies and other uses for which they are suitable. They are given a letter suffix to denote the TYPE 5 weapon to which they are upgraded.

**(b)** TYPE 5A identifies an inert nonnuclear weapon with hazardous explosive components.

**(c)** TYPE 5B identifies an inert nonnuclear weapon without hazardous explosive components.

**(d)** TYPE 5C identifies an inert nonnuclear weapon without hazardous explosive components. This unit differs from the TYPE 5B in definition and internal configuration due to usage.

**(e)** TYPE 5D identifies an inert nonnuclear weapon without hazardous explosive components configured for JTA evaluation and training

**(3)** Special Test Units.

**(a)** TYPE 6 identifies a category of non WR units designed for extended evaluation.

**(b)** TYPE 6A identifies a laboratory test unit to evaluate nuclear systems' structural integrity and the weapon electrical firing system after being subjected to a stockpile-to-target environment.

**(c)** TYPE 6B identifies a prebuilt laboratory test unit to expose specified components of the weapon system to storage environments.

**(d)** TYPE 6C identifies a laboratory test unit used to evaluate the electrical system after being subjected to stockpile-to-target environments.

**(e)** TYPE 6D identifies a laboratory test unit to evaluate the explosive system and weapon electrical system after being subjected to stockpile-to-target environments.

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**WEAPON YIELD.** (See yield (or energy yield).)

**WEAPON(S) UNIQUELY CODED FOR RETIREMENT (WUCFR).** A procedure to recode selected retirement designated weapons with a unique PAL code. The WUCFR PAL code alleviates requirements for further recoding during a weapon's retirement cycle (i.e., storage, transportation, dismantlement).

**WEAPONIZATION PROGRAMS.** The process involved in creating a nuclear weapon. This includes the research and development laboratories with the human resources, technical skills, and equipment, specialized materials; production equipment; test facilities, and delivery systems.

**WEAPONS ACCESS DELAY SYSTEM (WADS).** A multiple component system integrated into a weapons storage structure consisting of external and internal parts both active and passive which will in combination effectively delay unauthorized access to stored weapons.

**WEAPONS DATA.** Restricted data or formerly restricted data concerning the design, manufacture, or utilization (including theory, development, storage, characteristics, performance, and effects) of nuclear weapons or nuclear weapon components, including information incorporated in or related to nuclear explosive devices.

**WEAPONS EMPLOYMENT ANALYSIS.** A pre-strike evaluation to determine the best available weapon, yield, height of burst, and recommended ground zero for use against a target complex.

**WEAPONS GRADE MATERIAL.** Nuclear material considered most suitable for a nuclear weapon. It usually connotes uranium enriched to 90 percent or greater uranium-235 or plutonium with greater than about 90 percent plutonium-239.

**WEAPONS RECOVERY.** Includes a comprehensive assessment of the accident neutralizing the weapon hazards, and removing, packaging, and shipping of the weapon hazards.

**WEAPONS RETIREMENT.** The process by which nuclear weapons are determined to be obsolete or unnecessary for national defense. A retired weapon or weapon system is no longer in an active status or deliverable, but may still be a fully functioning nuclear device. A retired weapon may be moved to Active/Inactive status by following applicable procedures.

**WEAPONS SECURITY CONTAINER (WSC).** The XH4289 weapons security container is a rectangular cage, fabricated from structural steel and expanded steel mesh to be used for small containerized weapons. It is mounted on casters for mobility and uses two combination locks for security.

**WEAPONS TRANSFER.** The authorized exchange of weapons between elements of the DOE and DoD or between elements of the DoD. Such transfers include appropriate assumption and relinquishment of responsibility for security, storage, maintenance, transfer, access to and movement of weapons and components, and maintenance of accountability therefor as prescribed by competent authority. (See custody.)

**WHOLE BODY DOSE.** The dose of radiation received by the body in its entirety, as distinct from a dose to a limited area of the body. A whole body dose can be lethal depending on the type of radiation and exposure time.

**WILL.** Whenever the word “will” appears in the Joint Nuclear Weapons Publication System (JNWPS), it shall be construed to mean the requirement is binding.

**WITHHOLD (NUCLEAR).** The limiting of authority to employ nuclear weapons by denying their use within specified geographical areas of certain countries.

**WOODEN BOMB.** A concept which pictures a weapon as being completely reliable and having an infinite shelf life while at the same time requiring no special handling, storage or surveillance.

**WORK BOTTLE.** A container for pressurized inert gas used as an energy source.

**WORKING PRESSURE.** Pressure in a reservoir at a stated time during its service life.

# X

**X-RAY PANCAKE.** A layer of air, about 30,000 feet thick at a mean altitude of roughly 270,000 feet, which becomes incandescent by absorption of the thermal X-rays from explosions above 270,000 feet altitude. The heated air emits thermal radiation (of longer wavelengths) in a single pulse of several seconds duration. (See thermal radiation, thermal x-rays.)

**X-RAYS.** Electromagnetic radiations of high energy having wavelengths shorter than those in the ultraviolet region, i.e., less than$10^{-6}$ cm or 100 Angstroms. Materials at very high temperatures (millions of degrees) emit such radiations; they are then called thermal X-rays. As generally produced by X-ray machines, they are bremsstrahlung resulting from the interaction of electrons of 1 kilo-electron volt or more energy with a metallic target. (See electromagnetic radiation (EMR), thermal x-rays.)

**X-UNIT.** A device used in nuclear weapons to provide energy to initiate the nuclear system detonators.

# Y

**YIELD (OR ENERGY YIELD).** The total effective energy released in a nuclear (or atomic) explosion. It is usually expressed in terms of the equivalent tonnage of TNT required to produce the same energy release in an explosion. The total energy yield is manifested as nuclear radiation, thermal radiation, and shock (and blast) energy, the actual distribution being dependent upon the medium in which the explosion occurs (primarily) and also upon the type of weapon and the time after detonation. (See TNT equivalent.)

**YIELD DETERMINING TARGETS.** The target elements in a complex which, by interaction of hardness and distance, determine the yield and location of recommended ground zero which will give the desired damage to the complex.

**YIELD PRESSURE.** Pressure that produces a permanent deformation in the wall of a vessel.

# Z

**Z.** The symbol commonly used to denote atomic number. In usage, usually “low-Z” or “high-Z.”

**ZERO POINT.** The location of the center of a burst of a nuclear weapon at the instant of detonation. The zero point may be in the air, or on, or beneath the surface of land or water, dependent upon the type of burst, and it is thus to be distinguished from ground zero.

**ZERO ROOM.** A term used within DoD to designate the room or enclosure containing the nuclear device.

**ZIPPER.** An obsolete nickname used instead of the term “neutron generator” when the fact of existence of such components was classified. After many years of use it has become entrenched in the jargon. Its continued use is acceptable so long as the user realizes that it no longer provides any classification protection.

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# SECTION 3

# ABBREVIATIONS AND ACRONYMS

# A

| | |
|---|---|
| **A** | amperes |
| **ABM** | anti-ballistic missile |
| **ABS** | acrylo-butadiene-styrene |
| **AC** | alternating current |
| **ACCD** | aircraft compatibility control drawing |
| **ACN** | activity control number |
| **ACO** | advance change order |
| **ACU** | air conditioning unit |
| **AEDA** | Ammunition, Explosives and Dangerous Articles |
| **AER** | advance engineering release |
| **AFB** | Air Force Base |
| **AFD** | arming and fuzing device |
| **AF&F** | arming, fuzing, and firing |
| **AFGSC** | Air Force Global Strike Command |
| **AFNWC** | Air Force Nuclear Weapons Center |
| **AFS** | arming and fuzing subsystem |
| **AFTO** | Air Force technical order |

| | |
|---|---|
| **AGZ** | actual ground zero |
| **AK** | adaption kit |
| **ALARA** | as low as reasonably achievable |
| **ALI** | annual limit on intake |
| **ALT** | alteration |
| **AMAC** | aircraft monitoring and control |
| **AN** | Army-Navy |
| **ANSI** | American National Standards Institute |
| **APC** | automated PAL controller |
| **APL** | Allowance Parts List |
| **APS** | active protection system |
| **ARA** | alternate release assembly |
| **ARF** | augmentation reserve force |
| **AS** | Auxiliary Ship |
| **ASSOC** | associates |
| **ASSY** | assembly |
| **ATTN** | attention |
| **AUR** | all-up-round |

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# B

| | |
|---|---|
| **B** | bomb or bridge |
| **BA** | basic assembly |
| **BAF** | backup alert force |
| **BDU** | bomb dummy unit |
| **BLDG** | building |
| **BLK** | black |
| **BLVD** | boulevard |
| **BMSS** | Base and Military Spares Server |
| **BOI** | Break-of-Inspection |
| **BT** | bottle |
| **BW** | bridgewire |
| **BX** | box |

# C

| | |
|---|---|
| **C** | Confidential or Celsius |
| **CA** | cartridge |
| **CAGE** | Commercial and Government Entity |
| **CAGEC** | Commercial and Government Entity Code |
| **CAL** | completely assembled for launch or calibration |
| **CAP** | code activated processor or capacity |

| | |
|---|---|
| **CAPE** | capability and proficiency evaluation |
| **CAR** | Continuing Authority SWOP Matrix Report |
| **CAS** | completely assembled for strike |
| **CBL** | Commercial Bill of Lading |
| **CB** | circuit breaker |
| **CC** | Combatant Commanders or cubic centimeter |
| **CCA** | circuit card assembly |
| **CCAD** | command-coded arming device |
| **CCM** | counter-countermeasure or Sturtevant Richmont CCM-series torque wrench |
| **CCW** | counterclockwise |
| **CD** | command disable, command disablement |
| **CDC** | command disable code |
| **CDS** | command disable system |
| **CEDE** | committed effective dose equivalent |
| **CEL** | commercial equipment list |
| **CEP** | circular error probable |
| **CER** | complete engineering release |
| **CES** | code enabling switch |
| **CF** | cable functioning |
| **CFRD** | Confidential Formerly Restricted Data |
| **CG** | center of gravity |

| | |
|---|---|
| **CII** | configuration item identifier |
| **CIM** | contractor inventory manager |
| **CJCS** | Chairman Joint Chiefs of Staff |
| **CJCSI** | Chairman Joint Chiefs of Staff Instruction |
| **CL** | checklist |
| **CM** | communication module |
| **cm $^2$** | centimeter squared |
| **CMS** | code management system |
| **CN** | can |
| **CNS** | Consolidated Nuclear Security (as in CNS Pantex) |
| **CNWDI** | Critical Nuclear Weapons Design Information |
| **COM** | common |
| **COML** | commercial |
| **CONTR** | contract |
| **CONUS** | Continental United States |
| **COSAL** | coordinated shipboard/activity allowance list |
| **COT** | consolidated operability test |
| **COTS** | commercial-off-the-shelf |
| **cps** | counts per second |
| **CRD** | Confidential Restricted Data |
| **CRIT** | critical mass |

**CS** coded switch

**CSK** countersink

**CSS** coded switch set

**CSSC** coded switch set controller

**CT** cable test

**CTE** component test equipment

**CTL** combat training launch

**CTU** control unit

**CW** clockwise

**CY** cylinder

# D

**DAASC** Defense Automatic Addressing System Center

**DAC** derived air concentration

**DASO** demonstration and shakedown operations

**DAU** Data Acquisition Unit

**DBD** detailed breakdown

**DC** direct current

**DCER** design criteria engineering release

**DCS** Defense Courier Service

**DE** disablement equipment

**DEMIL** Demilitarization

| | |
|---|---|
| **DEPSO** | Departmental Standardization Office |
| **DER** | development engineering release |
| **DGZ** | desired ground zero |
| **DIA** | diameter |
| **DIAMONDS** | Defense Integration and Management of Nuclear Data Services |
| **DIC** | Document Identifier Code |
| **DIRSSP** | Director, Strategic Systems Programs |
| **DJTA** | developmental joint test assembly |
| **DLA** | Defense Logistics Agency |
| **DMC** | DMM Multi-functional Calibrator |
| **DMM** | digital Multi-meter |
| **DNSI** | Defense Nuclear Surety Inspection |
| **DoD** | Department of Defense |
| **DOE** | Department of Energy |
| **DON** | Department of Navy |
| **DOT** | Department of Transportation |
| **DRAAG** | Design Review and Acceptance Group |
| **DRMO** | Defense Reutilization and Marketing Office |
| **DRR** | drum or Defect Repair Record |
| **DSN** | Defense Switched Network |
| **DSRL** | DOE Spares Repair List |

| | |
|---|---|
| **DT** | deuterium-tritium |
| **DTRA** | Defense Threat Reduction Agency |
| **DTRA/J10NLLC** | DTRA, Nuclear Logistics Operations Department, Nuclear Logistics Division, Cataloging Branch |
| **DTRA/RMA** | DTRA Records Management Application |
| **DW** | development warhead |
| **DWG** | drawing |
| **DZ** | dozen |

# E

| | |
|---|---|
| **EB** | exploding bridge |
| **EBW** | exploding bridgewire |
| **ED** | emergency destruction |
| **EDD** | Earliest Delivery Date |
| **EDQR** | Electrical Designated Qualified Representative |
| **EED** | electro-explosive device |
| **e.g.** | for example |
| **EGR** | energy gamma rays |
| **EHW** | Explosive Handling Wharf |
| **EM** | expendable material |
| **EMI** | electromagnetic interference |

| | |
|---|---|
| **EML** | equipment maintenance log |
| **EMP** | electromagnetic pulse |
| **EMR** | electromagnetic radiation |
| **ENR** | energy neutrons |
| **ENTB** | Extended Navy Test Bed |
| **EOD** | explosive ordnance disposal |
| **EODWG** | Explosive Ordnance Disposal Working Group |
| **EOS** | equation of state |
| **ER** | energy ratio, engineering release, eardrum rupture, or enhanced radiation |
| **ERP** | equipment requirement program |
| **ERS** | equipment requirements schedule |
| **ERS PCD** | Equipment Requirements Schedule Program Control Document |
| **ES** | equipment section |
| **ESD** | environmental sensing device |
| **ESDS** | electrostatic discharge sensitive |
| **ESM** | elastomeric shield material |
| **ESSD** | electrostatic sensitive device |
| **ET5** | early type 5 |
| **etc.** | etcetera |
| **ETI** | early transient incapacitation |
| **EURS** | Electronic Unsatisfactory Reporting System |

| | |
|---|---|
| **EVP** | Equipment Verification Procedure |
| **EXR** | energy X-rays |

# F

| | |
|---|---|
| **°F** | degree Fahrenheit |
| **F** | fuze |
| **FBM** | fleet ballistic missile |
| **FCET** | Follow-on Commanders Evaluation Tests |
| **FCO** | final change order |
| **FD** | facility drawing |
| **FG** | Foreign Government |
| **FHC** | Final Hazard Classification |
| **FIG** | figure |
| **FISC** | Fleet and Industrial Supply Center |
| **FOD** | foreign object debris damage |
| **FOT** | follow-on operational test |
| **FOUO** | For Official Use Only |
| **FPDR** | first production drawing release |
| **FPU** | first production unit |
| **FRD** | Formerly Restricted Data |
| **FS** | firing set or far side |

| | |
|---|---|
| **FSC** | Federal Supply Class |
| **FSG** | federal supply group |
| **FTU** | flight test unit |
| **FUFO** | full-fuzing option |
| **FWD** | forward |
| **FY** | Fiscal Year |

# G

| | |
|---|---|
| **GA** | gun-assembled |
| **GAPL** | group assembly parts list |
| **GBL** | Government Bill of Lading |
| **GL** | gallon |
| **GM** | gram |
| **GOE** | Government Owned Equipment |
| **GPS** | Global Positioning System |
| **GRN** | Green |

# H

| | |
|---|---|
| **H** | handling equipment |
| **HAB** | high altitude burst |
| **Hd** | head |
| **HD** | hundred |

| | |
|---|---|
| **HE** | high explosives |
| **HERO** | hazards of electromagnetic radiation to ordnance |
| **HETT** | high explosive transit time |
| **Hex** | hexagon |
| **HOB** | height of burst |
| **Hr.** | hour |
| **Hz** | hertz |

# I

| | |
|---|---|
| **IA** | implosion-assembled |
| **IAW** | in accordance with |
| **IC** | interim change |
| **ICB** | interconnecting box |
| **ICBM** | intercontinental ballistic missile |
| **ICP** | Inventory Control Point |
| **ID** | identification |
| **IFD** | in-flight disconnect |
| **IH** | inert head |
| **IHC** | Interim Hazard Classification |
| **IHE** | insensitive high explosive |
| **IM** | inert modified |

| | |
|---|---|
| **IMM** | Integrated Materiel Management |
| **IN or in.** | inch |
| **INC or inc.** | incorporated |
| **INRAD** | intrinsic radiation |
| **INSI** | Initial Nuclear Surety Inspection |
| **IOC** | Initial Operational Capability |
| **IOCD** | initial operational capability date |
| **IPB** | Illustrated Parts Breakdown |
| **IPG** | interproject group |
| **IPST** | initial production systems test |
| **IR** | Infrared |
| **IRC** | inspection record card |
| **IS** | inactive stockpile |
| **ITC** | in-tube conversion |

# J

| | |
|---|---|
| **J** | jack |
| **JCS** | Joint Chiefs of Staff |
| **JCWG** | Joint Configuration Working Group |
| **JFT** | joint flight test |
| **JNSI** | Joint Nuclear Surety Inspection |

**JNWPS** Joint Nuclear Weapons Publication System

**JR** jar

**JTA** joint test assembly

**JTG** joint task group

**JTS** joint test subassembly

**JTU** joint test unit

**JTWG** joint test working group

# K

**k** kilo

**kHz** kilohertz

**kt** kiloton or kit

**kv** kilovolt

# L

**LABS** low altitude bombing system

**LADD** low angle drogue delivery

**LANL** Los Alamos National Laboratory

**LAPSC** Limited Area Production and Storage Complex

**lb** pound

**LCD** liquid crystal display

| | |
|---|---|
| **LCTMK** | low cost test missile kit |
| **LD** | lethal dose |
| **LE** | low explosive |
| **LED** | light-emitting diode |
| **LEE** | logistical evaluation exercise |
| **LEG** | logistical evaluation group |
| **LES** | loaded equipment section |
| **LG** | length |
| **LH** | left hand |
| **LLC** | limited-life component |
| **LLCE** | limited-life component exchange |
| **LLNL** | Lawrence Livermore National Laboratory |
| **LMSSC** | Lockheed Martin Space Systems Company |
| **LOS** | line-of-sight |
| **LT** | left |
| **LTC** | limited try count |
| **Ltd** | limited |
| **Ltr** | letter |
| **LTU** | laboratory test units |
| **LVI** | low-voltage initiator |
| **LVS** | low-voltage squib |

# M

| | |
|---|---|
| **m** | milli or meter |
| **MAJCOM** | Major Command |
| **M/N** | model number |
| **mAH** | Milliampere Hours |
| **MAR** | Major Assembly Release |
| **MARV** | maneuverable reentry vehicle |
| **MASO** | Munitions Accountable Systems Officer (Air Force Only) |
| **MAX** | maximum |
| **MC** | major component or military characteristics |
| **MCCS** | multiple code coded switch |
| **MCCSS** | multiple code coded security switch |
| **MDU** | munitions dummy unit |
| **MEK** | methyl-ethyl-ketone |
| **MES** | manufacture-through-employment sequence |
| **MET** | MCCS encryption translator |
| **mfd** | manufactured |
| **MFD** | military first destination |
| **MFG or mfg** | manufacturer |
| **MG** | milligram |
| **MIL** | military |

| | |
|---|---|
| **MIL-STD** | military-standard |
| **MILSTRAP** | Military Standard Transaction Reporting and Accounting Procedures |
| **min** | minimum |
| **MIPR** | Military Inter-Departmental Purchase Request |
| **MIR** | Major Impact Report |
| **MK** | Mark |
| **ML** | Management Data List |
| **ML** | milliliter |
| **MLI** | Munitions List Item |
| **MLP** | manual lowering procedure |
| **MMM** | Missile Motor Magazine |
| **MOA** | Memorandum of Agreement |
| **MOD** | modification |
| **MOU** | Memorandum of Understanding |
| **MPH** | miles per hour |
| **MPI** | Master Painters Institute |
| **MPPCF** | million particles per cubic foot |
| **MPW** | missile parts warehouse |
| **MR** | mortality range |
| **MRC** | maintenance requirement card |
| **MRR** | minimum residual radioactivity (weapon) |

| | |
|---|---|
| **MS** | military standard |
| **MSDS** | Material Safety Data Sheet |
| **MSAD** | mechanical safing and arming detonator |
| **MSL** | missile |
| **MTO** | materiel transfer order |
| **MUNS** | munitions squadron |
| **mV** | millivolt |
| **MX** | thousand |

# N

| | |
|---|---|
| **N** | nose |
| **NA or N/A** | not applicable |
| **NAPSAC** | Naval Atomic Planning, Support, and Capabilities |
| **NAS** | nuclear assembly system |
| **NASP** | nuclear ammunition supply point |
| **NAVICP/MECH** | Naval Inventory Control Point/Mechanicsburg, Pennsylvania |
| **NCM** | nonconforming materiel |
| **NDEW** | nuclear directed energy weapon |
| **NDI** | Non-Developmental Items |
| **NDT** | nondestructive test |
| **NELA** | nuclear explosive-like assembly |

| | |
|---|---|
| **NF** | nose fairing |
| **NHA** | next higher assembly |
| **NIIN** | National Item Identification Number |
| **NIMACS** | Nuclear Inventory Management and Cataloging System |
| **NLLJ** | Nuclear Logistics Operations (JNWPS) |
| **NMFT** | new materiel flight tests |
| **NMLT** | new materiel laboratory test |
| **NNAP** | Nonnuclear Assurance Program |
| **NNV** | nonnuclear verification |
| **NNSA** | National Nuclear Security Administration |
| **NO or No.** | number |
| **NOAM** | nuclear ordnance Air Force materiel |
| **NOCM** | nuclear ordnance controlled materiel |
| **NOCO** | Nuclear Ordnance Cataloging Office |
| **NORC** | nuclear ordnance record card |
| **NOSS** | nuclear ordnance shipping schedule |
| **NOTU** | Naval Ordnance Test Unit |
| **NOWR** | nuclear ordnance war reserve (materiel) |
| **NPP** | nuclear pilot production |
| **NPT** | National Pipe Thread (pipe thread specification) |
| **NQAA** | nuclear quality assurance agency |

| | |
|---|---|
| **NS** | near side |
| **NSC** | National Security Campus (Formerly KCP) |
| **NSI** | Nuclear Surety Inspection |
| **NSN** | National Stock Number |
| **NTA** | Navy test assembly |
| **NTPI** | Navy Technical Proficiency Inspection |
| **NVD** | nonviolent disablement |
| **NVTS** | no-voltage test set |
| **NWAI** | Nuclear Weapons Acceptance Inspection |
| **NWAO** | Nuclear Weapons Accountable Officer |
| **NWC** | Nuclear Weapons Council |
| **NWCSSC** | Nuclear Weapons Council Standing and Safety Committee |
| **NWER** | nuclear weapon effects research |
| **NWET** | nuclear weapon effects test |
| **NWMDDWG** | Nuclear Weapons Materiel DEMIL/Disposal Working Group |
| **NWRM** | Nuclear-Weapons-Related Materiel |
| **NWRMAO** | Nuclear-Weapons-Related Materiel Accountable Officer |
| **NWRO** | nuclear weapons retrofit order |
| **NWSM** | Nuclear Weapons Stockpile Memorandum |
| **NWSP** | Nuclear Weapons Stockpile Plan |
| **NWSS** | nuclear weapon subsystem |

**NWSSG** nuclear weapon system safety group

**NWSSTP** nuclear weapon subsystem test plan

**NWSSTPG** nuclear weapon subsystem test plan group

**NWTI** Nuclear Weapons Technical Inspection

**NWTM** Nuclear Weapons Technical Manual

# O

**OAD** operational availability date

**OCONUS** outside Continental United States

**OD** operating directive or ordnance data or outside diameter

**OET** operational employment test

**OMB** Office of Management and Budget

**OOSS** overseas operational storage site

**OP** operating procedure or ordnance pamphlet/ordnance publication

**OPR** Office of Primary Responsibility

**OPUS** overland palletized unit shipper

**org** organization

**OS** ordnance specifications

**OS/AEL** operating space/allowance equipage list

**OSHA** Occupational Safety and Health Administration

**OSR** operational safety review

| | |
|---|---|
| **OSS** | operational storage site |
| **OUO** | official use only |
| **OZ** | ounce |

# P

| | |
|---|---|
| **P** | plug |
| **PA** | production agency |
| **PAL** | permissive action link |
| **PAPS** | permissive arming and protection system |
| **PCD** | Program Control Document |
| **PCI** | permanent complete incapacitation |
| **PCP** | product change proposal |
| **PD** | performance decrement |
| **PDA** | Procurement Defense Agency |
| **PDS** | Packaging Data Sheet (container) |
| **PDW** | Procurement Defense Wide |
| **PE** | positive enable |
| **PG** | procedural guide |
| **PM** | preventative maintenance |
| **PMCT** | PAL Management Control Team |
| **PMOSSP** | Program Management Office Strategic Systems Programs |

| | |
|---|---|
| **PMS** | planned maintenance system |
| **P/N OR PN** | part number |
| **PNAF** | Primary Nuclear Airlift Force |
| **PNR** | Processing Number Report |
| **POG** | Project Officers Group |
| **POM** | Project Officers meeting |
| **POMF** | Polaris Missile Facility |
| **POS** | position |
| **PPM** | parts per million |
| **PPS** | preliminary planning schedule |
| **PREP** | preparation |
| **PRP** | personnel reliability program |
| **psi** | pounds per square inch |
| **PT** | pint |
| **PTFE** | polytetrafluoroethylene |
| **PTR** | pressure test record |
| **PWR** | power |
| **PXSO** | Pantex Site Office |

# Q

| | |
|---|---|
| **QA** | quality assurance |
| **QAER** | qualification acceptance equipment release |
| **QAIA** | quality assurance inspection agency |
| **QAIP** | quality assurance inspection procedures |
| **QAP** | quality assurance procedures |
| **QAS** | Quality Assurance Specialist |
| **QART** | quality assurance and reliability testing |
| **QAST** | quality assurance service test |
| **QATI** | quality assurance test instructions |
| **QD** | quantity/distance |
| **QER** | qualification evaluation release |
| **QRA** | quick reaction alert |
| **QT** | quart |

# R

| | |
|---|---|
| **R** | resistance |
| **RA** | release assembly |
| **RAC** | radioactive cargo |
| **RAD** | radiation absorbed dose |
| **RADEX** | radiation exclusion |

| | |
|---|---|
| **RADIAC** | radioactivity detection indication and computation |
| **RAL** | recommended allowance list |
| **RB** | reentry body |
| **RBA** | reentry body assembly (reentry body with release assembly) |
| **RBC** | Reentry Body Complex |
| **RBE** | relative biological effectiveness |
| **RD** | Restricted Data |
| **RDD** | Required Delivery Date |
| **RDE** | radiation detection equipment |
| **RDI** | retirement disposal instruction |
| **REB** | Reentry Body Building |
| **REF** | reference |
| **REM** | roentgen equivalent mammal |
| **RES** | reentry system |
| **Rev** | revision |
| **RF** | reserve force or radio frequency |
| **RH** | relative humidity |
| **RI** | Routing Identifier |
| **R-IHC** | Renewed Interim Hazard Classification |
| **RMA** | Return Material Authorization |
| **RNAD** | Royal Navy Armament Depot |

| | |
|---|---|
| **RNS** | rework number sequence |
| **RO** | retrofit order or roll |
| **ROA** | record of assembly |
| **ROD** | record of disassembly |
| **RP** | repair procedure |
| **RRR** | reduced residual radiation |
| **RS** | reentry system |
| **RSP** | render safe procedures |
| **RT** | right |
| **RTG** | radio-isotopic thermoelectric generator |
| **RTV** | room temperature vulcanizing or return to vendor |
| **RV** | reentry vehicle |

# S

| | |
|---|---|
| **S** | Secret |
| **SA** | Sandia apparatus or Storage Activity |
| **SAF&F** | safing, arming, fuzing and firing |
| **SAT** | security alert team |
| **SBCD** | shipboard command disable |
| **SC** | shape component |
| **SCS** | security container system |

| | |
|---|---|
| **SD** | source data |
| **SDRT** | Sturtevant Richmont square drive ratchet |
| **SDS** | Safety Data Sheet |
| **SE** | support equipment |
| **SEARA** | stockpile evaluation and reliability assessment |
| **Sec** | Section |
| **SEL** | special equipment list |
| **SEP** | spherical error probability |
| **SEQR** | stockpile evaluation qualification release |
| **SER** | serial |
| **SEV** | stockpile emergency verification |
| **SF** | security force or Standard Form |
| **SFI** | significant finding investigation |
| **SFIR** | Significant Finding Investigation Report |
| **SFRD** | Secret Formerly Restricted Data |
| **SFT** | stockpile flight tests |
| **SGT** | safeguards transporter |
| **SH** | sheet |
| **SI** | storage inspection |
| **S/** | System International d’ Unités |
| **SIER** | special instruction engineering release |

| | |
|---|---|
| **SIR** | semiannual inventory report |
| **SLE** | service life evaluation |
| **SLT** | stockpile laboratory test |
| **S/N** | serial number |
| **SNL** | Sandia National Laboratories |
| **SNL/ML** | Sandia National Laboratories/Military Liaison |
| **SNM** | special nuclear material |
| **SOP** | standard operating procedure |
| **SP** | Special Procedure |
| **SPALT** | Strategic Systems Programs Alteration |
| **SPF** | PMOSSP, Flight Systems |
| **SPL** | spare parts list |
| **SPTDR** | Strategic Systems Programs Technical Data Repository |
| **SR** | suppressed radiation |
| **SRAN** | Stock Record Account Number |
| **SRD** | Secret Restricted Data |
| **SRP** | sensitive repair |
| **S/RP** | spare/repair part |
| **SS** | source and special |
| **SSBN** | Ship Submersible Ballistic Nuclear |
| **SSCN** | Supply support Change Notice |

| | |
|---|---|
| **SSE** | surface support equipment |
| **SSF** | Service storage facility |
| **SSP** | Strategic Systems Programs |
| **SST** | safe secure trailer |
| **SSU** | separation sequencer unit |
| **ST** | special tool |
| **START** | Strategic Arms Reduction Treaty |
| **STAS** | Safe to Arm Signal |
| **STD** | standard |
| **StratSysIPT** | Strategic Systems Integrated Project Team |
| **STS** | stockpile-to-target sequence |
| **SU** | service unit |
| **SUCI** | sensitive use control information |
| **SWF** | Strategic Weapons Facility |
| **SWFLANT** | Strategic Weapons Facility Atlantic |
| **SWFPAC** | Strategic Weapons Facility Pacific |
| **SWOG** | special weapons overflight guide |
| **SWOP** | special weapons ordnance publication |
| **SWS** | strategic weapon system |
| **SWSSW** | Strategic Weapons Systems Supply Warehouse (SWFLANT only) |
| **SYS** | system |

# T

| | |
|---|---|
| **T** | test equipment |
| **T&H** | Test and Handling |
| **TB** | terminal board |
| **TD** | timer driver |
| **TEDE** | Total Effective Dose Equivalent |
| **Temp** | temperature |
| **TES** | tamper-evident seal |
| **TFD** | Thomas-Fermi-Dirac |
| **TFIRR** | Trouble Failure Inspection/Rejection Report |
| **TH** | telemetry head |
| **THK** | thick |
| **TJFD** | TOMAHAWK joint flight developmental |
| **TJFS** | TOMAHAWK joint flight special |
| **TLD** | threshold lung damage/thermoluminescent dosimeter |
| **TM** | technical manual or telemetry |
| **TMK** | test missile kit |
| **TN** | thermonuclear |
| **TNT** | trinitrotoluene |
| **T.O.** | technical order |
| **TP** | technical publication |

| | |
|---|---|
| **TR** | trainer |
| **TRB** | trainer reentry body |
| **TREE** | transient radiation effects on electronics |
| **TRES** | Trident Reentry System |
| **TRF** | Trident Refit Facility |
| **TRI** | TRIDENT |
| **TSD** | Transportation Safeguards Division |
| **TSSG** | trajectory sensing signal generator |
| **TU** | tuballoy or tube |

# U

| | |
|---|---|
| **U** | Unclassified |
| **UC** | use control |
| **UCC** | use control characteristics |
| **UCS** | use control system |
| **UD** | use control disablement equipment |
| **UGM** | Underwater Guided Missile |
| **UH** | use control headquarters equipment |
| **UI** | unit of issue |
| **UII** | Unique Item Identifier |
| **UK** | United Kingdom |

| | |
|---|---|
| **UL** | use control cables, adapters |
| **UM** | use control miscellaneous equipment |
| **UN** | United Nations |
| **UNC** | unified national coarse thread (bolts, screws) |
| **UNF** | unified national fine threat (bolts, screws) |
| **UNJC** | unified national J series coarse thread |
| **UNJF** | unified national J series fine thread |
| **UR** | unsatisfactory report |
| **URL** | Uniform Resource Locater |
| **URR** | unsatisfactory report response |
| **US** | United States |
| **USAL** | Unit Spares Authorization List |
| **USAS** | USA standard |
| **USB** | Universal Serial Bus |
| **U.S.C.** | United States Code |
| **USDR&E** | Under Secretary of Defense for Research and Engineering |
| **USN** | United States Navy |
| **UU** | ultimate user |
| **UUT** | unit under test |

# V

| | |
|---|---|
| **V** | volts |
| **VA** | volts, alternating current (as used on test equipment) |
| **VAC or vac** | volts, alternating current |
| **VC** | vendor code |
| **VDC or vdc** | volts, direct current |
| **VH** | validation head |
| **VCP** | Verifiable Control Procedures |
| **VMPB** | Vertical Missile Packaging Building |
| **VOC** | volatile organic compound |
| **VRMS** | volts root mean squared |
| **VUGT** | verification of unintended gas transfer |

# W

| | |
|---|---|
| **W** | warhead |
| **WADS** | weapons access delay system |
| **WDR** | Weapon Development Report |
| **WFO** | Work for Others |
| **WH** | warhead |
| **WHS** | warhead section |
| **WHT** | white |

| | |
|---|---|
| **WIR** | Weapon Information Report |
| **WP** | weapons operating procedure |
| **WPNS** | weapons |
| **WR** | war reserve |
| **WS** | Weapon Specification |
| **WS$^3$** | weapon storage and security system |
| **WSC** | weapons security container |
| **WSR** | weapon status report |
| **WSR-EXER/ EMERG** | wartime/exercise/emergency report |
| **WSV** | weapons storage vault |
| **WT** | weight |
| **WUCFR** | weapon(s) uniquely coded for retirement |

# Y

| | |
|---|---|
| **YD** | yard |

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