APPENDIX F–GLOSSARY

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Alpha Particle: A particle emitted spontaneously from the nuclei of some radioactive elements. It is identical with a helium nucleus, having a mass of four units and an electric charge of two positive units.

Cloud Column: The visible column of weapon debris (and possibly dust and water droplets) extending upward from the point of burst of a nuclear (or atomic) weapon.

Crater: The pit, depression, or cavity formed in the surface of the Earth by a surface or underground explosion. Crater formation can occur by vaporization of the surface material, by the scouring effect of air blast, by throwout of disturbed material, or by subsidence. In general, the major mechanism changes from one to the next with increasing depth of burst. The apparent crater is the depression which is seen after the burst; it is smaller than the true crater (i. e., the cavity actually formed by the explosion), because it is covered with a layer of loose earth, rock, etc.

Dynamic Pressure: The air pressure that 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.

Electromagnetic Pulse: 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.

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 that ascend into the upper troposphere and into the stratosphere and are carried by 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.

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.

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 that 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.

Gamma Rays (or Radiations): Electromagnetic radiations of high photon energy originating i n atomic nuclei and accon:panying 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).

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.

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 (kt) (1 ,000 tons) of TNT.

Megaton Energy: Defined strictly as 10^{15} calories (or **4.2 x 1022 ergs). This is approximately the amount** of energy that would be released by the explosion of 1,000 kt (1 million tons) of TNT.

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.

Nuclear Radiation: Particulate and electromagnetic radiation emitted from atomic nuclei in various nuclear processes. The important nuclear radiations, from the weapons 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 atom i c nuclei,

Nuclear Weapon (or Bomb): A general name given to any weapon in which the explosion results from the energy released by reactions involvin g atomic nuclei, either fission or fusion or both. Thus, the A- (or atomic) bomb and the H- (or 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-Iess 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.

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.

Rad: A unit of absorbed dose of radiation; it represents the absorption of 100 ergs of nuclear (or ionizing) radiation per gram of absorbing material, such as body tissue.

Rem: A unit of biological dose of radiation; the name is derived from the initial letters of the term "roentgen equivalent man (or mamreal). " The number of reins of radiation is equal to the number of rads absorbed multiplied by the relative biological effectiveness 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.

Roentgen: A unit of exposure to 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 2.58 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 *Rad.*

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), 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 [30,480 meters]), the thermal radiation is emitted as a single pulse, which is of short durartion below about 270,000 feet [82,296 meters] but increases at greater burst heights