APPENDIX 3

ACRONYMS & ABBREVIATIONS

A

AAF	Army Air Forces
AAL	Arctic Aeromedical Laboratory
ACHRE	Advisory Committee on Human Radiation Experiments
ACR	American College of Radiology
AEC	Atomic Energy Commission [predecessor to the Department of Energy]
AFB	Air Force Base
AFMPC	Armed Forces Medical Policy Council
AFR	Air Force Regulation
AFRRI	Armed Forces Radiobiology Research Institute
AFSWP	Armed Forces Special Weapons Project (predecessor to DASA)
AMA	American Medical Association
AR	Army Regulation
ATSD (AE)	Assistant to the Secretary of Defense (Atomic Energy)

B

BUMED	Bureau of Medicine and Surgery, Navy

C

CBDCOM	Chemical and Biological Defense Command
CDC	Centers for Disease Control and Prevention
CIA	Central Intelligence Agency
CIC	Coordination and Information Center
CMS	Committee on Medical Sciences

D

DASA	Defense Atomic Support Agency (predecessor to DNA and successor to AFSWP)
DBM	Division of Biology and Medicine (of the Atomic Energy Commission)
DDR&E	Director, Defense Research and Engineering
DHEW	Department of Health, Education and Welfare
DHHS	Department of Health and Human Services
DNA	Defense Nuclear Agency (predecessor to DSWA and successor to DASA)
DoD	Department of Defense
DOE	Department of Energy
DPG	Dugway Proving Ground
DSWA	Defense Special Weapons Agency (successor to DNA)
DVA	Veterans Administration

E

EO	Executive Order

F

FDA	Food and Drug Administration
FOIA	Freedom of Information Act

G

GAO	General Accounting Office
GC	General Counsel
GSA	General Services Administration

H

HID	Health Instrument Division of the General Electric Co.
HEDR	Hanford Environmental Dose Reconstruction Project
HRE	Human Radiation Experiments
HREX	Human Radiation Experiments Database
HSRB	Human Subject Review Board
HURAD	Human Use and Regulatory Affairs Division

I

IRB	Institutional Review Board
IWG	Interagency Working Group

J

JAG	Judge Advocate General
JCS	Joint Chiefs of Staff
JPMAAW	Joint Panel on the Medical Aspects of Atomic Warfare

L

LASL	Los Alamos Scientific Laboratory, now called Los Alamos National Laboratory (LANL)

N

NARA	National Archives and Records Administration
NASA	National Aeronautics and Space Administration
NEPA	Nuclear Energy for the Propulsion of Aircraft
NEPA / MAC	The Nuclear Engine for the Propulsion of Aircraft / Medical Advisory Committee on Radiation Tolerance of Military Personnel
NIH	National Institutes of Health
NMRI	Naval Medical Research Institute
NMRU	Naval Medical Research Unit
NTPR	Nuclear Test Personnel Review Program

O

OASG	Office of the Army Surgeon General
ONR	Office of Naval Research
OSD	Office of the Secretary of Defense

P

PBI	Partial-Body Irradiation

R

R	Roentgen
RaLa	Radioactive lanthanum, radio lanthanum
RDB	Research and Development Board
RECC	Radiation Experiments Command Center
RW	Radiological Warfare

T

TBI	Total-Body Irradiation
TECOM	Army Test and Evaluation Command
TNT	Trinitrotoluene
TSP	Technical Steering Panel

U

UCCM	University of Cincinnati College of Medicine
USAF	United States Air Force
USAF SAM	United States Air Force School of Aviation Medicine
USUHS	Uniformed Services University of the Health Sciences

V

VA	Department of Veterans Affairs (successor to Veterans Administration)

APPENDIX 4

RADIATION TERMS

Defined below are some technical terms relating to radiation.*

RADIOACTIVITY

Radioactivity is the tendency of unstable atoms to undergo a spontaneous, energy-releasing change in their structure. The energy released is called radiation. It occurs at various energy levels. At a certain point, radiation energy is sufficient to strip electrons from the atoms in materials it strikes and is therefore called ionizing radiation. It is particularly dangerous for humans because these energy levels are such that they also can cause damage to living tissues. Ionizing radiation may involve alpha particles, beta particles, gamma rays, x-rays, or neutrons.

ALPHA PARTICLES

An alpha particle is a high-energy particle with a very short range. It does not pose an external hazard because it cannot penetrate human skin. It may be stopped by a single sheet of paper. However, if inhaled or ingested, the particles come in direct contact with tissue cells and can cause severe damage. Accordingly, alpha particles present a serious internal hazard. Uranium, radium, and plutonium all emit alpha particles.

BETA PARTICLES

Beta particles exhibit a wide range of energy levels. Some have sufficient energy to penetrate human skin and will cause skin burns. These particles can cause damage if inhaled or ingested. Beta particles can be stopped by plastic, aluminum, and wood. Tritium is one example of a beta emitter.

GAMMA RAYS AND X-RAYS

Both of these are high-energy emissions that easily penetrate the human body. They are, therefore, dangerous in high amounts as external radiation hazards. They can be stopped by dense materials, such as lead, concrete, or steel. Gamma rays are produced by isotopes such as lanthanum-140, cesium-137, and cobalt-60. X-rays are produced by medical x-ray tubes and the x-ray machines used to examine carry-on baggage at airports.

NEUTRONS

Neutrons are a component of the nucleus of an atom. Neutron radiation can be harmful to living things. Neutrons are liberated in great numbers in a nuclear reactor, but they do not present a hazard to humans because they are absorbed by the heavy shielding that encloses the reactor. Neutrons are also emitted during the spontaneous decay of certain radionuclides such as californium-252.

Amount of radiation is expressed in several ways. A curie is a measure of activity, or the rate of disintegration of atoms undergoing change. This unit of measure is often expressed as millicuries (thousandths of a curie) or microcuries (millionths of a curie). A roentgen is a measure of the ionization of air by x-rays or gamma rays.

*Source: U.S. Department of Energy, Assistant Secretary for Environment, Safety, and Health. Human Radiation Experiments: The Department of Energy Roadmap to the Story and the Records. Page 295. February 1995.

Exposure

Exposure refers to being placed in a field of radiation energy. Dose refers to energy imparted per unit mass of tissue. A rad is a measure of the absorbed dose to tissue from exposure to radiation; that is, the amount of energy deposited per unit mass of tissue. A rem is a measure of dose equivalent in man. It is the dose in rads multiplied by a weighting factor to account for the more damaging effects of alpha particles and neutron radiation.

Background Radiation

Background radiation refers to the natural radiation to which people are exposed in daily life. It differs for different locations and different circumstances. Brick and wood homes emit different levels of background radiation. Cities at different elevations have different levels of background cosmic radiation. For example, the average annual dose from all sources to U.S. residents is estimated to be 200 millirems per year. However, the average dose to residents of Los Alamos, New Mexico, a city at high elevation, is 330 millirems per year. A transcontinental airplane flight will result in a dose of about 4 millirems to a passenger. A standard chest x-ray will result in a dose of about 10 millirems.

Occupational Dose

Occupational dose refers to the dose that people receive in their workplace. To provide for the safety of workers, the International Commission on Radiological Protection has established certain standards to limit the dose received by workers. Standards for minors are 10 percent of the dose for adults. These annual dose limits for radiation workers are:

whole-body	5 rem
skin or any extremities	50 rem
eyes	15 rem
embryo/fetus	0.5 rem

By comparison, the annual dose limit for the general public (not radiation workers) set by the Commission is 0.1 rem.