

APPENDIX L

GLOSSARY OF TERMS AND ABBREVIATIONS

(With Table of Radionuclides)

actinides

The radioactive elements with atomic number of 89 and above.
The name is taken from actinium, the first member of the series.

activation

The process of making a material radioactive by bombardment with neutrons, protons, or other nuclear particles.

activity

Radioactivity or radioactive materials. A measure of the rate at which a material is emitting radiations; usually given in terms of the number of nuclear disintegrations occurring in a given quantity of material over a unit of time. The standard unit of activity is the curie (Ci).

AEC

Atomic Energy Commission (discontinued with formation of ERDA and NRC on January 19, 1975).

alpha particle (α)

A positively charged particle emitted by certain radioactive materials. It is made up of two neutrons and two protons; hence it is identical with the nucleus of a helium atom.

annulus

The space between concentric primary and secondary waste tanks.

anion

A negatively charged ion such as OH^- in an aqueous solution.

aquifer

A water-bearing layer of permeable rock or soil.

background radiation

The radiation of man's natural environment, from cosmic rays and from the naturally radioactive elements of the earth, including those within man's body.

base case

The activities as presently planned.

beta particle (β)

An elementary particle emitted from a nucleus during radioactive decay. It has a single negative electrical charge and a mass equal to 1/1837 that of a proton. A negatively charged beta particle is physically identical to the electron. If the beta particle is positively charged, it is called a positron (β^+).

biota

The animal and plant life of a region.

BOD

Biological Oxygen Demand, a measure of the organic content of water.

body burden

The amount of a specified radioactive material or the summation of the amounts of various radioactive materials present in an animal or human body.

burial ground

An area specifically designated for the subsurface disposal of solid waste or excess materials.

burnout safety factor

The ratio of the thermal power or heat flux required to cause surface melting of a fuel element to the actual operating power or heat flux.

cabinet

A glove box or a containment box around process equipment.

cal

calories

calcine

Material heated to a temperature below its melting point to bring about loss of moisture and oxidation to a chemically stable form.

canyon building

A heavily shielded building used in the chemical processing of irradiated fuel and target elements. Operation and maintenance is by remote control.

cask

A container that provides shielding and containment for retrievable storage of solid waste. The shielding is normally concrete, and the cask is filled with waste.

cation

A positively charged ion such as Na^+ in an aqueous solution.

cc

cubic centimeters (1 cc = 1 ml).

centipoise

The unit of measurement of the viscosity of a fluid. Water at 20°C (70°F) has a viscosity of 1.0 centipoise.

CEQ

Council on Environmental Quality

cermet

Ceramic-metal systems suitable for use at high temperatures. They have some of the desirable properties of both ceramics and metals, e.g., high melting point, high oxidation resistance, high thermal conductivity, and shock resistance.

cfm

cubic feet per minute

10-CFR-100

U.S. Code of Federal Regulations Title 10, Part 100. Reactor Site Criteria.

cfs

cubic feet per second

CG

Concentration Guide

Ci

curie(s)

cladding

The outer aluminum jacket of a nuclear fuel or target element.

CMX

Pilot plant for hydraulic tests in SRL.

Concentration guide

The average concentration of a radionuclide in air or water to which a worker or member of the general population may be continuously exposed without exceeding radiation dose standards.

CRC

Cesium Removal Column, a deionizer used to remove ^{137}Cs ions from evaporator condensate.

critical

The condition in which a material is undergoing nuclear fission at a self-sustaining rate.

curie

The basic unit used to describe the intensity of radioactivity in sample of material. One curie (Ci) equals 37 billion disintegrations per second.

CW

Cooling Water

DBE

Design basis earthquake. An earthquake, postulated to be the most severe near any site based on historical records, which is used as a basis for facility and system design.

decay

The spontaneous radioactive transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. Every decay process has a definite half-life.

decontamination

The selective removal of radioactive material from the surface or from within another material.

deionizer

A metal vessel containing ion exchange resins, used for removing positively or negatively charged ions from water.

delta

The usually triangular deposit of sediment at the mouth of a river or stream.

depleted uranium

Uranium having a smaller percentage of uranium-235 than the 0.7% found in natural uranium.

deuterium

An isotope of hydrogen whose nucleus contains one neutron and one proton and is therefore about twice as heavy as the nucleus of normal hydrogen which has only the proton. Deuterium (D or ^2H) is often referred to as heavy hydrogen; it occurs as 1 part to 6500 parts of normal hydrogen in water supplies (as HDO).

DF

Decontamination factor, the ratio of the concentration of a constituent in the feed stream to that in the treated effluent.

diatom

Any of a class of unicellular or colonial algae with silicified skeletons.

diatometer

A floating device, used in streams and rivers, to collect diatoms on glass microscope slides for subsequent determination of population numbers and population diversity. These devices are used as a method of evaluating the biological health of aquatic systems.

diversion box

An enclosure where inlet pipes and outlet pipes are connected by jumpers, thus permitting a selection of pathways for liquid process streams or effluents.

DOP

Diocetylphthalate, a chemical that can be dispersed as fine droplets in an air stream to test the efficiency of air filters.

dose

The energy imparted to matter by ionizing radiation per unit mass of irradiated material at a specific location. The unit of absorbed dose is the rad.

DTG

Digital thickness gage, used to measure the thickness of steel waste tank walls.

D₂O

See "heavy water."

eductor

A steam jet

electrolytic dissolver

A device for dissolving fuel elements by imposition of an electric current in the dissolver vessel.

enriched uranium

Uranium in which the percentage of the fissionable isotope uranium-235 has been increased above the 0.7% contained in natural uranium.

EPA

Environmental Protection Agency

ERDA

Energy Research and Development Administration (includes part of the former AEC).

ERDAM

ERDA Manual (for ERDA operations and ERDA contractors)

fallout

Radioactive materials in the atmosphere and deposited on the earth's surface following the detonation of nuclear weapons.

fCi

femtoCuries (1 fCi = 1×10^{-15} curie)

feral

Wild, or having reverted to the wild state, applied to animals on the site.

fertile material

A material, for example, uranium-238, not itself a readily fissionable material, which can be converted into a fissionable material by irradiation in a reactor.

fission

The splitting of a heavy nucleus into two roughly equal parts (which are nuclei of lighter elements), accompanied by the release of a relatively large amount of energy and frequently one or more neutrons.

fission products

Nuclei formed by the fission of heavy elements. Many are radioactive. Examples: strontium-90, cesium-137.

fissionable material

Any material readily fissioned by neutrons, for example, uranium-235 and plutonium-239.

fly ash

Airborne ash from fuel burning operations.

food chain

A linear sequence of successive utilizations of nutrient energy by a series of plant and animal species.

FRC

Federal Radiation Council (now part of EPA).

fuel assembly

An assembly of fuel elements.

fuel element

A tube, rod, or other form into which fissionable material is fabricated for use in a reactor.

g

- (1) grams
- (2) the acceleration of gravity (32.2 ft/sec²)

gal

gallons

gamma rays (γ)

High-energy, short-wavelength electromagnetic radiation emitted by a nucleus. Gamma radiation usually accompanies alpha and beta emissions and always accompanies fission.

GAO

General Accounting Office (under the Comptroller General of the United States).

g/l

grams per liter

glove box

A sealed box in which workers, using gloves attached to and passing through openings in the box, can handle certain radioactive materials safely.

gpm

gallons per minute

ground water

Water in the zone of saturation beneath the land surface.

grout

Mortar or plaster that does not contain gravel or other reinforcing aggregate.

half-life, radiological

The time in which half the atoms in a radioactive substance disintegrates.

half-life, biological

The time required for a living organism to eliminate, by natural processes, half the amount of a substance that has entered it.

health physics

The profession which deals with the protection of man and his environment from unwarranted exposure to ionizing radiation.

heavy water

Deuterium oxide, D₂O. Water in which normal hydrogen atoms have been replaced with deuterium atoms. D₂O has a low neutron absorption cross section; hence, it is used as a moderator in some nuclear reactors. In SRP reactors, it is used as the moderator and primary coolant.

HEPA

High efficiency particulate air filter. A type of filter designed to remove 99.97% of particles down to 0.3 μm in diameter from a flowing air stream.

herbaceous

Pertaining to, or having the characteristics of an herb. An herb is a seed plant that does not develop woods, persistent tissue.

HHW

High heat waste (high-level liquid waste that may require auxiliary cooling).

high beta-gamma

Solid radioactive waste containing primarily beta-gamma emitters, and measuring more than 50 mR/hr at 3 in. from the unshielded package or more than 50 mR/hr at 10 ft from the truck load.

high-level liquid waste

Includes high-heat waste (HHW) and low-heat waste (LHW).

high-level waste

(a) high-level liquid waste, or (b) the products from solidification of high-level liquid waste, or (c) irradiated fuel elements if discarded without processing.

HWCTR

Heavy Water Components Test Reactor

ICRP

International Commission on Radiological Protection

Imhoff tank

A tank for sewage clarification consisting of an upper sedimentation chamber and a lower sludge digestion chamber.

ion exchange

A reversible chemical reaction between a solid and a fluid mixture by means of which ions may be interchanged.

isopleth

A line on a map connecting points at which a given variable has a specified constant value.

isotope

One of two or more forms of an element that differ in atomic weight.

jumper

A short piece of pipe used to connect two other pipes.

Kanne chamber

A device for continuously monitoring the concentration of radioactivity in air by the production of an ionization current. It is designed for optimum response to low energy beta radiation and is therefore particularly applicable to tritium monitoring.

k_{eff}

Effective multiplication constant, a measure of the degree of sequential change in the number of fission events in a system containing fissionable material.

km

kilometers (1 kilometer = 1000 meters or 0.621 mile)

knuckle plates

The curved steel plates that connect the flat bottom to the cylindrical side wall of a waste tank.

lattice

The geometric arrangement of fuel assemblies in a nuclear reactor.

LHW

Low heat waste (high-level liquid waste that does not require auxiliary cooling but may contain significant quantities of radionuclides).

light water

Normal water (H_2O), as distinguished from heavy water (D_2O).

low beta-gamma

Solid radioactive waste containing primarily beta-gamma emitters, and measuring less than 50 mR/hr at 3 in. from the unshielded package and less than 50 mR/hr at 10 ft. from the truck load

M

molar

m

(1) meter; (2) as prefix, milli. See "milli."

manometer

An instrument for measuring the pressure of liquids or gases.

man-rem

The total radiation dose commitment to a given population group; the sum of the individual doses received by a population segment.

mesh

Used to indicate screen size, as the number of openings per linear inch.

mg

milligrams

micro (μ)

Prefix indicating one millionth (1 microgram = 1/1,000,000 of a gram or 10^{-6} gram).

mil

One thousandth of an inch

milli

Prefix indicating one thousandth (1 milli = 1/1000 of a rem or 10^{-3} rem).

millirem

One thousandth of a rem

ml

milliliters

MM

Modified Mercalli (scale of earthquake intensities).

mol

mole. The amount of a substance that has a weight in grams numerically equal to the molecular weight of the substance.

molar

Designation of the concentration of a solute in a solution (a solution that is 1.0 molar (1.0M) in NaOH contains 1.0 mol of NaOH per liter).

moderator

A material, such as heavy water, used in a reactor to slow down high-velocity neutrons. In SRP reactors, heavy water is used as moderator and primary coolant.

MPC

Maximum permissible concentration. The average concentration of a radionuclide or chemical in air or water to which a worker or a member of the general population may be continuously exposed without exceeding an established standard.

mph

miles per hour

mR

millirads

mrem

millirems

multiplication constant

The ratio of the number of neutrons present in one generation to those in the preceding generation in a neutron chain-reacting system.

nano

Prefix indicating one thousandth of a micro unit (1 nanocurie = 1/1000 of a microcurie or 10^{-9} curie).

natural basin

A low-lying undeveloped area that receives surface runoff or the overflow from certain settling basins. The only natural basins in use at SRP are in the fuel fabrication area and the semiworks of the Savannah River Laboratory. These basins receive the overflow from settling basins into which waste streams with some uranium contamination are discharged.

natural (normal) uranium

Uranium as found in nature. It is a mixture of the fertile uranium-238 isotope (99.3%), the fissionable uranium-235 isotope (0.7%), and a minute percentage of uranium-234.

nCi

nanocuries

NCRP

National Council on Radiation Protection and Measurements.

neutron

An uncharged elementary particle with a mass nearly equal to that of the proton. Neutrons sustain the fission chain reaction in a nuclear reactor.

NO_x

The term NO_x is used to represent a mixture of nitric oxide (NO) and nitrogen dioxide (NO₂) released to the atmosphere. Also, as used in this statement, it includes nitric acid (HNO₃) releases to the atmosphere from fabrication processes.

noble gas

A chemically inert gas, e.g., xenon, argon, and krypton.

NRC

Nuclear Regulatory Commission (includes the regulatory branch of the former AEC).

nuclide

Any atomic nucleus specified by its atomic weight, atomic number, and energy state. A radionuclide is a radioactive nuclide.

nucleus

The positively charged center of an atom.

pad

A layer of concrete or asphalt covering a large flat area. In radioactive waste storage, a pad is used as a base for stacking retrievable containers in the burial ground. After stacking, the containers are normally covered with an earthen mound. The pad drains to a sump that is sampled to ensure that no radioactivity is escaping from the containers to the ground.

pCi

picocuries

pD

A measure of the deuterium ion concentration in heavy water solutions.

perched water

Ground water separated from the main body of ground water by unsaturated rock or soil.

pH

A measure of the hydrogen ion concentration in aqueous solutions. Acidic solutions have a pH from 0 to 7. Basic solutions have a pH from 7 to 14.

pico

Prefix indicating one millionth of a micro unit (1 picocurie = 1/1,000,000 of a microcurie or 10^{-12} curie).

piezometer

A well used for measuring the water pressure, or head, of subsurface aquifers.

pit

An excavation for the disposal of miscellaneous aqueous and organic wastes, some of which may be contaminated with tritium, fission products, or activation products.

plant stream

Any natural stream on the SRP site. Surface drainage of the site is via these streams to the Savannah River.

plenum

An enclosure in which a fluid is at a pressure higher than that outside the enclosure.

plutonium

A radioactive element with atomic number 94. Its most important isotope is fissionable plutonium-239, produced by neutron irradiation of uranium-238.

ppm

parts per million

ppb

parts per billion

production reactor

A nuclear reactor designed primarily for large-scale production of plutonium, tritium, and other radionuclides by neutron irradiation.

proton

An elementary particle with a single positive electric charge and a mass approximately equal to the mass of a hydrogen atom. The atomic number of an atom is equal to the number of protons in its nucleus.

psi

pounds per square inch

Purex

A solvent extraction process in which uranium and plutonium are selectively separated from each other and from fission products by extraction from nitric acid solutions with tributylphosphate in a hydrocarbon diluent.

PVC

Polyvinyl chloride

rad

Radiation absorbed dose. The basic unit of absorbed dose of ionizing radiation. One rad is equal to the absorption of 100 ergs of radiation energy per gram of matter.

radioactivity

The spontaneous decay or disintegration of unstable atomic nuclei, accompanied by the emission of radiation.

radionuclide

An unstable nuclide of an element that decays or disintegrates spontaneously, emitting radiation.

RBOF

Receiving Basin for Offsite Fuels, a facility at SRP.

reactor

A device by means of which a fission chain reaction can be initiated, maintained, and controlled.

reflux condenser

A condenser that returns condensed vapor to the tank from which the vapor originated.

release guide

A control number which regulates the concentration or amount of a radioactive material or toxic chemical released to the environment.

rem

A quantity used in radiation protection to express the effective dose equivalent for all forms of ionizing radiation. It is the product of the absorbed dose in rads and factors related to relative biological effectiveness.

resin

A synthetic organic polymer that can act as an ion exchanger.

retention basin

An excavation, either lined with an impermeable material or unlined, to receive aqueous streams for temporary storage. Retention basins are used when necessary for temporary storage of cooling water or storm drainage that might be contaminated. After sampling, this water may be processed further or transferred to a seepage basin or an onsite stream.

risers

Pipes or openings leading from the tops of waste tanks to ground surface level above the tanks. Risers are used for a variety of purposes such as access for in-tank instrumentation and insertion of pumps and cooling coils. When not in use, risers are sealed with a heavy shielding plug.

roentgen

A unit of exposure dose of ionizing radiation. It is that amount of gamma or x-rays required to produce ions carrying 1 electrostatic unit of electrical charge in 1 cubic centimeter of dry air under standard conditions.

RRF

Resin Regeneration Facility, an SRP facility.

scram

Rapid shutdown of a reactor by insertion of neutron absorbing materials to stop the chain reaction.

seepage basin

An excavation in the ground to receive aqueous streams containing chemical and radioactive wastes. The water evaporates and seeps from the basin through the soil column to the ground water and ultimately to the streams that drain the plantsite. Insoluble materials settle out on the floor of the basin. Soluble radioactive materials move with the water or are removed by ion exchange with the soil. Seepage basins are surrounded by earthen dikes to prevent the entrance of surface water, and levels are controlled to prevent overflow from the basin system.

seismicity

The tendency for the occurrence of earthquakes.

semiconcentrate

Concentrated waste solution containing the highest concentration of salts that will not crystallize on cooling.

separations

Chemical processes used to separate nuclear products from byproducts and from each other.

settling basin

An excavation in the ground similar to a seepage basin. Normally a settling basin overflows to a natural basin. In the settling basin, most of the solids settle out.

solvent extraction

A process in which materials are selectively removed from an aqueous solution by contact with an immiscible organic solvent.

sparge

To mix or agitate a liquid in a tank by admitting air or steam.

SRP

Savannah River Plant

SRL

Savannah River Laboratory

steam jet

A device to move liquids from one place to another by suction and entrainment in moving steam.

stress corrosion

Chemical corrosion that is accelerated by stress concentrations.

sump

Any low area that receives and contains drainage.

supernate

That portion of high level liquid waste that contains fission products (primarily ^{137}Cs) and inert salts in solution. Other portions are the insoluble sludge and crystallized salt.

tank farm

An installation of interconnected underground tanks at SRP for the storage of radioactive high-level liquid wastes.

target element

A tube, rod, or other form into which fertile or other materials are fabricated for irradiation in a reactor.

tectonic

Pertaining to structural deformation of the earth's crust.

thermocouple

Two conductors of different metals joined at both ends. When there is a difference in temperature between the two junctions, an electric potential is generated. This potential (in millivolts) is proportional to the temperature difference.

thermowell

A container for a thermocouple or thermometer.

TNX

Pilot plant for chemical processing tests in SRL.

tracer

An element or compound that has been made radioactive so that it can be easily followed (traced) in biological and industrial processes. Radiation emitted by the radioisotope pinpoints its location.

Transuranic waste

Solid radioactive waste containing primarily alpha emitters.

transuranium elements

Elements above uranium in the periodic table, that is, with an atomic number greater than 92. All 13 known transuranium elements are radioactive and are produced artificially. Examples: neptunium, plutonium, curium, californium.

trench

A long and narrow excavation in the ground for solid waste. Unless qualifying descriptions are given, a trench is unlined, and its walls are unsupported. After the solid wastes are placed in position, the trench is filled to grade level with some of the removed soil.

tritium

A radioactive isotope of hydrogen with two neutrons and one proton in the nucleus. It is heavier than deuterium (heavy hydrogen). Tritium (T or ^3H) is used in industrial thickness gages, as a label in tracer experiments, in controlled nuclear fusion experiments, and in thermonuclear weapons. It is produced primarily by neutron irradiation of lithium-6.

TRU

See Transuranic waste.

uranium

A naturally radioactive element with the atomic number 92 and an atomic weight of approximately 238. The two principal naturally occurring isotopes are the fissionable uranium-235 (0.7% of natural uranium) and the fertile uranium-238 (99.3% of natural uranium).

USAEC

United States Atomic Energy Commission (see AEC).

USGS

United States Geological Survey.

viscosity

The property of a fluid that causes it to resist flow. The unit of viscosity is the centipoise.

waste, radioactive

Equipment and materials (from nuclear operations) that are radioactive or have radioactive contamination and for which there is no recognized use or for which recovery is impractical.

water table

The upper surface of the ground water.

zeolite

Any of various hydrous silicates that can act as ion exchangers.

μ

mu, a prefix. Same as "micro".

μCi

microcuries

μg

micrograms

μm

micrometers

TABLE OF RADIONUCLIDES^a

Nuclides with Half-Lives Less Than One Year^b

Element	Nuclide	Radiation Emitted	Half-life ^c	Specific Activity, Ci/g
Barium	^{137m} Ba	γ	~2.55 min	5.4 × 10 ⁶
Xenon	¹³⁷ Xe	β,γ	3.84 min	3.6 × 10 ⁶
Xenon	¹³⁶ Xe	β,γ	14.2 min	9.6 × 10 ^{7d}
Xenon	^{135m} Xe	γ	15.3 min	9.1 × 10 ⁷
Rubidium	⁸⁸ Rb	β,γ	17.7 min	1.2 × 10 ⁸
Krypton	⁸⁷ Kr	β,γ	1.27 hr	2.8 × 10 ⁷
Argon	⁴¹ Ar	β,γ	1.83 hr	4.2 × 10 ⁷
Krypton	^{83m} Kr	γ	1.86 hr	2.0 × 10 ⁷
Iodine	¹³² I	β,γ	2.29 hr	1.0 × 10 ⁷
Krypton	⁸⁸ Kr	β,γ	2.80 hr	7.6 × 10 ⁶
Krypton	^{85m} Kr	β,γ	4.48 hr	8.2 × 10 ⁶
Technetium	^{99m} Tc	γ	6.02 hr	5.3 × 10 ⁶
Iodine	¹³⁵ I	β,γ	6.59 hr	3.5 × 10 ⁶
Xenon	¹³⁵ Xe	β,γ	9.2 hr	2.5 × 10 ⁶
Sodium	²⁴ Na	β,γ	15.0 hr	8.7 × 10 ⁶
Iodine	¹³³ I	β,γ	20.8 hr	1.1 × 10 ⁶
Lanthanum	¹⁴⁰ La	β,γ	1.67 days	5.6 × 10 ⁵
Xenon	^{133m} Xe	γ	2.23 days	4.4 × 10 ⁵
Neptunium	²³⁹ Np	β,γ	2.35 days	2.3 × 10 ⁵
Molybdenum	⁹⁹ Mo	β,γ	2.75 days	4.8 × 10 ⁵
Tellurium	¹³² Te	β,γ	3.25 days	3.0 × 10 ⁵
Xenon	¹³³ Xe	β,γ	5.29 days	1.9 × 10 ⁵
Iodine	¹³¹ I	β,γ	8.04 days	1.2 × 10 ⁵
Xenon	^{131m} Xe	γ	11.99 days	8.3 × 10 ⁴
Barium	¹⁴⁰ Ba	β,γ	12.79 days	7.3 × 10 ⁴
Cesium	¹³⁶ Cs	β,γ	13.0 days	7.4 × 10 ⁴
Phosphorus	³² P	β ⁺ ,γ	14.28 days	2.9 × 10 ⁵
Protactinium	²³³ Pa	β,γ	27.0 days	2.1 × 10 ⁴
Chromium	⁵¹ Cr	γ	27.71 days	9.3 × 10 ⁴
Cerium	¹⁴¹ Ce	β,γ	32.53 days	2.9 × 10 ⁴
Niobium	⁹⁵ Nb	β,γ	35.1 days	3.9 × 10 ⁴
Ruthenium	¹⁰³ Ru	β,γ	39.6 days	3.2 × 10 ⁴
Iron	⁵⁹ Fe	β	44.6 days	5.0 × 10 ⁴
Strontium	⁸⁹ Sr	β,γ	50.5 days	2.9 × 10 ⁴
Yttrium	⁹¹ Y	β,γ	58.8 days	2.5 × 10 ⁴
Antimony	¹²⁴ Sb	β,γ	60.2 days	1.8 × 10 ⁴
Zirconium	⁹⁵ Zr	β,γ	65.5 days	2.1 × 10 ⁴
Cobalt	⁶⁰ Co	β	71.3 days	3.2 × 10 ⁴
Sulfur	³⁵ S	β	87.2 days	4.3 × 10 ⁴
Curium	²⁴² Cm	α	163 days	3.3 × 10 ³
Zinc	⁶⁵ Zn	γ	243.7 days	8.3 × 10 ³
Cerium	¹⁴⁴ Ce	β,γ	284.4 days	3.2 × 10 ³
Manganese	⁵⁴ Mn	γ	312.5 days	7.8 × 10 ³

a. Only nuclides included in tables of releases, dose calculational parameters, etc. in this environmental statement are listed.

b. Listed in order of increasing half-life.

c. Half-lives taken from "Chart of the Nuclides," Knolls Atomic Power Laboratory, April 1972.

d. 10⁶=100,000,000 , 10⁷=10,000,000 , 10⁸=1,000,000 , etc.

TABLE OF RADIONUCLIDES^a (continued)

Nuclides with Half-Lives Greater Than One Year^b

<u>Element</u>	<u>Nuclide</u>	<u>Radiation Emitted</u>	<u>Half-life, yr^c</u>	<u>Specific Activity, Ci/g</u>
Ruthenium	¹⁰⁶ Ru	β,γ	1.01	3.3 × 10 ³
Cesium	¹³⁴ Cs	β,γ	2.06	1.3 × 10 ³
Promethium	¹⁴⁷ Pm	β	2.62	930
Californium	²⁵² Cf	α,n	2.63	540
Antimony	¹²⁵ Sb	β,γ	2.73	1.1 × 10 ³
Cobalt	⁶⁰ Co	β,γ	5.27	1.1 × 10 ³
Krypton	⁸⁵ Kr	β,γ	10.73	390
Tritium	³ H	β	12.33	9.7 × 10 ³
Plutonium	²⁴¹ Pu	β	15	99
Curium	²⁴⁴ Cm	α	17.9	82
Curium	²⁴³ Cm	α	28	53
Strontium	⁹⁰ Sr	β	29	140
Cesium	¹³⁷ Cs	β,γ	30.1	87
Plutonium	²³⁸ Pu	α	87.8	17
Americium	²⁴¹ Am	α	433	3.4
Carbon	¹⁴ C	β	5.73 × 10 ³	4.4
Plutonium	²⁴⁰ Pu	α	6.5 × 10 ³	0.23
Plutonium	²³⁹ Pu	α	2.44 × 10 ⁴	0.062
Uranium	²³³ U	α	1.58 × 10 ⁵	9.8 × 10 ^{-3d}
Neptunium	²³⁷ Np	α	2.14 × 10 ⁶	7.1 × 10 ⁻⁴
Iodine	¹²⁹ I	β,γ	1.59 × 10 ⁷	1.8 × 10 ⁻⁴
Uranium	²³⁶ U	α	2.34 × 10 ⁷	6.5 × 10 ⁻⁵
Uranium	²³⁵ U	α	7.04 × 10 ⁸	2.2 × 10 ⁻⁶
Uranium	²³⁸ U	α	4.47 × 10 ⁹	3.4 × 10 ⁻⁷
Uranium	<i>Nat</i> U	α	4.47 × 10 ⁹	7.0 × 10 ⁻⁷
Thorium	²³² Th	α	1.4 × 10 ¹⁰	1.1 × 10 ⁻⁷

a. Only nuclides included in tables of releases, dose calculational parameters, etc. in this environmental statement are listed.

b. Listed in order of increasing half-life.

c. Half-lives taken from "Chart of the Nuclides," Knolls Atomic Power Laboratory, April 1972

d. 10⁻³ = 0.001, 10⁻⁴ = 0.0001, etc.