TRANSPORTATION AND PACKAGING RESOURCE GUIDE

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1. INTRODUCTION

The purpose of this resource guide is to provide a convenient reference document of information that may be useful to the U.S. Department of Energy (DOE) and DOE contractor personnel involved in packaging and transportation activities. It may be useful also to those in other disciplines, including those indirectly associated with packaging and transportation.

An attempt has been made to present the terminology of DOE community usage as it currently exists. DOE's mission is changing with emphasis on environmental cleanup. The terminology or nomenclature that has resulted from this expanded mission is included for the packaging and transportation user for reference purposes. Older terms still in use during the transition have been maintained. The Packaging and Transportation Resource Guide consists of four sections: Sect. 1, "Introduction"; Sect. 2, "Abbreviations and Acronyms"; Sect. 3, "Definitions"; and Sect. 4, "References" for packaging and transportation of hazardous materials and related activities, and Appendices A and B. Information has been collected from DOE Orders and DOE documents; U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), and U.S. Nuclear Regulatory Commission (NRC) regulations; and International Atomic Energy Agency (IAEA) standards and other international documents. The definitions included in this guide may not always be a regulatory definition but are the more common DOE usage. In addition, the definitions vary among regulatory agencies. It is, therefore, suggested that if a definition is to be used in a regulatory or a legal compliance issue, the definition should be verified with the appropriate regulation. To assist in locating definitions in the regulations, a listing of all definition sections in the regulations are included in Appendix B. In many instances, the appropriate regulatory reference is indicated in the right-hand margin.

DOE Orders for packaging and transportation are included in the reference section. For completeness, all DOE Orders are listed in Appendix A. This resource guide will be reviewed annually for updating. Suggestions for improvement (additions or deletions) are encouraged; these should be sent to Miriam J. Welch, Martin Marietta Energy Systems, Inc., Oak Ridge National Laboratory, P.O. Box 2008, 105MIT, Oak Ridge, TN, 37831-6495; telephone 615/574-5068; telefax 615/574-3431.

2. ABBREVIATIONS AND ACRONYMS

AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACGIH	American Conference of Governmental Industrial Hygienists
ADP	Automatic Data Processing
AEC	U.S. Atomic Energy Commission
AECB	Atomic Energy Control Board (Canada)
AECL	Atomic Energy of Canada, Limited
AGA	American Gas Association
AIChE	American Institute of Chemical Engineers
AIHA	American Industrial Hygiene Association
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
ALARA	As low as reasonably achievable
ANI	American Nuclear Insurers
ANPRM	Advance Notice of Proposed Rulemaking
ANS	American Nuclear Society
ANSI	American National Standards Institute, Inc.
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASQC	American Society of Quality Control
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Association; also Air Transport Associations, Inc.
ATMS	Automated Transportation Management System
ATSDR	Agency for Toxic Substance Disease Registry
AWS	American Welding Society
BAT	Breath analyzer technician

BIA	Bureau of Indian Affairs
BMCS	Bureau of Motor Carrier Safety
BOE	Bureau of Explosives
BOM	Bureau of Mines
BPA	Bonneville Power Administration
Bq	Becquerel
CAA	Clean Air Act
CAB	Civil Aeronautics Board
CANUTEC	Canadian Transport Emergency Centre
CAS	Chemical Abstracts Service
CDL	Commercial drivers license
CDLIS	Commercial Drivers License Information System
CEGB	Central Electricity Generating Board
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	CERCLA Information System
CFR	Code of Federal Regulations
CGA	Compressed Gas Association
CHEMNET	Chemical Network, Chemical Manufacturers Association
CHEMTREC	Chemical Transportation Emergency Center
CHLOREP	Chlorine Emergency Plan (Chlorine Institute)
CHRIS	Chemical Hazards Response Information System
Ci	Curie
CMA	Chemical Manufacturers Association
CMV	Commercial motor vehicle
CMVD	Commercial Motor Vehicle Driver
CoC	Certificate of Compliance
COCO	Contractor owned, contractor operated
CofCA	Certificate of Competent Authority
COFC/TOFC	Container on flatcar/trailer on flatcar (piggyback)
COTP	Captain of the Port

cpm	Counts per minute
CR	DOE Office of Chief Financial Officer
CRCPD	Conference of Radiation Control Program Directors, Inc.
CSO	Cognizant Secretarial Officer
CTMA	Contractor Traffic Managers Association (DOE)
CVSA	Commercial Vehicle Safety Alliance
CWA	Clean Water Act
DBA	Design-basis accident
D&D	Decontamination and decommissioning
DERP	U.S. Defense Environmental Restoration Program
DHHS	U.S. Department of Health and Human Services
DIS	Draft International Standard
DMIS	Disaster Management Information System
DNFSB	U.S. Defense Nuclear Facility Safety Board
DOC	U.S. Department of Commerce
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOE-HQ	U.S. DOE—Headquarters
DOESI	DOE Standards Index
DOI	U.S. Department of the Interior
DOJ	U.S. Department of Justice
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DOT-TSI	DOT Transportation Safety Institute
DP	DOE Office of Defense Programs
DPM	Disintegrations per minute
DPM/m ³	Disintegrations per minute per cubic meter
DU	Depleted uranium
DVIR	Driver vehicle inspection report
DWPF	Defense Waste Processing Facility
EAP	Employee assistance program
EC	European Community

EE	DOE Office of Energy Efficiencies and Renewable Energy
EH	DOE Office of Environment, Safety and Health
EHTR	Emergency Highway Traffic Regulations
EHTRC	Emergency Highway Traffic Regulation Center
EIA	DOE Energy Information Administration
EIS	Environmental impact statement
EM	DOE Office of Environmental Management
EMI	Emergency Management Institute
EN	European standard
ENV	European prestandard
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ER	DOE Office of Energy Research
ERC	Emergency response center
ERDA	U.S. Energy Research and Development Administration
ERG	Emergency response guidebook
EM	DOE Office of Environmental Management
ET	DOE Office of Science Education and Technical Information
ETSI	European Telecommunications Standards Institute
FAA	Federal Aviation Administration
FE	DOE Office of Fossil Energy
FEMA	Federal Emergency Management Agency
FEIS	Final environmental impact statement
FFA	Federal Facility Agreement
FFCA	Federal Facility Compliance Act
FFER	Federal Facility Environmental Restoration
FHWA	Federal Highway Administration
FM	DOE Office of Field Management
FMCSR	Federal Motor Carrier Safety Regulations
FO	Field Office
FOIA	Freedom of Information Act
FR	<i>Federal Register</i>

FRA	Federal Railroad Administration
FRERP	Federal Radiological Emergency Response Plan
FSAR	Final safety analysis report
FUDS	Formerly used defense sites
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	Fiscal year
GAO	U.S. General Accounting Office
GAWR	Gross axle-weight rating
GC	DOE Office of General Counsel
GCWR	Gross combination-weight rating
GET	General employee training
GOCO	Government owned, contractor operated
GOGO	Government owned, government operated
GSA	General Services Administration
GVW	Gross vehicle weight
GVWR	Gross vehicle weight rating
HAZCHEM	Hazardous chemicals
HAZCOM	Hazardous communication
HAZMAT	Hazardous materials
HAZWOPER	Hazardous waste operations and emergency response
HAZWRAP	Hazardous Waste Remedial Actions Program
HCO	Headquarters (Packaging) Certification Official
HCS	Hazard communications standard
HD	Harmonization document
HDBK	Handbook
HEU	Highly enriched uranium
HIT	Hazard information transmission
HLW	High-level waste
HM	Hazard mitigation
HMAC	Hazardous Materials Advisory Council
HMCP	HAZMAT Contingency Planning Course
HMI	Hazardous material incident

HMIR	Hazardous materials incident reports
HMIS	Hazardous Materials Information System; also Hazardous Materials Identification System
HMIX	Hazardous Materials Information Exchange
HMR	Hazardous materials regulation
HMRB	Hazardous Materials Regulations Board
HMTA	Hazardous Materials Transportation Act
HMTUSA	Hazardous Materials Transportation Uniform Safety Act
HOD	Head of the delegation
HP	Health physics
HPS	Health Physics Society
HR	DOE Office of Human Resources and Administration
HRCQ	Highway route-controlled quantity
HSDB	Hazardous Substances Data Bank
HSRI	Highway Safety Research Institute (University of Michigan)
HUD	U.S. Department of Housing and Urban Development
IACP	International Association of Chiefs of Police
IAEA	International Atomic Energy Agency
IAFC	International Association of Fire Chiefs
IAFF	International Association of Fire Fighters
IAG	Interagency Agreement
IATA	International Air Transport Association
IAW	In accordance with
ICAO	International Civil Aviation Organization
ICAP	Interagency Committee for Aviation Policy
ICC	Interstate Commerce Commission
ICRP	International Commission on Radiological Protection
IDLH	Immediately dangerous to life and health
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IG	DOE Office of the Inspector General
IM	Intermodal

IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
INMM	Institute of Nuclear Materials Management
INMTS	International Nuclear Material Tracking System
INPO	Institute of Nuclear Power Operations
IS	DOE Office of Intelligence and National Security
ISA	Instrument Society of America
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
JTC	Joint Technical Committee
LDR	Land-disposal restriction
LEL	Lower explosive limit
LFL	Lower flammable limit
LLEA	Local law enforcement agency
LLRWPA	Low-Level Radiative Waste Policy Act
LLS	Low-level solid
LLW	Low-level waste
LM	DOE Office of Laboratory Management
LNG	Liquified natural gas
LOI	Lines of inquiry
LPG	Liquified-petroleum gas
LSA	Low specific activity
LTD QTY	Limited-quantity shipments
LTL	Less-than-truckload
LWT	Legal weight truck
MAWP	Maximum allowable working pressure
MIL	Military standard
MIS	Management Information System
M&O	Management and operating
MONAL	Mobile Nondestructive Assay Laboratory
MORT	Management oversight and risk tree
MOU	Memorandum of understanding

MPC	Maximum permissible concentration, also multipurpose canister
MRO	Medical review officer
MRS	Monitored retrievable storage
MSDS	Material safety data sheet
MSHA	DOL Mine Safety and Health Administration
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry
MTU	Metric tons uranium
NAHMI	National Alliance of Hazardous Materials Instructors
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NASS	National Accident Sampling System
NB	National Board of Boiler and Pressure Vessel Inspectors
NBS	National Bureau of Standards (now National Institute of Standards and Technology)
NCAI	National Congress of American Indians
NCP	National Contingency Plan
NCRIC	National Chemical Response and Information Center
NCRP	National Council on Radiation Protection and Measurements
NE	DOE Office of Nuclear Energy
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NGS	Nongovernment standard
NGSB	Nongovernment Standards Body
NHTSA	National Highway Transportation Safety Administration
NIOSH	National Institute for Occupational Safety and Health
NISO	National Information Standards Organization
NIST	National Institute of Standards and Technology
NMC&A	Nuclear Materials Control and Accountability system
NMFC	National Motor Freight Classification
NMMSS	Nuclear Materials Management and Safeguards System
NMTDB	National Motor Truck Data Base

NOAA	National Oceanic and Atmospheric Administration
NOIBN	Not otherwise indicated by name
NOS	Not otherwise specified
NPL	National Priorities List
NPRM	Notice of Proposed Rulemaking
NPT	National taper pipe (thread)
NRC	U.S. Nuclear Regulatory Commission, also National Response Center (U.S. Coast Guard)
NRT	National Response Team
NSB	Nuclear Standards Board
NTAG	Nuclear Technical Advisory Board
NTCN	National Telecommunications Network
NTIA	National Telecommunication and Information Administration
NTIS	National Technical Information Service
NTMS	National Telecommunications Management System
NTP	National Toxicology Program
NTSB	National Transportation Safety Board
NTTC	National Tank Truck Carriers, Inc.
NUREG	Nuclear Regulatory Guide (NRC reports category)
NWPA	Nuclear Waste Policy Act
OHMT	Office of Hazardous Materials Transportation
OJT	On-the-job training
O&M	Operations and maintenance
OMB	Office of Management and Budget (Executive Office of the U.S. Government)
ORM	Other regulated materials
ORPS	Occurrence Reporting and Processing System (DOE)
OSHA	Occupational Safety and Health Administration (DOL)
OSS	DOE Office of Safeguards and Security
OSTI	DOE Office of Scientific and Technical Information
OSTP	Office of Science and Technology Policy (Executive Office of the U.S. Government)

OTA	Office of Technology Assessment (U.S. Congress)
OTSM	<u>On-Site Transportation Safety Manual</u> (DOE)
OWT	Overweight truck
PAA	Price-Anderson Act
PAT	Plutonium air transportable (packaging)
PATS	Packaging and transportation safety
PATRAM	Packaging and Transportation of Radioactive Materials (International conference)
PCB	Polychlorinated biphenyls
PEIS	Programmatic environmental impact statement
PEL	Permissible exposure limit
PG	Packing group number
PHS	U.S. Public Health Service
PIH	Poison-inhalation hazard
PIN	Product identification number
PIRS	Pollution Incident Reporting System
PMP	Preventive Maintenance Program
PPE	Personal protective equipment
PPM	Parts per million
PRP	Potentially responsible party
PSI	Pounds per square inch
PSN	Proper shipping name
P&T	Packaging and transportation
PTRA	Port Terminal Rail Authority
QA	Quality assurance
QC	Quality control
RADCON	Radiological control/reliability, accessibility and maintainability
RAM(s)	Radioactive material(s)
RAMPAC	Radioactive materials packages (data base)
RAMRT	Radioactive Materials Routing Report
RAP	Radiological Assistance Program
RAT	Radiological assistance team

RCRA	Resource Conservation and Recovery Act
R&D	Research and development
REAC/TS	Radiation Emergency Assistance Center/Training Site
REO	Regional environmental officers
RI/FS	Remedial investigation/feasibility study
ROD	Record of Decision
RP	Radiation protection
RQ	Reportable quantity
RRT	Regional response team
RSPA	Research and Special Programs Administration (DOT)
RW	DOE Office of Civilian Radioactive Waste Management
SAE	Society of Automotive Engineers
SAP	Substance abuse professional
SAR	Safety analysis report
SARA	Superfund Amendments and Reauthorization Act
SARP	Safety Analysis Report for Packaging
SCALE	Standardized computer analyses for licensing evaluation
SCANS	Shipping Cask Analysis System
SCBA	Self-contained breathing apparatus
SCF	Standard cubic feet
SCO	Surface-contaminated object
SCRA	Specialized Carriers and Rigging Association
SER	Safety Evaluation Report
SG	Safety Guide
SHMED	State Hazardous Materials Enforcement Development program
SI	International System of Units (Système International d'Unités)
SIC	Standard Industrial Classification
SIG	Special interest group
SMAC	Shipment/mobility accountability collection (data base)
SNF	Spent nuclear fuel
SNM	Special nuclear material
SOP	Standard operating procedure

SPCC	Spill Prevention, Control and Countermeasure Plan
SPCL	Standard Point Location Code (geocodification of the United States)
SPMS	Safety Performance Measurement System
SPP	Standard practice procedure
SSAB	Site-Specific Advisory Board
SSNM	Strategic special nuclear material
SSR	Safe-secure railcar
SSRMT	State surveillance of radioactive materials transportation
SST	Safe-secure trailer
STAA	Surface Transportation Assistance Act
STC	Single-trip container
STCC	Standard Transportation Commodity Code (ICC)
STEL	Short-term exposure limit
STS	Special train service
SVTC	Silicon Valley Toxics Coalition
TA	Technical advisor
TAG	Technical advisory group
TBD	To be determined
TC	Technical committee
TCE	Trichloroethylene
TDG	Transportation of Dangerous Goods Regulations
TEPP	Transportation Emergency Preparedness Program
TI	Transport Index
TIN	Transportation Information Network (EM)
TIS	Technical Information System (EH)
TKC	The Keystone Center
TL	Threshold limit
TLD	Thermoluminescent dosimeter
TLV	Threshold-limit value
TLV—C	Threshold-limit value—ceiling
TLV—TWA	Threshold-limit value—time-weighted average
TMD	Transportation Management Division (DOE-EM-261)

TOFC	Trailer on flatcar
TPSD	Transportation and Packaging Safety Division (DOE-EH-332)
TQL	Threshold-quantity level
TQM	Total quality management
TRADE	Training Resources and Data Exchange (Oak Ridge Associated Universities)
TRANSCOM	U.S. Department of Energy Transportation Tracking and Communications System
TRC	DOD Technical Review Committee
TRQ	Threshold reporting quantity
TRU	Transuranic material
TRUPACT-II	Transuranic Package Transporter-II
TSA	Technical Safety Appraisal
TSC	Transportation System Center
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, and/or disposal (facilities)
TSUSA	Tariff Schedule for United States Annotated
TTMA	Truck Trailers Manufacturers Association
TWA	Time-weighted average
UCNI	Unclassified controlled nuclear information
UEC	Uranium Enrichment Corporation
UEL	Upper explosive limit
UFC	Uniform freight classification
UL	Underwriters' Laboratories
UMTRAP	Uranium Mill Tailings Remedial Action Program
UMTRI	University of Michigan Transportation Research Institute
UN/NA	United Nations/North American hazardous materials code
UNK	Unknown
UOR	Unusual occurrence report
U.S.C.	U.S. Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture

USNC	U.S. National Committee for IEC
VIN	Vehicle identification number
WBS	Work breakdown structure
WD	Working draft
WG	Working group
WIPP	Waste Isolation Pilot Plant

3. DEFINITIONS

A₁	The maximum activity of special-form radioactive material permitted in a Type A package.	49 CFR Part 173.403; see also 10 CFR Part 71.4 and IAEA Safety Series 6.
A₂	The maximum activity of radioactive material, other than special form or low specific activity radioactive material, permitted in a Type A package.	49 CFR Parts 173.403; see also 49 CFR Parts 173.433 and .435 and IAEA Safety Series 6.
Accident	An occurrence involving a commercial motor vehicle operating on a public road which results in: <ol style="list-style-type: none">1. a fatality,2. bodily injury to a person who, as a result of the injury, immediately receives medical treatment away from the scene of the accident, or3. one or more motor vehicles incurring disabling damage as a result of the accident, requiring the vehicle to be transported away from the scene by a tow truck or other vehicle.	49 CFR Part 390.5
Accident conditions	Hypothetical accident conditions are those used as described in the NRC regulations for evaluation of package design.	10 CFR Part 71.73
Activity release rate	Loss of radioactive contents per unit time which passes through leaks or permeable walls of a containment system.	
Air Waybill	See Shipping Paper and Shipper's Declaration for Dangerous Goods.	
ALARA (as low as reasonably achievable)	As low as is reasonably achievable taking into account the state of technology and the economics of improvements in relation to: (1) benefits to the public health and safety, (2) benefits to the radiation workers who are occupationally exposed, (3) other societal and socioeconomic considerations, and (4) the utilization of atomic energy in the public interest.	10 CFR Part 35.2

Alpha particle	A positively charged particle emitted by the nucleus of some radioactive materials undergoing radioactive decay. Alpha particles are the least penetrating of the three common forms of radiation (alpha, beta, gamma); they can be stopped by a sheet of paper or an inch of air. Alpha particles cannot penetrate skin, but materials that emit alpha particles (alpha emitters) are harmful if inhaled or ingested.	
Appraisal (technical assessment)	A documented review of a field element or facility's transportation and/or packaging management discipline performed in accordance with written guidance and criteria to verify, by examination and evaluation of objective evidence at the facility and/or operation, that applicable elements of the program have been developed, documented, and effectively implemented in accordance with specific requirements, needs, and regulations.	
Atmospheric gases	Air, nitrogen, oxygen, argon, krypton, neon, and xenon.	49 CFR Part 171.8
Atom	A unit of matter indivisible by chemical means. Atoms are the fundamental building blocks of chemical elements. Elements differ from each other because they are made up of different atoms.	
Atomic Energy Act	The Act (1954) which placed production and control of nuclear materials within a civilian agency, originally the Atomic Energy Commission, now the U.S. Department of Energy.	
Authorized inspector	An inspector who is currently commissioned by the National Board of Boiler and Pressure Vessel Inspectors and employed as an inspector by an authorized inspection agency.	49 CFR Part 171.8
Authorized Inspection Agency	(1) A jurisdiction which has adopted and administers one or more sections of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code as a legal requirement and has a representative serving as a member of the ASME Conference Committee; or (2) an insurance company which has been licensed or registered by the appropriate authority of a state of the United States or a province of Canada.	49 CFR Part 171.8

Background radiation	Radiation from cosmic sources; naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material); and global fallout as it exists in the environment from the testing of nuclear explosive devices. "Background radiation" does not include radiation from source, by-product, or special nuclear materials.	
Bag	A flexible packaging made of paper, plastic film, textiles, woven material or other similar materials.	49 CFR Part 171.8
Bar	1 bar = 100 kPa (14.5 psi); a unit of pressure equal to one million dynes per square centimeter.	49 CFR Part 171.8
Barge	A non-self-propelled vessel.	49 CFR Part 171.8
Basic description	Identification of a hazardous material by its proper shipping name, hazard class, and identification number, in that sequence. Under the new hazardous materials rules, the basic description also includes the packing group number (I, II, or III).	
Becquerel	The International System unit for activity of radioactive material. One becquerel is that quantity of radioactive material that undergoes one disintegration per second.	
Beta particle	A negatively charged particle emitted from an atom during radioactive decay. Beta particles are easily stopped by a thin sheet of metal. Exposure to high levels of beta radiation can cause skin burns.	
Bill of Lading	See Shipping paper .	
Blasting agent	Materials to be used for blasting (at construction sites or elsewhere), but any one of which is not likely to start an explosion by itself. See Explosives .	
Blockage mechanism	The mechanism by which radioactive material might be retained within a containment system due to blockage of potential leakage paths by solid or liquid material.	
Bottle	An inner packaging having a neck of relatively smaller cross section than the body and an opening capable of holding a closure for retention of the contents.	49 CFR Part 171.8

Bottom shell	That portion of the tank-car tank surface, excluding the head ends of the tank-car tank, that lies within 2 ft, measured circumferentially, of the bottom longitudinal center line of the tank-car tank.	49 CFR Part 171.8
Box	A packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fiberboard, plastic, or other suitable material.	49 CFR Part 171.8
Break-bulk	Packages of hazardous materials that are handled individually, palletized, or unitized for purposes of transportation as opposed to bulk and containerized freight.	49 CFR Part 171.8
Bulk packaging	A reference to such containers as tank cars, cargo tanks (tank trucks), or portable tanks.	See also 49 CFR Part 171.8
Burial grounds	Areas designated for near-surface disposal of containers of low-level radioactive waste and obsolete or worn-out radioactively contaminated equipment.	
Buried waste	Low-level radioactive waste (or in some cases, pre-1970 transuranic contaminated waste) that has been disposed of by near-surface burial. (See Transuranic waste .)	
By-products	Radioactive materials resulting from the production or processing of nuclear materials. Some by-products have beneficial commercial uses.	See also 10 CFR Parts 20.3 and 40.4
Calcining/ Calcination	The process of making unconsolidated powder or granules by thermal evaporation and partial decomposition (release of gases) of high-level waste.	
Canister	A container for radioactive waste forms, especially vitrified high-level liquid waste that has been solidified and immobilized. (See Vitrification .)	
Captain of the Port	The Officer of the Coast Guard, under the command of a District Commander, so designated by the Commandant for the purpose of giving immediate direction to Coast Guard law enforcement activities within an assigned area. The term "Captain of the Port" includes an authorized representative of the Captain of the Port.	49 CFR Part 171.8

Carfloat	A vessel that operates on a short run on an irregular basis and serves one or more points in a port area as an extension of a rail line or highway over water, and does not operate in ocean, coastal, or ferry service.	49 CFR Part 171.8
Cargo Aircraft	An aircraft that is used to transport cargo and is not engaged in carrying passengers. The terms "cargo aircraft only," "cargo-only aircraft," and "cargo aircraft" have the same meaning.	49 CFR Part 171.8 also see IAEA Safety Series 6
Cargo security	The physical protection against theft, pilferage, burglary, hijacking, sabotage, and vandalism of DOE cargo and vehicles in transit, including the physical protection of cargo and transportation safeguards.	
Cargo tank	<p>A bulk packaging which:</p> <ol style="list-style-type: none"> 1. is a tank intended primarily for the carriage of liquids or gases and includes appurtenances, reinforcements, fittings, and closures (for "tank", see 49 CFR 178.345-1(c), 178.337-1, or 178.338-1, as applicable), 2. is permanently attached to or forms a part of a motor vehicle, or is not permanently attached to a motor vehicle but which, by reason of its size, construction or attachment to a motor vehicle is loaded or unloaded without being removed from the motor vehicle, and 3. is not fabricated under a specification for cylinders, portable tanks, tank cars, or multi-unit tank car tanks. 	49 CFR Part 171.8
Cargo-tank motor vehicle	A motor vehicle with one or more cargo tanks permanently attached to or forming an integral part of the motor vehicle.	49 CFR Part 171.8
Cargo vessel	(1) Any vessel other than a passenger vessel and (2) any ferry being operated under authority of a change of character certificate issued by a Coast Guard Officer-in-Charge, Marine Inspection.	49 CFR Part 171.8

Carrier	Any entity engaged in the transportation of property as a common, contract, or private carrier, or as a freight forwarder, as those terms are used in Federal statutes and regulations, as amended; by the U.S. Postal Service, or as officers, agents, and employees of such carriers.	also see 49 CFR Part 171.8, 10 CFR Part 71.4, and IAEA Safety Series 6
Chemical Abstracts Service number	A Chemical Abstracts Service, used standardized reference number for regulated materials.	
Cask	A thick-walled container that provides shielding during the transportation of canisters of highly radioactive materials.	
Certificate of Compliance	A certificate issued by the DOE or NRC, as appropriate, approving for use with specified limitations specific packaging for amounts of fissile or other radioactive materials exceeding the A_1/A_2 quantities defined in DOE and NRC regulations.	
Certification	A signed statement verifying compliance with applicable regulations.	
Character of vessel	The type of service in which the vessel is engaged at the time of carriage of a hazardous material.	49 CFR Part 171.8
Characterization	Facility or site-sampling, -monitoring, and -analysis activities to determine the extent and nature the waste stream. Characterization provides the basis for acquiring the necessary technical information to develop, screen, analyze, and select appropriate cleanup techniques.	
Chemical manufacturer	An employer with a work place where chemicals are produced for use or distribution.	29 CFR Part 1910.1200
Chemical name	Scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry or the Chemical Abstracts Service rules of nomenclature, or a name which will clearly identify the chemical for the purpose of conducting a hazard evaluation.	29 CFR Part 1910.1200

Chemical plant	Any chemical industry facility including manufacturing plant, distribution facilities, warehouses, and transportation vehicles located on-site.
CHEMNET	Mutual aid network of chemical shippers and contractors composed of over 250 chemical emergency response teams and several emergency response contractors. Activated when a member shipper cannot respond promptly to an incident involving that company's product(s) and requiring the presence of a chemical expert. If a member company cannot go to the scene of the incident, the shipper will authorize a CHEMNET-contracted emergency response company to go. Responders act as advisors on safe techniques for securing the scene and dealing with spills and fires involving the chemical. If requested, the experts will provide "hands-on" assistance in capping and patching containers and in transferring the chemical from the damaged container.
Chemical Transportation Emergency Center	Chemical Transportation Emergency Center, operated by the Chemical Manufacturers Association to provide information and/or assistance to member companies and emergency responders. CHEMTREC contacts the shipper or producer of the material for more detailed information on the chemical released to facilitate response and cleanup actions. CHEMTREC maintains technical information files on over 300,000 proprietary chemicals. During emergencies, CHEMTREC can provide information regarding the effects of most chemicals on persons or the environment and suggest methods for treatment, containment, and control of an incident. CHEMTREC also maintains a directory of experts and industry assistance teams that can assist in an emergency. CHEMTREC can be reached 24 hours a day (800-424-9300). REMEMBER: A call to CHEMTREC does not fulfill any statutory or regulatory reporting requirement of the federal government.
Chlorine Emergency Plan	The Chlorine Emergency Plan, established by the Chlorine Institute to enable the nearest producer of chlorine to respond to an accident involving chlorine. CHEMTREC serves as the communication link for this program.

Class	See Hazard Class and UN Class or Division Number .	
Classification	A means of identifying groups of hazardous materials by their respective form and hazard characteristics.	
Clean Air Act	The purpose of this Act is to "protect and enhance the quality of the nation's air resources." Its primary application is through permits to regulate new and existing facilities. Of increasing importance are the National Emissions Standards for Hazardous Air Pollutants. The Clean Air Act was passed in 1970 and was amended in 1977 and 1990.	
Cleanup	Actions taken to correct a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term <i>cleanup</i> is sometimes used interchangeably with the terms remedial action, removal action, response action, or corrective action or activity.	
Clean Water Act of 1977	Amended the Federal Water Pollution Control Act passed in 1956. Its objective is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The Act's major enforcement tool is the National Pollutant Discharge Elimination System permit. The Clean Water Act addresses surface waters only.	
Closed transport vehicle	A transport vehicle equipped with a securely attached exterior enclosure that during normal transportation restricts the access of unauthorized persons to the cargo space containing the hazardous materials. The enclosure may be either temporary or permanent, and in the case of packaged materials, it may be of the "see-through" type, and must limit access from top, sides, and ends.	49 CFR Part 173.403
Closure	A device which closes an opening in a receptacle.	
Cognizant Secretarial Officers	Senior outlay program officials, including the Assistant Secretaries for Conservation and Renewable Energy (CE), Defense Programs (DP), Fossil Energy (FE), and Nuclear Energy (NE), and the Directors of Energy Research (ER), Civilian Radioactive Waste Management (RW), and Environmental Restoration and Waste Management (EM).	

Combination package	A type of nonbulk container consisting of one or more inner packagings secured in an outer packaging. It does not include a composite packaging.	See also 49 CFR Part 171.8
Combustible liquid	Any liquid having a flash point at or above 100° F (37.8° C), but below 200° F (93.3° C), except any mixture having components with flash points of 200° F (93.3° C), or higher, the total volume of which make up 99% or more of the total volume of the mixture. Liquids that can ignite only at temperatures higher than the temperature required for liquids are classed as "flammable." Combustible liquids (such as fuel oil), therefore, are considered dangerous, but not as dangerous as flammable liquids.	29 CFR Part 1910.1200; see also 49 CFR Part 173.120.
Commerce	(a) any trade, traffic or transportation within the jurisdiction of the United States between a place in a state and a place outside of such state, including a place outside of the United States, and (b) trade, traffic, and transportation in the United States which affects any trade, traffic, and transportation described in paragraph (a) of this definition.	49 CFR Part 383.5
Commercial drivers's license	A license issued by an individual's state of residence which authorizes that person to operate a class or classes of commercial motor vehicles.	49 CFR Part 383.5
Commercial Driver's License Information System	The CDLIS established by the Federal Highway Administration.	49 CFR Part 383.5
Commercial motor vehicle	Any self-propelled or towed vehicle used on public highways in interstate commerce to transport passengers or property if: <ol style="list-style-type: none"> 1. the vehicle has a gross combination weight rating or gross combination weight rating of 10,001 or more pounds; or 2. is designed to transport more than 15 passengers, including the driver; or 	

3. the vehicle is used in the transportation of hazardous materials in a quantity requiring placarding under regulations issued by the Secretary under the Hazardous Materials Transportation Act (49 USC App. 1801-1813).49 CFR Part 390.5

Communication requirements

The requirements for providing a means to identify the material being transported and the hazards associated with the material. They include package markings and warning labels, vehicle placarding, and shipping documents.

Compatibility group letter

A designated alphabetical letter used to categorize different types of explosive substances and articles for purposes of stowage and segregation.

49 CFR Part 171.8

Competent Authority

(1) A national agency responsible under its national law for the control or regulation of a particular aspect of the transportation of hazardous materials (dangerous goods). The term "Appropriate Authority," as used in the International Cargo Aircraft Association Technical Instructions, has the same meaning as "Competent Authority." The Associate Administrator for Hazardous Materials Safety is the Competent Authority for the United States. (2) Any national or international authority designated or recognized as such for any purpose in connection with the International Atomic Energy Agency's Regulations for the Safe Transport of Radioactive Material.

49 CFR Part 171.8;
see also IAEA Safety Series 6.

Compliance agreements

Legally binding agreements between regulators and regulated entities that set standards and schedules for compliance with environmental statutes. Includes Consent Order Compliance, federal facilities, and federal facilities compliance agreements.

Compliance assurance

A systematic program of measures applied by a competent authority which is aimed at ensuring that the provisions of these Regulations are met in practice.

IAEA Safety Series 6

Composite packaging	A packaging consisting of an outer packaging and inner receptacle, so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled, it remains thereafter an integrated single unit; it is filled, stored, shipped, and emptied as such.	49 CFR Part 171.8
Comprehensive Environmental Response, Compensation, and Liability Act	Federal statute (also known as Superfund) enacted in 1980 and reauthorized in 1986, that provides the statutory authority for cleanup of hazardous substances that could endanger the public health, welfare, or environment. Program activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority-level on the list, and conducting and/or supervising the ultimately determined cleanup and other remedial actions.	
Compressed gas	A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70°F (21.1°C); a gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130°F (54.4°C) regardless of the pressure at 70°F (21.1°C); or a liquid having a vapor pressure exceeding 40 psi at 100°F (37.8°C) as determined by ASTM D-323-72. Gases that are shipped under pressure. These can be nonflammable (e.g., nitrogen or helium) or flammable (e.g., hydrogen or butane). See also Poison A and Cryogenic liquid .	29 CFR Part 1910.1200
Concentrated load	A defined weight in a defined span or localized area, whereas a distributed load is the same weight equally distributed over the entire length and width of the load-bearing upper surface of the semitrailer.	
Consignee	The person designated in the shipping papers to receive the shipment.	See also IAEA Safety Series 6.
Consignment	Any package or packages, or load of radioactive material, presented by a consignor for transport.	IAEA Safety Series 6
Consignor	The person executing the shipping papers and named as such in the shipping papers. The consignor is in every case a shipper.	See also IAEA Safety Series 6.

Consumer commodity	A material that is packaged and distributed in a form intended or suitable for sale through retail sales agencies or instrumentalities for consumption or use by individuals for personal care or household use. This term also includes drugs and medicines.	49 CFR Part 171.8
Contact-handled	Radioactive containers that can be handled without shielding. (See Transuranic waste .)	
Container	Any type of drum, barrel, can, pail, box, cylinder, bag, bulk tank or vehicle, or other means of packaging hazardous materials.	See also 29 CFR Part 1910.1200.
Containership	A cargo vessel designed and constructed to transport, within specifically designed cells, portable tanks and freight containers which are lifted onto and off the vessel with their contents intact.	49 CFR Part 171.8
Containment requirements	Requirements applicable to the features of a package (e.g., closures, seals, pressure-relief devices, package-content limits) which reduce the probability that material might be released to the environment during conditions normally incident to transport.	
Containment system	The components of the packaging intended to retain the radioactive contents during transportation.	49 CFR Part 173.403; see also 10 CFR Part 71.4 and IAEA Safety Series 6.
Contamination	The deposit and/or absorption of radioactive material and biological and chemical agents on and by structures, areas, personnel, or objects where it is undesirable.	See also IAEA Safety Series 6.
Contamination control	Procedures to avoid, reduce, remove, or render harmless, temporarily or permanently, nuclear, biological, and chemical contamination for the purpose of maintaining or enhancing the efficient conduct of operations.	
Contamination control line	The inner boundary of the contamination control station.	

Contamination control station	An area specifically designated for permitting ingress and egress of personnel and equipment to and from, respectively, the radiation control areas. The outer boundary of the contamination control station is the radiological control line, and inner boundary is the line segment labeled the contamination control line.	
Controlled access	Roadways that are provided with either temporary or permanent physical access control barriers. Examples of physical barriers include fences, DOE- or contractor-controlled guard gates, and security road blocks. Use of passive barriers such as signs does not constitute providing controlled access.	
Control requirements	Those operational steps or administrative measures taken to reduce the probability or consequence of an accident. These controls may include speed-limit restrictions, temporary road closures, or escorts.	
Conveyance	(1) For transport by public highway or rail: any transport vehicle or large freight container; (2) for transport by vessel: any vessel, or any hold, compartment, or defined deck area of a vessel; and (3) for transport by aircraft: any aircraft.	49 CFR Part 173.403; see also 10 CFR Part 71.4 and IAEA Safety Series 6.
Corrosive material	Solids or liquids that destroy or severely damage skin or cause rapid corrosion of certain metals. Many acids, such as sulfuric acid, are corrosive to skin or steel, or to both.	See also 49 CFR Part 173.136.
Crate	An outer packaging with incomplete surfaces.	49 CFR Part 171.8
Crew member	A person assigned to perform duty in an aircraft during flight time.	49 CFR Part 171.8
Critical mass	The smallest mass of fissionable material that will support a self-sustaining chain reaction under specified conditions.	

Criticality	A term used to describe the state of a given fission system when the specified conditions are such that the mass of active material present is precisely a critical mass. Thus, the fission neutron production rate is a constant and is exactly balanced by the combined rate of neutron loss and utilization so that the neutron population remains a constant. Supercriticality occurs when a greater than critical mass of active material is present and the neutron population increases rapidly.	
Criticality alarm	A device incorporating a radiation detector and alarm circuitry placed at locations where significant quantities of fissionable material are handled or stored. At a preset value, the device triggers alarms indicating that high radiation is present at the detector probe and that a criticality accident may have occurred.	
Cryogenic liquid	Gases that become liquids at extremely low (cryogenic) temperatures. Cryogenic liquids may be either flammable or nonflammable.	See also 49 CFR Part 173.115.
Curie	A unit measure of radioactivity; 1 curie (Ci) equals that quantity of any nuclide that undergoes 3.7×10^{10} disintegrations per second. A millicurie (mCi) is one-thousandth of a curie; a microcurie (μ Ci) is one-millionth of a curie, and a picocurie (pCi) is one-billionth of a curie.	10 CFR Part 30.4; see also 40 CFR Parts 190.2 and 192.01.
Cylinder	A pressure vessel designed for pressures higher than 40 psia and having a circular cross section. It does not include a portable tank, multiunit tank-car tank, cargo tank, or tank car.	49 CFR Part 171.8
Decay	The spontaneous radioactive transformation of one nuclide into a different nuclide or into a lower energy state of the same nuclide. (See Nuclide.)	
Decommissioning	The process of removing a facility from operation, followed by decontamination and then entombment, dismantlement, or conversion to another nonnuclear use.	
Decontamination	The removal of unwanted material (especially radioactive material) from facilities, soils, or equipment by washing, chemical action, mechanical cleaning, or other techniques.	

Defined deck area	The area, of the weather deck of a vessel, or of a vehicle deck of a roll-on/roll-off ship or a ferry, which is allocated for the stowage of radioactive material.	IAEA Safety Series 6
Depleted uranium	Uranium that has a smaller percentage of U-235 than the 0.7% found in natural uranium. It is found in some spent nuclear fuel or as by-product "tails" of uranium isotope separation.	See also 49 CFR Part 173.403 and 10 CFR Part 71.4.
Description	Identification of a hazardous material by its proper shipping name, hazard class, identification number, and other information, such as a recognized chemical name.	
Design	The description of a special form material, a package or a packaging, that enables those items to be fully identified. The description may include specifications, engineering drawings, reports showing compliance with regulatory requirements, and other relevant documentation.	49 CFR Part 173.403; see also IAEA Safety Series 6.
Design basis	The set of functional requirements that bounds the design limits of process systems, components, equipment, or structures. These include plant availability, efficiency, reliability, and maintainability. Some aspects of the design basis are important to safety, while others are not.	
Design basis accidents	Accidents that are postulated for the purpose of establishing functional requirements for safety significant structures, systems, components, and equipment.	
Design certifying engineer	A person registered with the U.S. Department of Transportation who has the knowledge and ability to perform stress analysis of pressure vessels and to otherwise determine if a cargo tank design and construction meet the applicable DOT specifications and who has an engineering degree and one year of work experience in structural or mechanical design. Persons registered as professional engineers by appropriate authority of a state of the United States, or a province of Canada, who have the requisite experience may be registered under this program.	49 CFR Part 171.8
Designated facility	A hazardous waste-treatment, storage, or disposal facility that has been designated on the manifest by the generator.	49 CFR Part 171.8

Dismantlement	The removal of radioactive- and nonradioactive-contaminated equipment and materials from a facility to reduce the potential hazard to humans and to meet regulatory requirements.
Disqualified driver	A driver who has been convicted of an offense or is not qualified because of medical reasons, drug testing failure, expiration of any document in the driver's qualification files, or any other such qualifications as predetermined in the contractor's agreement with bargaining units.
Disposal	Final placement or destruction of toxic or radioactive waste, surplus or banned pesticides or other chemicals; polluted soils, and drums containing hazardous materials from removal actions or accidental releases. Disposal may be accomplished through use of approved, secured, regulated landfills, surface impoundments, land farming, deep-well injection, or incineration.
Distributed load	A defined weight that bears essentially uniformly along the entire length and width of the load-bearing upper surface of the semitrailer.
District Commander	The District Commander of the Coast Guard, or his authorized representative, who has jurisdiction in the particular geographical area.
DOE Alternative	A DOE document that authorizes DOE shipments of hazardous materials not in compliance with DOE orders.
DOE Covered Contractor	A seller of supplies and services involving the packaging and transportation of hazardous materials under a procurement contract or a subcontract either of which (a) contains the clause entitled "Safety and Health" or (b) is performed in part on-site at a DOE-owned or -leased facility and contains a provision asserting DOE's authority to enforce environmental protection, safety, and health requirements. The term "contract" does not include small purchases.

49 CFR Part 171.8

DOE Orders	The means by which DOE identifies management objectives and requirements for DOE personnel. When incorporated into contracts, Orders establish requirements for DOE contractors. Orders are subject to all elements of the directives system. Orders may be changed through page changes or through complete revisions.	
Domestic transportation	Transportation between places within the United States other than through a foreign country.	49 CFR Part 171.8
DOT Exemption	A DOT document that authorizes shipments of hazardous materials not in compliance with DOT regulations.	
DOT labels	Labels required by DOT to be placed on packages of hazardous materials.	
DOT placards	Devices, similar to DOT labels, used on the outside of vehicles and bulk containers transporting hazardous materials.	
DOT specification marks	Marks which DOT requires to be placed on DOT specification packages, showing the DOT specification number and related information. (See UN Specification Marks .)	
DOT specification number	The number assigned by DOT to a type of DOT specification package.	
DOT specification packaging	Packaging fabricated in accordance with specification provided by the DOT.	
Drivers log	A daily record of a driver's off-duty, on-duty-but-not-driving, and driving time and other information that serves to identify the motor carrier, the driver, and the nature of the driver's duties.	
Driver qualification file	A file containing the documents specified by DOT for each employee who operates a commercial motor vehicle off-site.	
Drivers subject to testing	Employee drivers and contract drivers under contract for 90 days or more in a period of 365 days.	

Driver's supervisor	A line manager who directly supervises an individual responsible for operating a commercial motor vehicle.	
Driver's time record	A daily record showing (1) each time the driver reports for duty; (2) each time the driver is released from duty; (3) if applicable, the number of hours worked for compensation for an employer other than the contractor; and (4) the total number of hours worked.	
Driver training	A type of training designed for motor vehicle operators.	
Drum	A flat- or convex-ended cylindrical packaging made of metal, fiberboard, plastic, plywood, or other suitable materials. This definition includes also packagings of other shapes made of metal or plastic (e.g., round taper-necked packagings or pail-shaped packagings), but does not include cylinders, jerricans, wooden barrels, or bulk packagings.	49 CFR Part 171.8
Electron	A negatively charged atomic particle. Electrons surround the atom's positively charged nucleus and determine the atom's chemical properties.	
Element	One of the 107 known chemical substances that cannot be divided into simpler substances by chemical means. The Periodic Table lists these elements. (Some examples: hydrogen, lead, uranium.)	
Elevated-temperature material	A material which, when offered for transportation or transported in a bulk packaging: (1) is in a liquid phase and at a temperature at or above 100°C (212°F), (2) is in a liquid phase with a flash point at or above 37.8°C (100°F) that is intentionally heated and offered for transportation or transported at or above its flash point, or (3) is in a solid phase and at a temperature at or above 240°C (464°F).	49 CFR Part 171.8
Emergency plan	A brief, clear, and concise description of the overall emergency organization; designation of responsibilities; and procedures, including notification, involved in coping with any or all aspects of a potential credible emergency.	

Emergency planning	The development and preparation of emergency plans and procedures and the identification of necessary personnel and resources to provide an effective response.	
Emergency preparedness	The training of personnel, acquisition and maintenance of resources, and exercising of the plans, procedures, personnel, and resources essential for emergency response.	
Emergency response	The implementation of planning and preparedness during an emergency involving the effective decisions, actions, and application of resources that must be accomplished to mitigate consequences and recover from an emergency.	
<i>Emergency Response Guidebook</i>	A book issued by DOT containing information of the potential hazards of hazardous materials and action to be taken in emergencies.	
Emergency response information	Information required to accompany a shipment of hazardous materials for use in emergencies.	
Emergency response telephone number	Information required to be shown on the shipping paper specifying a telephone number that must be constantly monitored to provide access to persons with information useful in a transportation emergency.	
Encapsulated	A method of packaging consisting of a plastic sheet completely enclosing the sides and top of a pallet-load containing combustible commodities or combustible packages. Totally noncombustible commodities on wood pallets enclosed only by a plastic sheet as described are not considered to fall under this definition. Banding (e.g., stretch-wrapping around the sides only of a pallet load) is not considered to be encapsulated. The term "encapsulated" does not apply to individual plastic-enclosed items inside a large, nonplastic-enclosed container.	
Engine	A locomotive propelled by any form of energy and used by a railroad.	49 CFR Part 171.8

Engineered barriers	Features of a disposal site constructed of materials designed to isolate radioactive materials from the environment.	
Enriched uranium	Uranium containing more uranium-235 than the naturally occurring distribution of uranium isotopes.	49 CFR Part 173.403; see also 10 CFR Part 71.4.
Enrichment	A process by which the natural ratios of the isotopes of a given element are altered.	
Entombment	The process of sealing or burying radioactively contaminated materials to prevent dispersion or intrusion.	
Environmental assessment	A written environmental analysis which is prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require preparation of a more detailed environmental impact statement.	
Environmental impact statement	A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and lists alternative actions. The report documents the information required to evaluate the environmental impact of a project. Such a report informs decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the environment.	
Environmental restoration	Cleanup and restoration of sites contaminated with radioactive and hazardous substances during past DOE production activities.	See also 49 CFR Part 387.5.
Ex number	A number, preceded by the prefix "Ex-," which is assigned by the Associate Administrator for Hazardous Materials Safety to identify an explosive that has been approved.	49 CFR Parts 171.8 and 173.56
Exclusive use (also referred as sole use or full load)	The sole use of a conveyance by a single consignor and for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee.	49 CFR Part 173.403; see also 10 CFR Part 71.4 and IAEA Safety Series 6.

Any loading or unloading must be performed by personnel having radiological training and resources appropriate for safe handling of the consignment. Specific instructions for maintenance of exclusive-use shipment controls must be issued in writing and included with the shipping-paper information provided to the carrier by the consignor.

Explosives

Materials which can detonate or are subject to very rapid combustion. The most hazardous explosives are referred to as Class A Explosives, which includes nitroglycerin and large ammunition. Class C Explosives, the least hazardous explosives, includes ordinary fireworks and small-arms ammunition. Explosives are assigned a classification code consisting of a division number followed by a compatibility group letter. (For example, a primary explosive substance is assigned classification code 1.1A.)

See also 49 CFR Part 173.50 and 29 CFR Part 1910.1200.

Facility

A term used to describe distinct DOE and/or contractor buildings, plants, multicomplex storage units, laboratories, and/or test ranges that are within fenced or otherwise access-controlled operating areas within the boundaries of a site.

Familiarization training

See **General Awareness and Familiarization Training**.

Feasibility study

Analysis of the practicability of a proposal, for example, a description and analysis of the potential cleanup alternatives for a site on the National Priorities List. The feasibility study frequently recommends selection of a cost-effective alternative. It frequently starts as soon as the remedial investigation is under way; together, they are commonly referred to as the "RI/FS." The term can apply to a variety of proposed corrective or regulatory actions.

Feed materials

Refined uranium or thorium metal or their pure components in a form suitable for use in nuclear reactor fuel elements or as feed to uranium enrichment facilities.

Field elements

All DOE activities that are not located at the headquarters at Germantown, Maryland or Washington, D.C.

Fissile classification	Classification of a package or shipment of fissile materials according to the controls needed to provide nuclear criticality safety during transportation.	See also 10 CFR Part 71.4.
Fissile material	Any material consisting of or containing one or more fissile radionuclides. Fissile radionuclides are Pu-238, Pu-239, Pu-241, U-233, and U-235. Neither natural nor depleted uranium is fissile material.	49 CFR Part 173.403; see also 49 CFR Part 173.453 and 455, 10 CFR Part 71.4, and IAEA Safety Series 6.
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 can occur spontaneously, but usually it is caused by the absorption of gamma rays, neutrons, or other particles.	
Fixed contamination	Contamination that can not be removed from a surface during normal handling	
Flammable liquid	Liquids (such as gasoline) that can ignite at relatively low temperatures.	See also 49 CFR Part 173.120 and 29 CFR Part 1910.1200.
Flammable solid	Solids, including water-reactive or spontaneously combustible solids. Included are certain metals (such as lithium) or metal powders and certain types of matches.	See also 49 CFR Part 173.124 and 29 CFR Part 1910.1200.
Flash point	The minimum temperature at which a substance gives off flammable vapors which, in contact with sparks or flame, will ignite.	49 CFR Part 173.120; see also 29 CFR Part 1910.1200.
Forbidden materials	Hazardous materials that are not allowed to be offered for transportation or transported in one or more types of transportation.	
Formerly Utilized Sites Remedial Action Program	A program under the direction of the Office of Environmental Restoration and Waste Management that addresses the cleanup of sites and adjacent properties contaminated by activities of the Manhattan Project.	
Freight container	A reusable container having a volume of 1.81 cubic meters (64 ft ³) or more, designed and constructed to permit its being lifted with its contents intact and intended primarily for containment of packages in	49 CFR Part 173.403; see also IAEA Safety Series 6.

unit form during transportation. A small freight container is one which has either one outer dimension less than 1.5 m (4.9 ft) or an internal volume of not more than 3 m³ (106 ft³). All other containers are designated as large freight containers.

Fuel tank

A tank other than a cargo tank, used to transport flammable or combustible liquid, or compressed gas for the purpose of supplying fuel for propulsion of the transport vehicle to which it is attached, or for operating other equipment on the transport vehicle.

49 CFR Part 171.8

Function-specific training

Instruction or training concerning the hazardous material rules that apply to the activities of a specific job.

Gamma ray

High-energy, short-wavelength, electromagnetic radiation emitted by a nucleus during radioactive decay. Gamma rays are very penetrating and are best blocked by dense materials like lead and depleted uranium. X-rays, although of nonnuclear origin, also occur in this same energy range, as do ultraviolet rays. Gamma radiation is usually accompanied by alpha and beta radiation, and always accompanies fission.

Gas

See **Compressed gas**.

Gas-leakage test methodology

A method of specifying a gas leakage rate test which relates permissible activity release rates of the radioactive contents carried within a containment system to equivalent gas-leakage rates under specified test conditions.

Gaseous diffusion

A technology for separating fissionable U-235 isotopes from the more abundant nonfissionable uranium isotopes by pumping gaseous uranium hexafluoride through resistant barriers.

Geologic repository

A mined facility for disposal of radioactive wastes that uses natural geologic barriers to provide waste containment for geologic time periods (millions of years).

Government aircraft	An aircraft used exclusively in the service of any government or of any political subdivision thereof, including the government of any state, territory, or possession of the United States, or the District of Columbia, but not including any government-owned aircraft engaged in carrying persons or property for commercial purposes.	
Gross combination weight rating	The value specified by the manufacturer as the loaded weight of a combination (articulated) vehicle. In the absence of a value specified by the manufacturer, the gross combination weight rating will be determined by adding the gross combination weight rating of the power unit and the total weight of the towed unit and any load thereon.	49 CFR Part 383.5; see also 49 CFR Part 390.5.
Gross vehicle weight rating	The value specified by the manufacturer as the loaded weight of a single vehicle.	49 CFR Part 383.5; see also 49 CFR Part 390.5.
Gross weight or gross mass	The weight of a packaging plus the weight of its contents.	49 CFR Part 171.8
Groundwater	Water that exists or flows in a zone of saturation beneath land surface; liquid occurring beneath the earth's surface, in the interstices between soil grains, in fractures, or in porous formations.	
Groundwater remediation	Treatment of groundwater to remove pollutants.	
Grout	A cement-like substance used to solidify and immobilize liquid low-level radioactive waste for disposal or to stabilize disposal trenches.	
Half-life	Time required for a radioactive substance to lose 50% of its radioactivity by decay. After a period equal to 10 half-lives, the radioactivity has decreased to about 0.1% of its original value. (See Alpha particle, Beta particle, and Gamma ray.)	
Hazard Class	The category of hazard assigned to a hazardous material. A material may meet the defining criteria for more than one hazard class but is assigned to only one hazard class.	49 CFR Part 171.8

Hazard Communication Standard	The Occupational Safety and Health Administration standard that is cited in 29 CFR Part 1910.1200. The standard requires the communication of hazards and risks of hazardous substances to workers that may be exposed to these hazards.	
Hazard Information Transmission	This program provides digital transmission of a Chemical Transportation Emergency Center emergency chemical report to first responders on the scene of hazardous materials incidents; also advises responders on hazards of the materials, level of protective clothing, mitigating action and aid of victims.	
Hazard warning	Any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the hazard(s) of the chemical(s) in the container(s).	
Hazard zone	One of four levels of hazard (Hazard Zones A through D) assigned to gases, and one of two levels of hazards (Hazard Zones A and B) assigned to liquids that are poisonous by inhalation. A hazard zone is based on the LC_{50} value for acute inhalation toxicity of gases and vapors.	49 CFR Part 171.8
Hazardous chemicals	All chemicals which constitute a physical hazard or a health hazard.	29 CFR Part 1910.1200
Hazardous material	A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. The term includes hazardous substances, hazardous wastes, marine pollutants, and elevated-temperature materials.	49 CFR Parts 171.8 and 390.5
Hazardous materials employee	A person who is employed by a hazardous materials employer and who in the course of employment directly affects hazardous materials transportation safety. This term includes a person employed by a hazardous material employer who, during the course of employment, <ol style="list-style-type: none"> 1. loads, unloads, or handles hazardous materials; 	49 CFR Part 171.8

2. tests, reconditions, repairs, modifies, marks, or otherwise represents containers, drums, or packagings as qualified for use in the transportation of hazardous materials;
3. prepares hazardous materials for transportation;
4. is responsible for safety of transporting hazardous materials; or
5. operates a vehicle used to transport hazardous materials.

**Hazardous
materials
employer**

A person or company which uses one or more of its employees in connection with transporting hazardous materials in commerce; causing hazardous materials to be transported or shipped in commerce or which represents, marks, certifies, sells, offers, reconditions, tests, repairs, or modifies containers, drums, or packagings as qualified for use in the transportation of hazardous materials. This term includes an owner-operator of a motor vehicle which transports hazardous materials in commerce. This term includes also any department, agency, or instrumentality of the United States, a state, a political subdivision of a state, or an Indian tribe engaged in an activity described in the first sentence of this definition.

49 CFR Part 171.8

**Hazardous
Materials
Information
Exchange**

A national data repository and "bulletin board" for all states' use regarding planning, available training courses, regional activities and events, and recent legislation or regulation updates. It is available to any communications-capable personal computer by dialing directly to (312)972-3275. Currently, the exchange is operated by Argonne National Laboratory, under contract.

**Hazardous
Materials
Regulations**

Those parts of 49 CFR (specifically Parts 106—190) related to the transport of hazardous materials.

**Hazardous
Materials Table**

A table that lists and classifies those materials which DOT has designated as hazardous materials for purposes of transportation. The table prescribes the requirements for shipping papers, package marking, labeling, and transport vehicle placarding applicable to the shipment and transportation of those hazardous materials.

Hazardous substances	Materials identified by the U.S. Environmental Protection Agency as environmentally hazardous.	See also 49 CFR Parts 171.8 and 390.5.
Hazardous waste	Any material defined and regulated as such by the Environmental Protection Agency regulation. As defined in the 1976 Resource Conservation and Recovery Act, a solid waste, or combination of solid waste, that because of its quantity or concentration or physical, chemical, or infectious characteristics, (a) may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.	See also 49 CFR Part 390.5 and 40 CFR Parts 240.101 and 261.3.
Hazardous Waste Manifest	See Shipping paper.	
Headquarters Certifying Official	The designated Headquarters Official responsible for administering the U.S. Department of Energy program for the certification of Type B and the review and approval of fissile, Type 7A, and special-form packagings.	
Headquarters elements	Cognizant Secretarial Officers and Secretarial support officers located at Washington, D.C. and Germantown, Maryland.	
Hermetically sealed	Closed by fusion, gasketing, crimping, or equivalent means so that no gas or vapor can enter or escape.	49 CFR Part 171.8
High-level waste	The highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid, that contains a combination of transuranic waste and fission products in concentrations high enough such as to require permanent isolation. It also includes other highly radioactive material that the Nuclear Regulatory Commission, consistent with existing law, determines to require permanent isolation.	See also 40 CFR Part 191.02.

Highway-route-controlled quantity	A quantity within a single package which exceeds (1) 3000 times the A_1 value of the radionuclides as specified for special-form radioactive material; (2) 3000 times the A_2 value of the radionuclides as specified for normal-form radioactive material; or (3) 30,000 curies, or whichever is least.	49 CFR Part 173.403
HM-181	The number assigned to the hearing in which the DOT considered adopting many of the international hazardous materials transportation rules for use in the United States.	
HM column	A part of a shipping paper used to identify the hazardous materials entries on the paper by placing an "X" or, when appropriate, the letters "RQ" in the column alongside such entries.	
Identification codes for packagings	<p>Identification codes for designating types of packagings consist of the following:</p> <ol style="list-style-type: none"> 1. An arabic numeral indicating the type of packaging, as follows: <ul style="list-style-type: none"> • 1 is a drum • 2 is a wooden barrel • 3 is a jerrican • 4 is a box • 5 is a bag • 6 is a composite packaging • 7 is a pressure receptacle 2. A capital letter indicating the material of construction, as follows: <ul style="list-style-type: none"> • A is steel (all types and surface treatments) • B is aluminum • C is natural wood • D is plywood • F is reconstituted wood • G is fiberboard • H is plastic • L is textile • M is paper, multiwall • N is metal (other than steel or aluminum) • P is glass, porcelain or stoneware 	49 CFR Part 178.502

3. A numeral indicating the category of packaging within the type to which the packaging belongs. For example, for steel drums ("1A"), "1" indicates a nonremovable head drum (i.e., "1A1") and "2" indicates a removable head drum (i.e., "1A2").
4. For composite packagings, two capital letters used in sequence in the second position of the code, the first indicating the material of the inner receptacle and the second, that of the outer packaging. For example, a plastic receptacle in a steel drum is designated "6HA1."
5. For combination packagings, only the code number for the outer packaging is used.

Identification number	The four-digit number on a placard or the four digit number (after UN/NA) on a shipping paper or package.	49 CFR Part 172.101(e)
Inactive waste site	Site formerly used for the treatment, storage, or disposal of waste.	
Incineration	A treatment technology using combustion to destroy organic constituents and reduce the volumes of waste, for example burning sludge to remove the water and reduce the remaining residues to a safe, nonburnable ash which can be disposed of safely on land or in underground locations.	See also 40 CFR Part 240.101.
Industrial hygiene	The occupational health science and art devoted to the recognition, evaluation, and control of environmental factors or stresses arising in or from the work place that may cause sickness, impaired health and well being, or significant discomfort and inefficiency among workers or those with whom they are in contact.	
Industrial hygiene program	The implementation of a written systematic plan to recognize, evaluate, control, and document exposure to health hazards in the environment.	
Inhalation hazard	See Poison inhalation hazard.	
Inner packaging	A packaging for which an outer packaging is required for transport. It does not include the inner receptacle of a composite packaging.	49 CFR Part 171.8

Inner receptacle	A receptacle which requires an outer packaging in order to perform its containment function. The inner receptacle may be an inner packaging of a combination packaging or the inner receptacle of a composite packaging.	49 CFR Part 171.8
Interim Hazard Classification	A DOE document that includes identification of the new explosive substance, the DOT classification, hazard communication information, expiration date, and approval signature.	
Intermodal container	A freight container designed and constructed to permit it to be used interchangeably in two or more modes of transport.	49 CFR Part 171.8
Intermodal portable tank	A specific class of portable tanks designed primarily for international intermodal use.	49 CFR Part 171.8
International Air Transport Association	A world organization of airlines.	
International Air Transport Association rules	The regulations issued by the International Air Transportation Association for air transportation of hazardous materials.	
International Civil Aviation Organization	An international organization of governments concerned with air transportation.	
International Civil Aviation Organization rules	The regulation issued by the International Civil Aviation Organization for air transportation of hazardous materials. The International Civil Aviation Organization rules are incorporated into the International Air Transportation Association Rules.	
International Maritime Dangerous Goods Code	The International Maritime Dangerous Goods Code issued by the International Maritime Organization for water transportation of hazardous materials.	
International Maritime Organization	An international organization of governments concerned with water transportation.	

**International
transportation**

Transportation—between

49 CFR Part 171.8

1. any place in the United States and any place in a foreign country,
2. in the United States through a foreign country, or
3. places in one or more foreign countries through the United States.

**Interstate
commerce**

Trade, traffic, or transportation in the United States which is between a place within a state and a place outside of such state (including a place outside of the United States) or is between two places in a state through another state or through a place outside of the United States.

49 CFR Part 390.5

**Intrastate
commerce**

Any trade, traffic, or transportation in any state which is not described in the term "interstate commerce."

**Irradiated
reactor fuel**

See Spent nuclear fuel.

Irradiation

Exposure to radiation of wavelengths shorter than those of visible light (gamma, x-ray, or ultraviolet).

**Irritating
material**

Solids or liquids that emit very irritating fumes under certain circumstances.

Isolation

The placement of radioactive waste so that contact between the waste and humans or the environment will be highly unlikely for a chosen period of time.

Isotope

Atoms with the same atomic number (same chemical element) but different atomic weights. In other words, the nuclei have the same number of protons, but a different number of neutrons. (See **Element, Atom.**)

Jerrican

A metal or plastic packaging of rectangular or polygonal cross-section.

49 CFR Part 171.8

Land disposal restrictions	Provisions of the Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act that apply to hazardous waste placed in storage or disposed of after November 7, 1986. Land Disposal Restrictions prohibit the placement in or on the land of listed or characteristic hazardous waste that does not meet specified standards.	
Landfills	Sanitary landfills are land disposal sites for nonhazardous solid waste. The waste is spread in layers and compacted to the smallest reasonable volume and cover material is applied at the end of each operation-day. Secured chemical landfills are disposal sites for hazardous waste. They are selected and designed to minimize the chance of release of hazardous substances into the environment.	
Leak	Any unwanted opening or openings throughout a containment system that could permit the escape of the contents.	
Leakage	Transfer of a material from the containment system to the environment through a leak or leaks.	
Leakage rate	Leakage rate is defined as the quantity of solid particles, liquids or gases passing through leaks per unit time. The term leakage rate can refer to the radioactive material (gas, liquid, solid, or any mixture of these) or to the test fluid. The dimensions of the rate of solid leakage are mass divided by time. The dimensions of the rate of liquid leakage can be mass divided by time or volume divided by time. The dimensions of the rate of gas leakage are the product of pressure and volume (this is a mass-like unit) divided by time.	
Leak-tight	A general term indicating that a containment system meets the required level of containment for particular contents.	
Licensee (also NRC Licensee)	A person who is authorized to conduct activities under a license issued by the NRC.	10 CFR Part 19.5 and 10 CFR Part 2.4
Limited access area	Areas on federal property where public access is controlled through the use of posted signs.	

Limited quantity	The maximum amount of a hazardous material for which there is a specific labeling or packaging exception.	49 CFR Part 171.8
Limited quantity of radioactive material	A quantity of radioactive material not exceeding the materials package limits as specified in 49 CFR Part 173.423 and which conform with requirements as specified in 49 CFR Part 173.421.	49 CFR Part 173.403
Limited quantity shipments	Shipments of certain types of hazardous materials in small containers specified in the hazardous material rules. Such shipments are allowed certain exceptions—such as an exception from the labelling requirements of the hazardous material regulations.	
Liquid	A material that has a vertical flow of over 2 in. (50 mm) within a 3-min period, or a material having one gram or more liquid separation when determined in accordance with the procedures specified in American Society for Testing and Materials D 4359-90, "Standard Test Method for Determining Whether a Material is a Liquid or Solid," 1990 edition.	49 CFR Part 171.8
Liquid phase	A material that meets the definition of "liquid" when evaluated at the higher of the temperatures at which it is offered for transportation or at which it is transported, not at the 37.8°C (100°F) temperature specified in American Society for Testing and Materials D 4359-90, "Standard Test Method for Determining Whether a Material is a Liquid or Solid," 1990 edition.	49 CFR Part 171.8
Local law enforcement agency	Any state, county, or municipal agency having law enforcement authority within the locality or jurisdiction. The term includes county or municipal police forces, port authority police, railroad special agents, highway patrol, etc. In some instances, involving sea shipments, for example, the U.S. Coast Guard or other federal agencies may also be considered as the local law enforcement agency, depending upon their authority to provide a response to a request for assistance.	

Locomotive crane	A rotating superstructure with power plant, operating machinery, and boom, mounted on a base or car equipped for travel on railroad track. It may be self-propelled or propelled by an outside source. Its function is to hoist and swing loads at various radii.	
Low-level waste	Radioactive waste not classified as high-level waste, transuranic waste, spent nuclear fuel, or by-product material.	
Low-specific-activity material	Any of the following: (1) uranium or thorium ores and physical or chemical concentrates of those ores; (2) unirradiated natural or depleted uranium or unirradiated natural thorium; (3) tritium oxide in aqueous solutions provided the concentration does not exceed 5 mCi per mL; (4) material in which the radioactivity is essentially uniformly distributed and in which the estimated average concentration of contents does not exceed (i) 0.0001 mCi per g of radionuclides for which the A_2 quantity is not more than 0.05 Ci; (ii) 0.005 mCi per g of radionuclides for which the A_2 quantity is more than 0.05 Ci, but not more than 1 Ci, or (iii) 0.3 mCi per g of radionuclides for which the A_2 quantity is more than 1 Ci; (5) objects of nonradioactive material externally contaminated with radioactive material, provided that the radioactive material is not readily dispersible and the surface contamination, when averaged over an area of 1 sq m, does not exceed 0.0001 mCi (220,000 dpm) per sq cm of radionuclides for which the A_2 quantity is not more than 0.05 Ci, or 0.001 mCi (2,200,000 dpm) per sq cm for other radionuclides.	49 CFR Part 173.403; see also 10 CFR 71.4 and IAEA Safety Series 6.
Magazine vessel	A vessel used for the receiving, storing, or dispensing of explosives.	49 CFR Part 171.8
Manhattan Project	The U.S. government top-secret program to produce an atomic bomb for use during World War II.	
Marine pollutant	A hazardous material which is listed in appendix B to 49 CFR Part 172.101 of this subchapter and, when in a solution or mixture of one or more marine pollutants, is packaged in a concentration which equals or exceeds:	49 CFR Part 171.8

1. 10 wt% of the solution or mixture for materials listed in the appendix; or
2. 1 wt% of the solution or mixture for materials that are identified as severe marine pollutants in the appendix.

Marking	A descriptive name, identification number, instructions, caution, weight, specification, or UN marks, or combinations thereof.	49 CFR Part 171.8
Marks	See Package marks ; see also DOT specification marks , Orientation marks .	
Materials poisonous by inhalation	<p>These are designated as</p> <ol style="list-style-type: none"> 1. a gas assigned to Hazard Zone A, B, C, or D; 2. a liquid (other than as a mist) assigned to Hazard Zone A or B; or 3. any material identified as an inhalation hazard by a special provision in the regulations. 	
Material Safety Data Sheet	A document containing detailed information about the chemical and physical characteristics of a product or material, usually including such information as the boiling point, flash point, vapor pressure, appearance, and odor. Also included may be health-hazard information, fire-fighting methods, first-aid procedures, and similar data.	See also 29 CFR Part 1910.1200.
Maximum capacity	The maximum inner volume of receptacles or packagings.	49 CFR Part 171.8
Maximum net mass	The allowable maximum net mass of contents in a single packaging, or the maximum combined mass of inner packaging and the contents thereof.	49 CFR Part 171.8; see also 49 CFR Part 178 Subpart M.
Maximum normal operating pressure	The maximum pressure above atmospheric pressure at mean sea-level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions of transport in the absence of venting, external cooling by an ancillary system, or operational control during transport.	IAEA Safety Series 6; see also 10 CFR Part 71.4.

Mixed waste	Waste that contains both radioactive and hazardous components as defined by the Atomic Energy Act and the Resource Conservation and Recovery Act.	
Mixture	A material composed of more than one chemical compound or element.	49 CFR Part 171.8; see also 29 CFR Part 1910.1200.
Mode	Any of the following transportation methods: rail, highway, air, or water.	49 CFR Part 171.8
Molecular flow	The flow of gas through a leak under conditions such that the mean free path is greater than the largest dimension of a transverse section of the leak.	
Monitoring	Periodic or continuous measuring of the quantity and type of discharges or migration of radioactive waste from a managed facility to determine the level of compliance with statutory requirements and/or pollutant levels in various media.	
Motor carrier	A common, contract, or private carrier of a property by motor vehicle.	49 CFR Part 387.3; see also 49 CFR Parts 386.2, 390.5 and 391.85.
Motor vehicle	Any vehicle, trailer, or semitrailer that is propelled or drawn by mechanical power and used upon the highways in the transportation of passengers or property, or any locomotives or cars operated exclusively on rail or rails.	See also 49 CFR Parts 171.8, 383.5, and 390.5.
Multilateral approval	Approval by both the appropriate competent authority of the country of origin and of each country through or into which the shipment is to be transported. This definition does not imply approval from countries over which radioactive materials are carried in aircraft if there is no scheduled stop in that country.	49 CFR Part 173.403; see also IAEA Safety Series 6.

**Multipurpose
canister**

The multi-purpose canister is a single triple-purpose sealed container for spent nuclear fuel (SNF) which provides handling and other capabilities for dry storage, transportation, and disposal activities. Multipurpose canisters are provided with two lids, welded to the container, which provide a dry environment for SNF and are overpacked separately and uniquely for the various system elements of storage, transportation, and geologic disposal.

**Name of
contents**

The proper shipping name as specified in 49 CFR Part 172.101.

**National
Emission
Standards for
Hazardous Air
Pollutants**

The Clean Air Act establishes limits on the release of hazardous pollutants for which no ambient air quality standard is applicable. Under the March 7, 1989, proposed ruling, National Emission Standards for Hazardous Air Pollutants will also address radioactive releases to the air.

**National
Environmental
Policy Act of
1969**

The Act which established the requirements for conducting environmental reviews of federal actions that have the potential for significant impact on the human environment.

**National
Pollutant
Discharge
Elimination
System**

A provision of the Federal Water Pollutants Control Act (also known as Clean Water Act) which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by the Environmental Protection Agency, a state, or (where delegated) a tribal government on an Indian reservation.

**National
Priorities List**

The Environmental Protection Agency's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund). A site must be on the National Priorities List to receive money from the Trust Fund for remedial action. The list is based primarily on the score a site receives from the Hazard Ranking System. The Environmental Protection Agency is required to update the National Priorities List at least once a year.

Natural thorium	Thorium with the naturally occurring distribution of thorium isotopes (essentially 100 weight-percent Th-232).	49 CFR Part 173.403; see also 10 CFR Part 71.4.
Natural uranium	Uranium with the naturally occurring distribution of uranium isotopes (approximately 0.711 weight-percent U-235 and the remainder essentially U-238).	
Navigable waters	Waters of the United States, including the territorial seas that maintain open passageways for marine traffic.	See also 49 CFR Part 171.8.
Neutron	An uncharged nuclear particle roughly equal in weight to a proton; one of the two principal components of a nuclei. Neutrons sustain the fission chain reaction in a nuclear reactor. (See Fission .)	
Neutron poisons	Materials other than fissile material which will absorb neutrons (such as boron, cadmium, or gadolinium).	
Nonbulk packaging	A packaging which has <ol style="list-style-type: none"> 1. a maximum capacity 450 L (119 gal) or less as a receptacle for a liquid; 2. a maximum net mass of 400 kg (882 lb) or less and a maximum capacity of 450 L (119 gal) or less as a receptacle for a solid; or 3. a water capacity of 454 kg (1000 lb) or less as a receptacle for a gas. 	See also 49 CFR Part 171.8.
Nonfixed radioactive contamination	Radioactive contamination that can be readily removed from a surface by wiping with an absorbent material. Nonfixed (removable) radioactive contamination is not significant if it does not exceed the limits specified.	49 CFR Part 173.403; see also 49 CFR Part 173.443.
Normal conditions of transport	The normal conditions of transport are those used as described in the NRC regulations for evaluation of package design.	10 CFR Part 71.71; see also IAEA Safety Series 6.
Normal-form radioactive material	Radioactive material which has not been demonstrated to qualify as "special form radioactive material."	49 CFR Part 173.403; see also 10 CFR Part 71.4.

Nonreusable container	A packaging (container) whose reuse is restricted.	49 CFR Part 171.8; see also 49 CFR Part 173.28.
Nuclear fuel	Fissionable material used as a source of power when placed in a specific arrangement in a nuclear reactor.	
Nuclear fuel cycle	The complete series of steps involved in supplying fuel for nuclear reactors. It includes mining, refining, enrichment, fabrication of fuel elements, use in a reactor, chemical processing to recover the fissionable material remaining in the spent fuel, reenrichment of the fuel material, refabrication of fuel elements, and management of radioactive waste.	See also 40 CFR Part 190.02.
Nuclear fuel element	A tube, rod, or other form into which fuel material is fabricated for use in a reactor.	
Nuclear fuel fabrication	The process through which fissionable metal is configured into precisely shaped fuel or target elements and clad in lead or other materials to be made ready for use in a reactor.	
Nuclear fuel reprocessing plant	A chemical plant where irradiated spent-nuclear-fuel elements are processed to separate fission products from uranium and plutonium.	
Nuclear radiation	Particulate and electromagnetic radiation emitted from nuclei. (See Alpha particle , Beta particle , Gamma ray , and Neutron .)	See also 40 CFR Part 190.02.
Nuclear reactor	An assembly of nuclear fuel capable of starting and sustaining a controlled chain reaction based on nuclear fission.	
Nuclear Waste Fund	A fund established by the Nuclear Waste Policy Act of 1982, which directed the Department of Energy to pursue a program toward disposal of commercial high-level and spent fuel waste, and defense high-level waste in a geologic repository. The nuclear waste fund assesses utilities a fee to pay for siting, development, and operation of a commercial repository. The share of the costs commensurate with the portion of the repository committed for disposal of defense high-level waste will be paid by the Department of Energy.	

Nuclear Waste Policy Act	An Act passed in 1982 and reauthorized in 1987 that directs the Department of Energy to design, site, and construct a geologic repository for the disposal of defense high-level radioactive waste and spent fuel from civilian (commercial) nuclear reactors. The Act also established the Office of Civilian Radioactive Waste Management to carry out these responsibilities.	
Nucleus	The small positively charged core of an atom that contains nearly all of the atom's mass and that consists of protons and neutrons except in hydrogen which consists of one proton only.	
Nuclide	Any species of an atom that exists for a measurable length of time. A radionuclide is a radioactive nuclide. Radionuclides emit alpha, beta, and/or gamma rays, depending on their composition. (See Alpha particle , Beta particle , and Gamma ray .)	
Occupied caboose	A rail car being used to transport nonpassenger personnel.	49 CFR Part 171.8
Offsite facility	A hazardous waste treatment, storage, or disposal area that is located at a place away from the generating site.	
Onsite facility	A hazardous waste treatment, storage, or disposal area that is located at the generating site.	
Officer in Charge, Marine Inspection	A person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who under the supervision and direction of the Coast Guard District Commander is in charge of a designated inspection zone for the performance of duties with respect to the enforcement and administration of Title 52, Revised Statutes.	49 CFR Part 171.8
Offshore supply vessel	A cargo vessel of less than 500 gross tons that regularly transports goods, supplies or equipment in support of exploration or production of offshore mineral or energy resources.	49 CFR Part 171.8
Offsite	Any area within or outside a DOE site to which the public has free and unlimited access.	
Onsite	Any area within the boundaries of a DOE site or facility that is fenced or otherwise access-controlled.	

Operator	A person who controls the use of an aircraft, a vessel, or a vehicle.	49 CFR Part 171.8
Organic peroxide	Generally unstable materials derived from hydrogen peroxide.	49 CFR Part 171.8; see also 49 CFR Part 173.128 and 29 CFR Part 1910.1200.
Orientation marks	Package marks indicating which part of the package must be kept upright (i.e., "This End Up").	
Originator	An individual or group that prepares a consignment of material for shipment off-site or transfer on-site.	
Other Regulated Materials	A category of hazardous materials, consisting of five subcategories, referred to as ORM-A, ORM-B, ORM-C, ORM-D, and ORM-E.	See also 49 CFR Parts 171.8 and 173.144.
Outage or ullage	The amount by which a packaging falls short of being liquid full, usually expressed in percent by volume.	49 CFR Part 171.8
Outer packaging	The outermost enclosure of a composite or combination packaging together with any absorbent materials, cushioning, and any other components necessary to contain and protect inner receptacles or inner packagings.	49 CFR Part 171.8
Overpack	An enclosure that is used by a single consignor to provide protection or convenience in handling of a package or to consolidate two or more packages. "Overpack" does not include a freight container.	49 CFR Part 171.8; see also 49 CFR Part 178 and IAEA Safety Series 6.
Oxidizer	Materials that give off oxygen which can stimulate burning. Many peroxides are oxidizers, as are some cosmetics.	See also 29 CFR Part 1910.1200 and 49 CFR Part 173.127.
Package	Packaging with contents as presented for transport.	See also 49 CFR Parts 171.8 and 173.403, 10 CFR Part 71.4, and IAEA Safety Series 6.
Package marks	Information required to be placed on containers of hazardous materials.	
Packaging	The assembly of components necessary to contain and transport hazardous materials. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding,	10 CFR Part 71.4; see also 49 CFR Parts 171.8 and 173.403.

passive devices for cooling or for absorbing mechanical shocks, external fittings, neutron moderators, nonfissile neutron absorbers, and other supplementary equipment. (See **Containers**; also **Specification package**.)

Packaging technology

All technology underlying the design, development, testing and operation of a materials packaging systems. Base technology elements include:

- (a) generic design concepts and components with potential for future systems applications;
- (b) maintenance and bench-marking of test facilities;
- (c) activities related to increased understanding of materials and their applications to package design;
- (d) characterization of authorized package contents;
- (e) risk and accident analysis methods;
- (f) environmental impact analysis methods;
- (g) standards development; (h) technical investigations into adequacy of regulations and need for revision of regulations; (i) development and application of computer codes for design and system analysis; (j) development and application of data bases; and (k) supporting research in the physical, chemical, mathematical, and engineering sciences.

Packing group

A grouping according to the degree of danger presented by hazardous materials. Packing Group I indicates great danger; Packing Group II, moderate danger; Packing Group III, minor danger.

49 CFR Part 171.8;
see also 49 CFR Part 172.101.

Packing group number

A number (I, II, or III), indicating whether a packaging may be used for products that are considered very dangerous (PG I), moderately dangerous (PG II), or of minor danger (PG III).

Permit

An authorization, license, or equivalent control document issued by the Environmental Protection Agency or an approved state agency to implement the requirements of an environmental regulation; for example, a permit to operate a wastewater treatment plant or to operate a facility that may generate harmful emissions.

Person

An individual, firm, copartnership, corporation, company, association, joint-stock association, including any trustee, receiver, assignee, or similar representative thereof, or government, Indian tribe, or agency or instrumentality of any government or

49 CFR Part 171.8

Indian tribe when it offers hazardous materials for transportation in commerce or transports hazardous materials in furtherance of a commercial enterprise, but such term does not include:

1. the United States Postal Service or
2. any agency or instrumentality of the federal government.

Placarded car	A rail car which is placarded in accordance with the regulations, except those cars displaying only the FUMIGATION placards.	49 CFR Part 171.8; see also 49 CFR Parts 172 and 172.510.
Placards	See DOT placards.	
Plutonium	A radioactive element with an atomic number of 94. Its most important isotope is fissionable plutonium-239, which is produced by neutron irradiation of uranium-238. (See Neutron , Irradiation , and Isotope .)	
Poison A	Gases whose vapors can be very dangerous to life. Phosgene (sometimes called "Mustard Gas") is a Poison A material. Under the hazardous materials regulations, these gases are in Hazard Class Division 2.3, poisonous gas.	See also 49 CFR Part 173.115.
Poison B	Materials, such as arsenic, that are dangerous to health because of their known toxicity, but which are not necessarily lethal. Under the new hazardous materials regulations, these materials are in Hazard Class Division 6.1, poisonous materials.	See also 49 CFR Part 173.132.
Poison-inhalation hazard	Liquids or gases that emit extremely toxic vapors even at normal temperatures. One example is methyl isocyanate, the material that was implicated in the deadly incident in Bhopal, India.	See also 49 CFR Part 173.132.

Portable tank	A bulk packaging (except a cylinder having a water capacity of 1000 lb or less) designed primarily to be loaded onto, or on, or temporarily attached to a transport vehicle or ship and equipped with skids, mountings, or accessories to facilitate handling of the tank by mechanical means. It does not include a cargo tank, tank car, multiunit tank-car tank, or trailer carrying 3AS, 3AAX, or 3T cylinders. It is usually used to transfer bulk materials from one type of transportation to another or for smaller quantities than tank car or tank truck shipments.	49 CFR Part 171.8
Precious metals	For the purposes of DOE series Orders, are defined as gallium, gold, iridium, osmium, palladium, platinum, rhodium, ruthenium, silver, or any combination of these metals.	
Preferred route or preferred highway	Is a highway for shipment of "highway route controlled quantities" of radioactive materials so designated by a state routing agency, and any interstate highway system for which an alternative highway has not been designated by such state agency.	49 CFR Part 171.8; see also 49 CFR Part 177.825.
Preliminary assessment	The process of collecting and reviewing available information about a known or suspected waste site or release.	
Primary hazard	The hazard class of a material.	49 CFR Part 171.8; see also 49 CFR Part 172.101.
Principal place of business	A single location designated by the motor carrier, normally its headquarters, where required records are maintained.	
Private track or private siding	Rail track located outside of a carrier's right-of-way, yard, or terminals where the carrier does not own the rails, ties, roadbed, or right-of-way, and includes track or portion of track which is devoted to the purpose of its user either by lease or written agreement, in which case the lease or written agreement is considered equivalent to ownership.	49 CFR Part 171.8
Production reactor	A reactor designed primarily for large-scale production of tritium or plutonium by neutron irradiation of U-238. The term also refers to a reactor used primarily for the production of isotopes.	

Proper shipping name	The correct name of a hazardous material as listed in the Hazardous Materials Table.	49 CFR Parts 171.8 and 172.101
Protective service	Measures taken by commercial carriers upon written request to provide physical protection for shipments, which is in addition to the protection furnished under the requirements of normal common carrier activity.	
Proton	A positively charged nuclear particle; one of the two principal components of nuclei. (See Neutron .)	
Public access areas	Any areas not subject to controlled access.	
Public vessel	A vessel owned by and being used in the public service of the United States. It does not include a vessel owned by the United States and engaged in a trade or commercial service or a vessel under contract or charter to the United States.	49 CFR Part 171.8
Quality	The degree to which an item or process meets or exceeds the user's requirements and expectations.	
Quality assurance	Actions that provide confidence that quality is achieved.	See also IAEA Safety Series 6.
Qualified driver	A driver who possesses a current drivers license; has an up-to-date, centrally maintained driver qualification file; maintains a drivers time record; and is physically qualified with a current medical examiner's certificate issued by a certified medical officer. In addition, except for intrastate drivers, drivers of commercial motor vehicles shall be enrolled in a drug-screening program.	
Quality Assurance Program	A system of administrative and technical checks initiated to ensure that the requirements for an operations are well-defined and are met. The term includes other related terms such as <i>quality control</i> and <i>compliance inspection</i> .	See also IAEA Safety Series 6.
Radiation	The propagation of energy through matter or space in the form of waves, rays, or streams of energetic particles. The term is frequently used in relation to the emission of rays from the nucleus of an atom. In nuclear physics, the term has been extended to include fast-moving particles (e.g., alpha and beta particles) and gamma rays.	See also 40 CFR Part 190.02 and 10 CFR Part 20.1003.

Radiation level	The radiation dose-equivalent rate expressed in millirem per hour (mrem/h). Neutron-flux densities may be converted into radiation levels according to the following table:	49 CFR Part 173.403; see also IAEA Safety Series 6.
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Neutron flux densities to be regarded as equivalent to a radiation level of 1 mrem/h

Energy of neutron	Flux density equivalent to 1 mrem/h [nNeutrons per square centimeter per second (n/cm ² /s)]
Thermal	268.0
5 keV	228.0
20 keV	112.0
100 keV	32.0
500 keV	12.0
1 MeV	7.2
5 MeV	7.2
10 MeV	6.8

Radioactive article	Any manufactured instruments and articles such as an instrument, clock, electronic tube or apparatus, or similar instruments and articles having radioactive material as a component part.	49 CFR Part 173.403
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Radioactive contents	The radioactive material, together with any contaminated liquids or gases, within the package.	49 CFR Part 173.403 and IAEA Safety Series 6
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Radioactive decay	The spontaneous decay or disintegration of an unstable atomic nucleus, accompanied by the emission of radiation.
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Radioactive material	Substances that emit radiation spontaneously. For purposes of transport, any material having a specific activity greater than 0.002 μ Ci/g.	49 CFR Part 173.403; see also 40 CFR Part 190.02, and IAEA Safety Series 6.
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Radioactive waste	A solid, liquid, or gaseous material of negligible economic value that contains radionuclides in excess of threshold quantities. Does not include material contaminated by radionuclides from nuclear weapons testing.
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Radioactivity	The rate at which radioactive material is emitting radiation, given in terms of the number of nuclear disintegrations occurring in a unit of time. The common unit of radioactivity is the curie (Ci), which is 3.7×10^{10} disintegrations per second.	
Radioisotope	A radioactive isotope of a chemical element. (See Element, Isotope.)	
Rail freight car	A car designed to carry freight or nonpassenger personnel by rail, and includes a box car, flat car, gondola car, hopper car, tank car, and occupied caboose.	
Receiver	The receiver is the organization to which a shipment is being made. The shipper and receiver could be the same organization.	
Receptacle	A containment vessel for receiving and holding materials, including any means of closing.	49 CFR Part 171.8
Recognized chemical name	A name of a material used by qualified scientists or in scientific and technical literature.	
Recurrent training	See Retraining.	
Registered inspector	<p>A person registered with DOT who has the knowledge and ability to determine if a cargo tank conforms with the applicable DOT specification and has, at a minimum, any of the following combinations of education and work experience in cargo-tank design, constructions, inspection, or repair:</p> <ol style="list-style-type: none"> 1. an engineering degree and one year of work experience, 2. an associate degree in engineering and two years of work experience, or 3. a high school diploma (or general equivalency diploma and 3 years of work experience. 	49 CFR Part 171.8; see also 49 CFR Part 107 Subpart F.
Registered User	An NRC licensee who has registered with the NRC to use a specific packaging in accordance with the provisions of 10 CFR Part 71.12.	

Rem	A measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of 1 roentgen (r) of x-rays [1 mrem = 0.001 rem]. The relation of the rem to other dose units depends upon the biological effect under consideration and upon the conditions for irradiation.	
Remedial action project	A group of activities initiated to assess a DOE facility or radioactive waste site that may require restoration to achieve acceptable radiation levels.	
Remedial investigation	The Comprehensive Environmental Response, Compensation, and Liability Act process of determining the extent of hazardous substance contamination, and, as appropriate, conducting treatability investigations. The in-depth study is designed to gather the data necessary to determine the nature and extent of contamination at a Comprehensive Environmental Response, Compensation, and Liability Act site; establish criteria for cleaning up the site; identify preliminary alternatives for remedial action; and support the technical and cost analyses of the alternatives. The remedial investigation is usually effected along with the feasibility study. Together, they are usually referred to as the "RI/FS."	
Remote-handled	Radioactive containers with a level of radioactivity sufficiently high to require shielding and handling remotely.	
Reportable quantity	Hazardous substances, when shipped in certain quantities per package.	See also 49 CFR Parts 171.8 and 172.101.
Repository (federal)	A federally owned and operated engineered facility for storage or disposal of specific types of radioactive waste for which the Department of Energy is responsible.	
Residue	The material remaining in or clinging to the inside of a container after it is unloaded, but not cleaned or purged.	See also 49 CFR Part 171.8.
Resource Conservation and Recovery Act	An amendment to the Solid Waste Disposal Act, which was passed in 1976 to address the problem of how to safely dispose of municipal and industrial solid waste generated nationwide. It established a	

national policy to reduce or eliminate hazardous waste and conduct treatment, storage, or disposal to minimize any threat from the waste. The Resource Conservation and Recovery Act was amended by the Hazardous and Solid Waste Amendments in 1984 to expand the scope of and to add detailed requirements to the Act.

Retraining	The training required to be given at least once every 2 years to hazardous material employees who have previously received training.
Retrievability	Capability to remove waste from its place in storage.
Reusable packaging	Containers, such as tank cars or cylinders, used repeatedly to transport hazardous materials.
Risk assessment	The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence and/or the use of specific pollutants.
Root cause	Those causal factors that, if corrected, would preclude a recurrence of the event.
Safe Drinking Water Act	Protects drinking water supplies. The maximum contaminant levels developed under this Act are used in groundwater monitoring programs.
Safe-secure railcar	A specially designed railcar that has protective and deterrent systems and is used in a special train to transport nuclear explosives or special nuclear material.
Safe-secure trailer	A specially designed semitrailer that has protective and deterrent systems that is used with a special tractor to transport nuclear explosives or special nuclear material.

Safety Analysis Report for Packaging	A document that provides a comprehensive technical basis for demonstrating how a packaging meets the regulatory requirements. It contains the design, testing, operational procedures, maintenance procedures, and quality assurance program for packaging to demonstrate compliance with the NRC regulatory safety standards, or equivalent standards established by DOE for approving packagings and issuing certificates of compliance.	
Safety training	Instruction concerning emergency response information and accident avoidance.	
Sanitary waste	Waste, such as garbage, that is generated by normal housekeeping activities and is not hazardous or radioactive. This waste is disposed of in sanitary landfills. Sanitary waste also includes liquids which are treated in sewage treatment plants.	
Seven or eight consecutive-day period	The period of seven or eight consecutive days beginning on any day at midnight. Each day is a period of 24 consecutive hours beginning at midnight. Used in determining commercial drivers' eligibility to continue work.	
Shallow land burial	Disposal of waste in shallow trenches; commonly used for low-level radioactive waste.	
Sheathing	A covering consisting of a smooth layer of wood placed over metal and secured to prevent any movement.	49 CFR Part 171.8
Shielding	Materials such as concrete, water, and lead, that are used to attenuate the transmission of ionizing radiation.	
Shipment	Any offsite transport of hazardous materials. It involves activities such as package loading, marking, and labeling; cargo securement; placarding; preparation of shipping documents; and tendering the package to the carrier or transporter.	See also IAEA Safety Series 6.
Shipper	The organization and/or person who offers a shipment to a carrier for transportation.	

Shipper's Declaration for Dangerous Goods	A shipping paper (with a red border) used for air shipments of hazardous materials.	
Shipping name	See Proper shipping name.	
Shipping order	See Shipping paper.	
Shipping paper	A shipping order, bill of lading, hazardous waste manifest or other shipping document serving a similar purpose and containing the information required by the regulations.	49 CFR Part 171.8; see also 49 CFR Parts 172.202, 203, and 204.
Sievert	The International System unit of dose equivalent, which relates dose to biological effects by using the quality factor, Q.	
Siftproof packaging	A packaging impermeable to dry contents, including fine solid material produced during transportation.	
Single packaging	A nonbulk packaging other than a combination packaging.	49 CFR Part 171.8
Single-trip container	A container not allowed to be used for transportation more than once, unless properly reconditioned. (See Nonreusable container .)	
Site	An area of land that contains a DOE facility or facilities, which is either owned or leased by the DOE or the federal government. The land may be divided by public rights-of-way. Lands, installations, and/or facilities for which DOE has or shares responsibility for environmental restoration and waste management activities.	See also 40 CFR Part 191.02.
Site inspection	The collection of information from a CERCLA (Superfund) site to determine the extent and severity of hazards posed by the site. It follows a preliminary assessment and is more extensive. The purpose is to gather information necessary to score the site, using the U.S. Environmental Protection Agency Hazard Ranking System, and to determine if the site presents an immediate threat that requires prompt removal action. (See National Priorities List .)	
Sludge	Slushy matter or sediment such as that precipitated by the treatment of liquid or solid waste.	

Solid	A material which has a vertical flow of 2 in. (50 mm) or less within a 3-m period, or a separation of 1 g or less of liquid when determined in accordance with the procedures specified in ASTM D 4359-84, "Standard Test Method for Determining Whether a Material is a Liquid or Solid," 1984.	49 CFR Part 171.8
Solid waste	Nonliquid, nonsoluble material ranging from municipal garbage to industrial waste that contains complex, and sometimes hazardous, substances. Solid waste also includes sewage sludge, agricultural refuse, demolition wastes, and residues. Technically, solid waste also refers to liquids and gases in containers.	See also 40 CFR Parts 240.101 and 261.2.
Solution	Any homogeneous liquid mixture of two or more chemical compounds or elements that will not undergo any segregation under conditions normal to transportation.	49 CFR Part 171.8
Source material	Uranium or thorium, or any combination thereof, in any physical or chemical form; or ores which contain by weight one-twentieth of one percent (0.05%) or more of (a) uranium, (b) thorium or (c) any combination thereof. Source material does not include special nuclear material.	10 CFR Part 20.1003
Special approval	A DOT approval for a specified type of container or shipment.	
Special arrangement	Those provisions, approved by the competent authority, under which a consignment which does not satisfy all the applicable requirements of the regulations may be transported. For international shipments, multilateral approval is required.	IAEA Safety Series 6
Special form radioactive material	Radioactive material which satisfies the following conditions: <ol style="list-style-type: none"> 1. It is either a single solid piece or is contained in a sealed capsule that can be opened only by destroying the capsule; 2. the piece or capsule has at least one dimension not less than 5 mm (0.197 in.); and 3. it satisfies the test requirements of DOT. 	49 CFR Part 173.403 and 10 CFR Part 71.4; see also IAEA Safety Series 6.

Special nuclear material	Plutonium, U-233, uranium enriched in U-233 or U-235, and any other material which NRC, determines to be special nuclear material, but does not include source material; or any material artificially enriched by any of the foregoing but does not include source material.	10 CFR Part 20.1003
Specific activity	The activity of the radionuclide per unit mass of that nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the activity per unit mass of the material.	49 CFR Part 173.403; see also 10 CFR Part 71.4 and IAEA Safety Series 6.
Specification marks	See DOT specification marks.	
Specification number	See DOT specification number.	
Specification packaging	A packaging conforming to one of the specifications or standards for packagings.	49 CFR Part 171.8; see also 49 CFR Parts 178 and 179.
Spent nuclear fuel	Nuclear reactor fuel that has been irradiated to the extent that it can no longer effectively sustain a chain reaction. Fuel becomes spent when its fissionable isotopes have been partially consumed and fission-product poisons have accumulated in it.	10 CFR Part 2.1105
Stabilization	Conversion of the active organic matter in sludge into inert, harmless material. Also, activities to reduce the active management required for disposal facilities (such as burial ground stabilization and closure).	
Standard cubic foot	One cubic foot of gas measured at 60°F and 14.7 psia.	
Standardized leakage rate	The leakage rate, evaluated under known conditions, normalized to the flow of dry air at reference conditions from an upstream pressure 1.013×10^5 Pa to a downstream pressure of 0 Pa at a temperature of 298 K (25°C). The units for standardized leakage rate are written as $\text{Pa} \cdot \text{m}^3 \cdot \text{s}^{-1}$ SIR.	

Standardized helium leakage rate	The helium flow rate through a leak at an upstream pressure P_u of $1.013 \times 10^5 \text{ Pa} \pm 5 \times 10^3 \text{ Pa}$ and a downstream pressure P_d of 10^3 Pa or less at a temperature of $296 \text{ K} \pm 7 \text{ K}$ ($23^\circ \text{C} \pm 7^\circ \text{C}$). The units for the standardized helium leakage rate are written as $\text{Pa} \cdot \text{m}^3 \cdot \text{s}^{-1} \text{ SHeLR}$.	
State	A state of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Virgin Islands, American Samoa, Guam, or any other territory or possession of the United States designated by the Secretary of Transportation.	49 CFR Part 171.8; see also 10 CFR 71.4.
State-designated route	A preferred route selected in accordance with DOT "Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantities of Radioactive Materials" or an equivalent routing analysis which adequately considers overall risk to the public.	49 CFR Part 171.8
State routing agency	An entity (including a common agency of more than one state such as one established by Interstate compact) which is authorized to use state legal process to impose routing requirements, enforceable by state agencies, on carriers of radioactive materials without regard to intrastate jurisdictional boundaries. This term includes also Indian tribal authorities who have police powers to regulate and enforce highway routing requirements within their lands.	49 CFR Part 171.8
Stowage	The act of placing hazardous materials on board a vessel.	49 CFR Part 171.8
Strong outside container	The outermost enclosure which provides protection from the unintentional release of its contents under conditions normally incident to transportation.	49 CFR Part 171.8
Strong tight package	A package that will not leak any type of materials during conditions normally incident to transportation.	49 CFR Parts 173.24 and 173.421
Subsidiary hazard	A hazard or a material other than the primary hazard.	49 CFR Part 171.8

**Superfund
Amendments
and
Reauthorization
Act**

The 1986 Act reauthorizing and amending the Comprehensive Environmental Response, Compensation, and Liability Act.

Supervisor

An individual who is a properly trained and knowledgeable hazardous materials employee and, therefore, is allowed to supervise hazardous materials employees.

Supplier

The supplier is an organization that provides equipment and services for the shipment of materials.

**Surface-
contaminated
object**

A solid object which is not itself radioactive but which has radioactive material distributed on its surfaces. Surface-contaminated objects (SCO) shall be in one of two groups:

IAEA Safety Series 6

1. SCO-I: A solid object on which:

- the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4 Bq/cm^2 ($10^{-4} \text{ } \mu\text{Ci/cm}^2$) for beta and gamma emitters, or 0.4 Bq/cm^2 ($10^{-5} \text{ } \mu\text{Ci/cm}^2$) for alpha emitters; and
- the fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $4 \times 10^4 \text{ Bq/cm}^2$ ($1 \text{ } \mu\text{i/cm}^2$) for beta and alpha emitters; and
- the nonfixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $4 \times 10^2 \text{ Bq/cm}^2$ ($1 \text{ } \mu\text{i/cm}^2$) for beta and gamma emitters, or $4 \times 10^3 \text{ Bq/cm}^2$ ($0.1 \text{ } \mu\text{i/cm}^2$) for all other alpha emitters.

2. SCO-II: A solid object on which either the fixed or nonfixed contamination on the surface exceeds the applicable limits specified for SCO-I in (1.) above and on which:

- the nonfixed contamination of the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not

exceed 400 Bq/cm^2 ($10^{-2} \text{ } \mu\text{Ci/cm}^2$) for beta and gamma emitters, or 40 Bq/cm^2 ($10^{-3} \text{ } \mu\text{Ci/cm}^2$) for all other alpha emitters; and

- the fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $8 \times 10^5 \text{ Bq/cm}^2$ ($20 \text{ } \mu\text{Ci/cm}^2$) for beta and gamma emitters, or $8 \times 10^4 \text{ Bq/cm}^2$ ($2 \text{ } \mu\text{Ci/cm}^2$) and all other alpha emitters; and
- the nonfixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $8 \times 10^5 \text{ Bq/cm}^2$ ($20 \text{ } \mu\text{Ci/cm}^2$) for beta and gamma emitters, or $8 \times 10^4 \text{ Bq/cm}^2$ ($2 \text{ } \mu\text{Ci/cm}^2$) for all other alpha emitters.

Surplus facility

Any facility or site (including equipment) that has no identified programmatic use and may or may not be contaminated.

Tamper-indicating devices

Devices that may be used on containers and that, because of their uniqueness in design or structure, reveal violations of containment integrity. Tamper-indicating devices include seals, mechanisms, containers, and enclosures.

Tank

A tank container, portable tank, a road tank vehicle, a rail tank wagon or a receptacle with a capacity of not less than 450 L intended to contain liquids, powders, granules or slurries and of not less than 1000 liters intended to contain gases. A tank container shall be capable of being carried on land or on sea and of being loaded and discharged without the need of removal of its structural equipment, shall possess stabilizing members and tie-down attachments external to the shell, and shall be capable of being lifted when full.

IAEA Safety Series 6

Tank truck

A truck used to carry bulk materials. See also Cargo tank.

Technical name

A recognized chemical name or microbiological name currently used in scientific and technical handbooks, journals, and texts. Generic descriptions are authorized for use as technical names provided that they readily identify the general chemical or

49 CFR Part 171.8

microbiological group. Examples of acceptable generic chemical descriptions are organic phosphate compounds, petroleum aliphatic hydrocarbons, and tertiary amines. For proficiency testing only, generic microbiological descriptions such as bacteria, mycobacteria, fungi, and viral samples may be used.

Testing	Oral and/or written tests given to each hazardous material employee to determine whether the training received by such employee is effective.	
Tiedown	A system for securing packages containing hazardous or radioactive materials to vehicles (including straps, cables, chains, bolts, attachment devices, tightening devices, etc.).	
Tiedown attachment points	The location where the tiedown attaches to the structure of the semitrailer.	
Tiedown owner	The individual, agency, contractor, company, or corporation that holds title to or will hold title to the tiedown during its use.	
Top shell	The tank-car tank surface, excluding the head ends and bottom shell of the tank-car tank.	49 CFR Part 171.8
Toxic Substances Control Act	Enacted in 1976 to protect human health and the environment from unreasonable risk from exposure to and manufacture, distribution, use, or disposal of substances containing toxic chemicals. For example, any hazardous waste that contains more than 50 parts per million (ppm) of polychlorinated biphenyls (PVC) are subject to regulations under this Act.	
Trade name	A commercial name assigned to a product for sales, marketing, or similar purposes or used for a company's internal designation of a product.	
Traffic management	All functional activities related to the planning, direction, selection, purchase, and use of transportation services efficiently, effectively, and economically while ensuring full compliance with applicable international, federal, state, tribal, and local regulations, DOE policy, and good business management practices.	

Train	One or more engines coupled with one or more rail cars, except during switching operations or where the operation is that of classifying and assembling rail cars within a railroad yard for the purpose of making or breaking up trains.	49 CFR Part 171.8
Training record	A written record of the training and testing given to each hazardous materials employee.	
Trainship	A vessel other than a rail-car ferry or carfloat, specifically equipped to transport railroad vehicles, and fitted with installed securing devices to tie down each vehicle.	
Transfer	Any onsite transport of hazardous materials, other than intrabuilding movements. It involves activities such as packaging, loading, marking and labeling, cargo security, placarding, and preparation of shipping documents as appropriate in addition to the transportation of the material via any transport vehicle.	
Transferee	(1) a person to whom a conveyance is made. (2) one who is transferred.	
Transferor	One that conveys a title, right or property.	
Transport index	<p>The dimensionless number (rounded up to the first decimal place) placed on the label of a package to designate the degree of control to be exercised by the carrier during transportation. The transport index is determined as follows:</p> <ol style="list-style-type: none"> 1. the number expressing the maximum radiation level in millirem per hour at 1 m (3.3 ft) from the external surface of the package, or 2. for Fissile Class II packages or packages in a Fissile Class III shipment, the number expressing the maximum radiation level at 1 m (3.3 ft) for the external surface of the package, or the number obtained by dividing 50 by the allowable number of packages which may be transported together, whichever is larger. 	10 CFR 71.4; see also 49 CFR Part 173.403 and IAEA Safety Series 6.
Transport vehicle	Any conveyance (motorized or towed, railcar, aircraft, boat, barge, or seagoing vessel) used for the transfer or transportation of property.	See also 49 CFR Part 171.8.

Transportation	The offsite shipment of cargo from one point to another using a transport vehicle.	
Transportation Emergency Preparedness Program	An emergency preparedness program in the DOE which concentrates on shipments and DOE capabilities to carry out responsibilities under the National Contingency Plan, Federal Radiological Emergency Response Plan, and other regulations.	
Transportation safety manual	A document which contains, explicitly or by reference, procedures or guidance implementing the DOE policy for onsite transfers of hazardous materials. The transportation safety manual may also include reference to documentation that implements the DOE policy for offsite transportation.	
Transuranic elements	Elements heavier than uranium, with an atomic number greater than 92. They include, among others, neptunium, plutonium, americium, and curium.	
Transuranic waste	Waste that is contaminated with alpha-emitting transuranium nuclides with half-lives greater than 20 years and concentrations greater than 100 nanocuries per gram of waste. Contact-handled transuranic waste does not require shielding and has a surface dose rate of less than 200 mrem/h. Remote-handled transuranic waste has a surface dose rate greater than 200 mrem/h and requires additional shielding because it presents an exposure hazard. The dose rates at the surface of remote-handled transuranic waste packages fall within the 200 to 1,000 rem/h range.	See also 40 CFR Part 191.02.
Test gas or tracer gas	The gas that is used to detect leakage or measure leakage rates.	
Treatment	Any activity that alters the chemical or physical nature of radioactive or hazardous waste to reduce toxicity, volume, mobility, or render it amenable for transport, storage, or disposal.	
Tumulus	Above-ground waste burial using materials including cement, plastics, and dirt. Radioactive waste is immobilized, stored in concrete vaults, placed on an above-ground concrete storage pad, and covered with plastic and dirt. In humid or wet regions, tumulus disposal protects the water table.	

Type A package	A Type A packaging together with limited radioactive contents. A Type A package does not require competent authority approval because its contents are limited to A_1 or A_2 quantities.	49 CFR Part 173.403; see also IAEA Safety Series 6.
Type A packaging	A packaging designed to retain the integrity of containment and shielding required under normal conditions of transport.	49 CFR Part 173.403; see also 49 CFR Parts 173.465 and 466.
Type AF packaging	A Type A packaging designed for fissile materials.	
Type A quantity	A quantity of radioactive material not exceeding the A_1 or A_2 value for the specified radionuclide.	See also 10 CFR Part 71.4.
Type B package	A Type B packaging together with its radioactive contents.	49 CFR Part 173.403; see also 10 CFR Part 71.4 and IAEA Safety Series 6.
Type B packaging	A packaging designed to maintain containment, subcriticality, and shielding under normal conditions of transport and hypothetical accident test conditions.	also see 49 CFR Part 173.403
Type B(M) package	A Type B packaging, together with its radioactive contents, that for international shipments requires multilateral approval of the package design, and may require approval of the conditions of shipment. Type B(M) packages are those Type B package designs which have a maximum normal operating pressure of more than 7 kg/cm ² (100 lb per sq in.) gauge or a relief device which would allow the release of radioactive material to the environment under the hypothetical accident conditions specified in 10 CFR Part 71.	49 CFR Part 173.403; see also 10 CFR Part 71 and IAEA Safety Series 6.
Type B(U) package	A Type B packaging, together with its radioactive contents, that for international shipments, requires unilateral approval only of the package design and of any stowage provisions that may be necessary for heat dissipation.	49 CFR Part 173.403; see also IAEA Safety Series 6.
Type B quantity	A quantity of radioactive material exceeding the A_1 or A_2 values, as applicable, for the specific radionuclide.	See also 10 CFR 71.4.

UN specification marks	Marks which the Department of Transportation requires to be placed on UN-type packages (used under the new hazardous materials rules), showing the UN identification number and related information.	
UN standard packaging	A specification packaging conforming to the requirements in the regulations.	49 CFR Part 171.8; see also 49 CFR Part 178 Subparts L and M or N and O.
Uncompressed gas	Gas at a pressure not exceeding the ambient atmospheric pressure at the time and location the containment system is closed. All other radioactive gases are considered to be compressed.	49 CFR Part 173.403; see also IAEA Safety Series 6.
Underground storage tank	Any tank or associated piping containing hazardous materials as defined by the Hazardous and Solid Waste Amendments Act (Subtitle C or Subtitle I).	
Unilateral approval	Approval by the competent authority of the country of origin only.	49 CFR Part 173.403; see also IAEA Safety Series 6.
Unirradiated thorium	Thorium containing not more than 10^{-7} g U-233 per 1 g of Th-232.	49 CFR Part 173.403; see also IAEA Safety Series 6.
Unirradiated uranium	Uranium containing not more than 10^{-6} g plutonium per 1 g of U-235 and a fission product activity of not more than 0.25 mCi of fission products per gram of U-235.	49 CFR Part 173.403; see also IAEA Safety Series 6.
Unit load device	Any type of freight container, aircraft container, aircraft pallet with a net, or aircraft pallet with a net over an igloo.	
United States	See State.	
Unqualified driver	A driver not meeting one or more of DOT requirements.	
Uranium	A naturally occurring radioactive heavy-metal element with the atomic number of 92 and an atomic weight of approximately 238. The two principal isotopes are the fissionable U-235 (0.7% of natural uranium) and the U-238 (99.3% of natural uranium).	See also 10 CFR 71.4 and IAEA Safety Series 6.

Uranium mill tailings	Naturally occurring radioactive rock and soil that are the result of uranium mining and milling. Tailings may contain other minerals or metals not extracted in the process of mining uranium for ore.	See also 40 CFR Part 192.31.
Uranium Mill Tailings Radiation Control Act of 1978	This Act directed the DOE to provide for stabilization and control of the uranium mill tailings from inactive sites in a safe and an environmentally sound manner to minimize radiation health hazards to the public. It authorizes DOE to undertake remedial actions at 24 designated inactive uranium processing sites and at an estimated 5,048 vicinity properties. The Uranium Mill Tailings Remedial Action Project accomplishes this cleanup.	
Vehicle	See Transport vehicle .	IAEA Safety Series 6
Vehicle custodian	A person organizationally responsible for vehicles in his or her custody.	
Vessel	Includes every description of water craft used or capable of being used as a means of transportation on the water.	49 CFR Part 171.8; see also IAEA Safety Series 6.
Viscous flow	The flow of gas through a leak under conditions such that the mean free path is very small in comparison with the smallest dimension of a transverse section of the leak. This flow may be either laminar or turbulent.	
Viscous liquid	A liquid material which has a measured viscosity in excess of 2500 centistokes at 25° C (77° F) when determined in accordance with the procedures specified in ASTM Method D 445—72, "Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)," or ASTM Method D 1200—70, "Viscosity of Paints, Varnishes, and Lacquers by Ford Viscosity Cup."	49 CFR Part 171.8
Vitrification	The process of immobilizing waste that produces a glass-like solid that permanently captures the radioactive materials.	
Vitrify	To form into a glass-like material by heating, melting, and cooling.	
Volatility	The relative rate of evaporation of materials to assume the vapor state.	49 CFR Part 171.8

Waste immobilization	The process of converting waste to a stable, solid form that encases the radionuclides to prevent or slow their migration to the biosphere.	
Waste Isolation Pilot Plant	Research and demonstration facility of the Department of Energy located at Carlsbad, New Mexico, intended to demonstrate safe disposal of radioactive waste in a deep geologic (salt) environment. A decision on whether to convert the Waste Isolation Pilot Plant to a disposal facility for transuranic waste will be made after successful testing is demonstrated.	
Waste manifest	See Shipping paper.	
Waste minimization	The reduction, to the extent feasible, of radioactive and hazardous waste that is generated <u>before</u> treatment, storage, or disposal of the waste. Waste minimization includes any source reduction or recycling activity that results in either (1) reduction of total volume of hazardous waste; (2) reduction of toxicity of hazardous waste; or (3) both.	
Waste stream	Term used to refer to waste leaving a facility or operation.	
Water reactive	A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.	29 CFR Part 1910.1200
Water resistant	Having a degree of resistance to permeability by and damage caused by water in liquid form.	49 CFR Part 171.8
Waybill	See Shipping paper.	

4. REFERENCES

4.1 FEDERAL REGULATIONS

4.1.1 U.S. Nuclear Regulatory Commission

10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

10 CFR Part 73, "Physical Protection of Plants and Materials."

10 CFR Part 110, "Export and Import of Nuclear Equipment and Material."

4.1.2 U.S. Department of Energy

10 CFR Part 871, "Air Transportation of Plutonium."

10 CFR Part 961, "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste."

4.1.3 U.S. Department of Commerce

15 CFR Parts 700-799, "Export Administration Regulations."

4.1.4 U.S. Department of the Treasury, U.S. Customs Service

19 CFR Part 161.2, "Enforcement for Other Agencies" (concerning import/export of nuclear materials).

4.1.5 U.S. Department of Labor

29 CFR Part 1905, "Rules of Practice for Variances, Limitations, Variations, Tolerances, and Exemptions under the Williams-Steiger Occupational Safety and Health Act of 1970."

29 CFR Part 1910, "Occupational Safety and Health Standards."

29 CFR Part 1915, "Occupational Safety and Health Standards for Shipyard Employment."

29 CFR Part 1918, "Safety and Health Regulations for Longshoring."

29 CFR Part 1926, "Safety and Health Regulations for Construction."

29 CFR Part 1928, "Occupational Safety and Health Standards for Agriculture."

29 CFR Part 1960, "Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters."

4.1.6 U.S. Environmental Protection Agency

40 CFR Parts 260-281, "Environmental Protection Agency Regulations."

4.1.7 General Services Administration

41 CFR Part 101, "Federal Property Management Regulations."

41 CFR, Chapter 109, "Department of Energy Property Management Regulations," Parts 109-40, "Transportation and Traffic Management."

41 CFR Chapter 201, Parts 201-1-201-99, "Federal Information Resources Management Regulations."

48 CFR Chapter 1, Parts 1-99, 942.14, and 947, "Federal Acquisition Regulations System."

48 CFR Part 47, "Transportation."

48 CFR Parts 900-999, "Department of Energy Federal Acquisition Regulations System."

4.1.8 U.S. Department of Health and Human Services

42 CFR Part 72, "Interstate Shipment of Etiologic Agents."

4.1.9 U.S. Department of Transportation

14 CFR Part 1, "Definitions and Abbreviations."

14 CFR Part 61, "Certification: Pilots and Flight Instructors."

14 CFR Part 77, "Objects Affecting Navigable Airspace."

14 CFR Part 91, "General Operating and Flight Rules."

14 CFR Part 121, "Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft."

14 CFR Part 125, "Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More."

14 CFR Part 135, "Air Taxi Operators and Commercial Operators."

49 CFR Part 40, "Procedures for Transportation Workplace Drug Testing Program."

49 CFR Parts 107-180, "Hazardous Materials Regulations."

49 CFR Parts 211-240, "Federal Railroad Administration."

49 CFR Parts 350-399, "Federal Motor Carrier Safety Regulations."

49 CFR Part 830, "Rules Pertaining to the Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records."

49 CFR Parts 1035, 1043, 1051, 1150-1174, and 1312, "Interstate Commerce Commission Regulations."

4.1.10 U.S. Postal Service

Acceptance of Hazardous, Restricted, or Perishable Articles, Publication 52, U.S. Postal Service, Sommerville, New Jersey, 1994.

4.2 FEDERAL LAWS

Cargo Preference Act (Merchant Marine) of 1954, Pub. L. 664, Chap. 936, 68 Stat. 832, August 26, 1954; 46 U.S.C. Sect. 1241, 1982; 49 U.S.C., Sect. 1517, 1988.

Federal Property and Administrative Services Act of 1949, Pub. L. 81-152, 63 Stat. 377, June 30, 1949.

Hazardous Materials Transportation Act of 1974, Pub. L. 93-633, 49 U.S.C. Sect. 1801 et seq., 88 Stat. 2156, January 3, 1975.

Hazardous Materials Transportation Uniform Safety Act of 1990, Pub. L. 101-615, 104 Stat. 3244, November 16, 1990.

Interstate Commerce Act, Part 4, Pub. L. 77-558, Chap. 318, 56 Stat. 284, May 16, 1942;
49 U.S.C., Subtitle IV, Chap. 107, 1988.

Nuclear Non-Proliferation Act of 1978, Pub. L. 94-242, March 10, 1978.

Occupational Safety and Health Act of 1970, Publ. L. 91-596, 29 U.S.C. 651 et seq., 84 Stat. 1590, December 29, 1970.

4.3 INTERNATIONAL REGULATIONS

IATA Restricted Articles Regulations, International Air Transport Association, Montreal, Quebec, Canada, 1944, (issued yearly).

International Atomic Energy Agency, *Safety Series No. 6 IAEA Safety Standards*, Regulations for the Safe Transport of Radioactive Material 1985 Edition (as amended 1990), Vienna, Austria, 1990.

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4.4 DOE ORDERS

The following DOE Orders have direct applicability to the packaging and transportation operations and safety of DOE facilities. A complete listing of all DOE Orders is presented in Appendix A.

<u>Order</u>	<u>Subject</u>	<u>Change Date</u>
1324.2A	Records Disposition	04/09/92
1540.1A	Materials Transportation and Traffic Management	07/08/92
1540.2	Hazardous Material Packaging for Transport— Administrative Procedures	12/19/88
1540.3A	Base Technology for Radioactive Material Transportation Packaging Systems	07/08/92
4330.4B	Maintenance Management Program	02/10/94
5000.3B	Occurrence Reporting and Processing of Operations Information	01/19/93
5480.1B	ES&H Program for DOE Operations	05/10/93
5480.3	Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes	07/09/85
5480.4	Environmental Protection, Safety, and Health Protection Standards	01/07/93
5480.5	Safety of Nuclear Facilities	09/23/86
5480.7A	Fire Protection	02/17/93
5480.8A	Contractor Occupational Medical Program	10/19/92

5480.10	Contractor Industrial Hygiene Program	06/26/85
5480.11	Radiation Protection for Occupational Workers	06/17/92
5480.13A	Aviation Safety	02/23/93
5480.18A	Accreditation of Performance-Based Training for Category A Reactors and Nuclear Facilities	07/19/91
5480.19	Conduct of Operations Requirements for DOE Facilities	05/18/92
5480.20	Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities	06/19/91
5482.1B	Environment, Safety and Health Appraisal Program	11/18/91
5483.1A	Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities	06/22/83
5500.1B	Emergency Management System	02/27/92
5500.3A	Planning and Preparedness for Operational Emergencies	02/27/92
5632.11	Physical Protection of Unclassified, Irradiated Reactor Fuel in Transit	03/04/94
5700.6C	Quality Assurance	08/21/91
5820.2A	Radioactive Waste Management	09/26/88

4.5 OTHER DOCUMENTS

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American Trucking Associations, *National Motor Freight Classification*, NMFC-100U, American Trucking Associations, Alexandria, Virginia, 1994.

ANSI N14.1-1990, "Uranium Hexafluoride—Packaging for Transport," 1990.

ANSI N14.5-1987, "Leakage Tests on Packages for Shipment," 1987.

ANSI N14.6-1993, "Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More," 1993.

ANSI N14.19-1986, "Irradiated Fuel Shipping Casks—Ancillary Features," 1986.

ANSI N14.24-1985, "For Highway Route Controlled Quantities of Radioactive Materials—Domestic Barge Transport," 1985.

ANSI N14.27-1986, "For Truckload Quantities of Radioactive Materials—Carrier and Shipper Responsibilities and Emergency Response Procedures for Highway Transportation Accidents," 1987.

ANSI N14.29-1988, "Guide for Writing Operating Manuals for Packaging," 1989.

ANSI N14.30-1992, "Semi-Trailers Employed in the Highway Transport of Weight-Concentrated Radioactive Loads — Design, Fabrication, and Maintenance," 1993.

J. M. Cruse, *Test and Evaluation Document for DOT Specification 7A Type A Packaging*, WHC-EP-0558, Rev 1, Westinghouse Hanford Company, Richland, Washington, January 1994.

L. M. Houlberg, G. T. Hawkins, R. E. Bock, and M. S. Salk, *Environmental Regulatory Update Table*, ORNL/M-3271/R2, Martin Marietta Energy Systems, Oak Ridge National Laboratory, May-June 1994.

International Civil Aviation Organization, *Technical Instructions for the Safe Transport of Dangerous Materials by Air*, Doc 9284-AN/905, 1993-1994 edition, Montreal, Quebec, Canada, 1992.

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J. H. Portsmouth, J. E. Maxwell, and G. O. Boness, *Motor Carrier Evaluation Program*, WHC-EP-0336, Westinghouse Hanford Company, Richland, Washington, February 1990.

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U.S. Department of Energy, *DOE Technical Standards List, Department of Energy Standards Index*, DOE-TSL-1-94, Office of Nuclear Safety, Policy and Standards, Washington, D.C., March 1994.

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U.S. Nuclear Regulatory Commission, "Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material," *Regulatory Guide 7.10, Rev 1*, Washington, D.C., June 1986.

U.S. Tariff Commission, *Tariff Schedules of the United States Annotated*, U.S. International Trade Commission, Washington, D.C., 1988.

4.6 METRIC INFORMATION

The following information is excerpted from a National Institute of Standards and Technology Notice in the *Federal Register* December 20, 1990, the ANSI/IEEE Standard 268-1992, the American Society for Testing and Materials Standard, ASTM E380-93, and the General Services Administration Federal Standard 376B. The latter reference lists the preferred metric units recommended for use throughout the federal government. For more detailed information concerning the references see the end of this section.

The International System of Units is abbreviated SI (from the French name, Le Système International d'Unités). SI units are divided into three classes:

base units: seven units considered basic to SI and dimensionally independent.
 supplementary units: two dimensionless derived units of angular measure.
 derived units: units derived by combining base units and supplementary units.

The following tables the base and dimensionless units SI units and conversions.

Table 1. Seven base SI units

Quantity	SI unit	
	Name	Symbol
Length	meter	m
Mass ^a	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Amount of substance	mole	mol
Luminous intensity	candela	cd

^a *Weight* is commonly used to mean *mass*.

Table 2. Two supplementary units

Quantity	SI Unit	
	Name	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Units for all other quantities are derived from these nine units. For example, in Table 3 are listed a number of SI derived units obtained from the base units. They are expressed as products and quotients of the seven base units without numerical factors.

Table 3. Some SI-derived units

Quantity	SI unit	
	Name	Symbol
Area	square meter	m ²
Volume	cubic meter	m ³
Speed, velocity	meter per second	m/s
Acceleration	meter per second squared	m/s ²
Wave number	reciprocal meter	m ⁻¹
Density, mass	kilogram per cubic meter	kg/m ³
Specific volume	cubic meter per kilogram	m ³ /kg
Current density	ampere per square meter	A/m ²
Magnetic field strength	ampere per meter	A/m
Concentration (of amount of substance)	mole per cubic meter	mol/m ³
Luminance	candela per square meter	cd/m ²

Certain derived units that have been given special names and symbols are listed in Table 4. They may themselves be used to express other derived units, as is also shown in Table 4. All the derived units given in the table have been obtained from the base and supplementary units.

Table 4. Some SI-derived units with special names

Quantity	SI unit		
	Name	Symbol	Expression in terms of other units
Frequency	hertz	Hz	s^{-1}
Force	newton	N	$m \cdot kg/s^2$
Pressure, stress	pascal	Pa	N/m^2
Energy, work, quantity of heat	joule	J	$N \cdot m$
Power, radiant flux	watt	W	J/s
Electric charge, quantity of electricity	coulomb	C	$s \cdot A$
Electric potential, potential difference, electromotive force	volt	V	W/A
Capacitance	farad	F	C/V
Electric resistance	ohm	Ω	V/A
Electric conductance	siemens	S	A/V
Magnetic flux	weber	Wb	$V \cdot s$
Magnetic flux density	tesla	T	Wb/m^2
Inductance	henry	H	Wb/A
Celsius temperature ^a	degree Celsius	$^{\circ}C$	K
Luminous flux	lumen	lm	$cd \cdot sr$
Illuminance	lux	lx	lm/m^2
Activity (of a radionuclide)	becquerel	Bq	s^{-1}
Absorbed dose, specific energy imparted, kerma, absorbed dose index	gray	Gy	J/kg
Dose equivalent, dose equivalent index	sievert	Sv	J/kg

^aIn addition to the thermodynamic temperature (symbol T) expressed in kelvins (see Table 1), use is also made of degree Celsius temperature (symbol t) defined by the equation, $t = T - T_0$, where $T_0 = 273.15$ K by definition. To express Celsius, the unit "degree Celsius" which is equal to the unit "kelvin" is used; in this case, "degree Celsius" is a special name used in place of "kelvin." An interval or difference of degree Celsius temperature can, however, be expressed in kelvins as well as in degrees Celsius.

Table 5 illustrates conversions for other units. The following example is a demonstration of the use of this table:

$$\text{foot} \times 0.304 = \text{meter}$$

Table 5. Conversions for some other units

Conventional Unit From	Multiply by	SI units to
foot (ft)	0.304	meter (m)
yard (yd)	0.914	meter (m)
inch (in.)	2.54	centimeter (cm)
mile	1.609	kilometer (km)
nautical mile	1.852	kilometer (km)
acre	4,046.9	square meter (m ²)
gallon (gal)	3.785	liter (L)
quart	0.946	liter (L)
mile per hour (mph)	1.609	kilometer per hour (km/h)
knot (nautical mile per hour)	1.852	kilometer per hour (km/h)
mile per gallon (mile/gal)	0.425	kilometer per liter (km/L)
ton (short)	907.1	kilogram (kg)
pound (lb)	0.4536	kilogram (kg)
pounds per square inch (psi)	6.895	kilopascal (kPa)
horsepower (hp)	746	watt (W)
curie (Ci)	37,000	megabecquerel (MBq)
rad	0.01	gray (Gy)
rem	0.01	sievert (Sv)

Table 6 gives the 16 prefixes used to form multiples and submultiples of the SI units. It is important to note that the kilogram is the only SI unit with a prefix as part of its name and symbol. Because double prefixes may not be used, in the case of mass, the prefixes of Table 6 are to be used with gram (g) but not with kilogram (kg).

Table 6. SI prefixes

Factor	Prefix	Symbol
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^9	giga	G
10^6	mega	M
10^3	kilo	k
10^2	hecto	h
10^1	deka	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

Additional and more detailed information on the use of SI units is available in the following documents.

ANSI/IEEE Std 268-1992 (Revision of ANSI/IEEE Std 268-1982) , *American National Standard for Metric Practice*, 1992, Institute of Electrical & Electronics Engineers (IEEE), 11 West 42nd Street, New York, N.Y. 10036.

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Standards and Metric Practices Subcommittee of the U.S. Department of Commerce, National Institute of Standards and Technology, "Federal Standard 376B Preferred Metric Units for General Use by the Federal Government," *Federal Standardization Handbook*, General Services Administration, Washington, D.C., 20406, 1993.

U.S. Department of Commerce, National Institute of Standards and Technology, "Metric System of Measurement; Interpretation of the International System of Units for the United States," *Fed. Reg.*, 55 (245), 52242-52245 (December 20, 1990).

Appendix A

DOE DIRECTIVES CHECKLIST AS OF May 27, 1994

DOE DIRECTIVES CHECKLIST AS OF 5-27-94

DOE No.	Subject	Dated
1000.2B	Department Seal and Flag (cancels DOE 1000.2A)	05-18-92
1000.3B	Internal Control Systems (cancels DOE 1000.3A)	07-05-88
1100.3	Office of Hearings and Appeals	09-15-78
	Change 001	04-13-92
1100.4	Organization and Functions—Board of Contract Appeals	03-01-79
1100.6A	Departmental Organization Control System (cancels DOE 1100.6)	06-08-92
1130.4	Federal Women's Program Advisory Councils	12-23-81
1130.5	Hispanic Employment Program Advisory Councils	05-04-82
1130.6	Advisory Committee Management	09-23-82
	Change 001	02-27-92
1130.8A	Data Integrity Board (cancels DOE 1130.8)	05-18-92
1220.1A	Congressional and Intergovernmental Activities (cancels DOE 1220.1)	04-09-92
	Change 001	06-28-92
1230.2	American Indian Tribal Government Policy	04-08-92
1240.2B	Unclassified Visits and Assignments by Foreign Nationals (cancels DOE 1240.2A)	08-21-92
	Change 001	09-03-92
1270.1	Funds-out Interagency Agreements	06-13-79
	Change 001	01-07-93
1270.2B	Safeguards Agreement with the International Atomic Energy Agency (cancels DOE 1270.2A)	06-23-92

DOE No.	Subject	Dated
1300.2A	Department of Energy Technical Standards Program (cancels DOE 1300.2)	05-19-92
1300.3	Policy on the Protection of Human Subjects	08-23-90
1322.2C	Forms Management	10-22-91
1323.2B	Interagency Reporting Requirements (cancels DOE 1323.2A)	04-09-92
1324.2A	Records Disposition (cancels DOE 1324.2)	09-13-88
	Change 001	04-09-92
1324.3	Files Management	03-02-81
	Change 001	04-09-92
1324.4A	Micrographics Management (cancels DOE 1324.4)	05-18-92
1324.5A	Records Management Program (cancels DOE 1324.5)	04-30-92
1324.6	Automated Office Electronic Recordkeeping	07-08-87
	Change 001	06-12-92
1324.8	Rights and Interests Records Protection Program	10-23-91
1330.1D	Computer Software Management (cancels DOE 1330.1C)	05-18-92
1331.1D	Procurement and Assistance Data System (cancels DOE 1331.1C)	05-18-92
1331.2B	Departmental Business Instrument Numbering System (cancels DOE 1331.2A)	05-18-92
1332.1A	Uniform Reporting System (cancels DOE 1332.1)	10-15-85
	Change 001	06-12-92
1332.2	Uniform Reporting System for Federal Assistance (Grants and Cooperative Agreements)	10-31-83

DOE No.	Subject	Dated
1340.1B	Management of Public Communications Publications and Scientific, Technical, and Engineering Publications (cancels DOE 1340.1A)	01-07-93
1350.1	Audiovisual and Exhibits Management	10-28-81
	Change 001	03-26-84
1360.1B	Acquisition and Management of Computing Resources (cancels DOE 1360.1A)	01-07-93
1360.2B	Unclassified Computer Security Program (cancels DOE 1360.2A)	05-18-92
1360.3C	Information Technology Standards (cancels DOE 1360.3B DOE N 1360.8)	10-19-92
1360.4B	Scientific and Technical Computer Software (cancels DOE 1360.4A)	12-31-91
1360.6A	Automatic Data Processing Equipment/Data Systems (cancels DOE 1360.6)	11-12-92
1360.8A	Analyses of Benefits and Costs for Information Technology Resources Initiatives (cancels DOE 1360.8)	05-18-92
1410.2	Mail Management	04-29-85
1430.1C	Management of Scientific and Technical Information (cancels DOE 1430.1B)	02-27-92
1430.2B	Scientific and Technical Information Management Program (cancels DOE 1430.2A)	02-25-93
1430.3A	Policy for the Dissemination of the Access to Departmental Unclassified Scientific and Technical Information (cancels DOE 1430.3)	02-27-92
	Change 001	05-14-92
1430.4A	Library Services (cancels DOE 1430.4)	05-18-92

DOE No.	Subject	Dated
1450.1C	Acquisition, Utilization, and Administration of Teleprocessing Services (cancels DOE 1450.1B)	09-03-86
1450.3A	Call Control/Verification Programs and Authorized Use of Government Telephone Systems (cancels DOE 1450.3)	09-12-91
	Change 001	04-09-92
1450.4	Consensual Listening-In to or Recording Telephone/Radio Conversations	11-12-92
1500.2A	Travel Policy and Procedures (cancels DOE 1500.2)	06-07-89
	Change 001	09-27-89
	Change 002	02-07-90
	Change 003	03-15-90
	Change 004	06-19-90
	Change 005	01-11-91
	Change 006	03-19-91
	Change 007	06-20-91
	Change 008	07-31-91
	Change 009	04-01-92
	Change 010	06-12-92
	Change 011	04-16-93
1500.3	Foreign Travel Authorization (cancels DOE 5638.1; and Chapter VIII of DOE 1500.2)	11-10-86
	Change 001	02-05-87
	Change 002	06-17-87
	Change 003	12-22-87
	Change 004	03-30-89
	Change 005	05-18-90
	Change 006	02-28-92
1500.4A	Travel Charge Card Program (cancels DOE 1500.4)	04-22-91

DOE No.	Subject	Dated
	Change 001	09-15-92
1540.1A	Materials Transportation and Traffic Management (cancels DOE 1540.1)	07-08-92
1540.2	Hazardous Material Packaging for Transport—Administrative Procedures	09-30-86
	Change 001	12-19-88
1540.3A	Base Technology for Radioactive Material Transportation Packaging Systems (cancels DOE 1540.3)	07-08-92
1600.1A	Federal Women's Program (cancels DOE 1600.1)	05-14-92
1600.2B	Secretary's Commitment to Equal Opportunity (cancels DOE 1600.2A)	06-14-85
1600.3	Policy on Sexual Harassment	06-15-81
1600.4	Hispanic Employment Program	02-02-82
1600.5	System for Processing Complaints of Discrimination	05-26-82
1600.6A	Civil Rights Compliance in Federally Assisted Programs (cancels DOE 1600.6)	05-14-92
1700.1	Freedom of Information Program	11-19-79
	Change 001	10-08-81
	Change 002	04-05-92
	Change 003	05-18-92
	Change 004	08-21-92
1800.1A	Privacy Act (cancels DOE 1800.1)	08-31-84
	Change 001	05-18-92
2020.2	Legislative Coordination and Clearance Process	09-28-79
2030.2	Dissemination of Departmental Regulations on Acceptance of Gifts and Travel From Foreign Governments	04-08-81
	Change 001	05-18-92

DOE No.	Subject	Dated
2030.3	Federalism Guidelines	09-29-89
	Change 001	05-14-92
2030.4B	Reporting Fraud, Waste, and Abuse to the Office of Inspector General (cancels DOE 2030.4A)	05-18-92
2100.3A	Transfer of Contracts Between Departmental Elements (cancels DOE 2100.3)	06-08-92
2100.8A	Cost Accounting, Cost Recovery, and Interagency Sharing of Information Technology Facilities (cancels DOE 2100.8)	01-27-93
2100.12A	Payments for Special Burdens and in Lieu of Taxes (cancels DOE 2100.12)	06-09-92
2110.1A	Pricing of Departmental Materials and Services (cancels DOE 2110.1)	07-14-88
	Change 001	10-05-88
	Change 002	05-18-92
2200.2B	Collection from Current and Former Employees for Indebtedness to the United States (cancels DOE 2200.2A)	06-09-92
2200.4	Accounting Overview (cancels DOE 2100.1A, DOE 2200.1)	03-31-88
	Change 001	06-08-92
2200.5B	Fund Accounting (cancels DOE 2200.5A)	06-08-92
	Change 001	11-12-92
	Change 002	04-02-93
	Change 003	06-14-93
	Change 004	08-16-93
2200.6A	Financial Accounting (cancels DOE 2200.6)	01-07-93
	Change 001	04-13-93
2200.7	Cost Accounting	05-02-88

DOE No.	Subject	Dated
2200.8B	Accounting Systems, Organizations and Reporting (cancels DOE 2200.8A)	06-08-92
2200.9B	Miscellaneous Accounting (cancels DOE 2200.9A)	06-08-92
	Change 001	11-12-92
	Change 002	01-12-93
	Change 003	02-23-93
2200.10A	Accounts, Codes, and Illustrative Entries (cancels DOE 2200.10)	08-09-89
	Change 001	02-27-90
	Change 002	10-17-90
	Change 003	01-15-92
	Change 004	06-08-92
	Change 005	03-10-93
	Change 006	08-16-93
2200.11	Processing Garnishment Orders for Child Support and/or Alimony	02-12-88
	Change 001	05-03-90
2200.12A	Financial Management Systems (cancels DOE 2200.12)	05-14-92
2200.13	Oversight of Integrated Contractor Financial Management	09-27-91
2300.1B	Audit Resolution and Followup (cancels DOE 2300.1A)	06-08-92
2320.1C	Cooperation with the Office of Inspector General (cancels DOE 2320.1B)	05-18-92
2320.2B	Establishment of Departmental Position on Inspector General Reports (cancels DOE 2320.2A)	05-18-92
2320.3A	Office of Inspector General—Responsibilities, Authorities, and Relationships with Other Departmental Elements (cancels DOE 2320.3)	05-18-92

DOE No.	Subject	Dated
2321.1B	Auditing of Programs and Operations (cancels DOE 2321.1A)	05-14-92
2340.1C	Coordination of General Accounting Office Activities (cancels DOE 2340.1B)	06-08-92
3220.1A	Management of Contractor Personnel Policies and Programs (cancels DOE 3220.1)	05-14-92
3220.2A	Equal Opportunity in Operating and Onsite Service Contractor Facilities (cancels DOE 3220.2)	05-14-92
3220.3A	Human Resource Development for Management and Operating Contractors (cancels DOE 3220.3)	05-18-92
3220.4A	Contractor Personnel and Industrial Relations Reports (cancels DOE 3220.4)	01-07-93
3220.5A	Payment of Wages or Salaries to Cost- Type Contractor Employees When Access Authorization is suspended (cancels DOE 3220.5)	06-12-92
3220.6A	Federal Labor Standards (cancels DOE 3220.6)	05-14-92
3240.2A	Utilization of Military Personnel (cancels DOE 3240.2)	06-23-92
3300.1B	Assignment of Departmental Personnel Outside the Department (cancels DOE 3300.1A)	06-23-92
3300.2A	Affirmative Action Program for Handicapped Persons (cancels DOE 3300.2)	05-18-92
3304.1A	Employment of Experts and Consultants (cancels DOE 3304.1)	06-23-92
3305.1	Presidential, Supergrade, and Schedule C Positions	07-31-81
3305.2	Senior Executive Service—Employment Change 001	08-11-81 09-23-83
3309.1A	Reductions in Contractor Employment (cancels DOE 3309.1)	11-30-92

DOE No.	Subject	Dated
3309.3	Utilization of Individual Consultants by Contractors	05-07-93
3315.1A	Probationary Period for Managers and Supervisors (cancels DOE 3315.1)	06-23-92
3330.1A	Federal Equal Opportunity Recruitment Program (cancels DOE 3330.1)	05-18-92
3330.2	Priority Placement and Consideration	10-08-86
	Change 001	02-05-87
	Change 002	06-23-92
3335.1C	Merit Promotion (cancels DOE 3335.1B)	06-23-92
3340.1A	Part-Time Career Employment Program (cancels DOE 3340.1)	05-14-92
3350.1	Furlough in the Senior Executive Service	09-13-82
	Change 001	11-23-84
3351.1C	Reduction in Force (cancels DOE 3351.1B)	06-23-92
3351.2	Reduction in Force in Senior Executive Service	11-27-81
	Change 001	04-07-82
3410.1B	Training (cancels DOE 3410.1A)	02-29-88
	Change 001	10-18-89
	Change 002	05-18-92
3410.2A	Upward Mobility Program (cancels DOE 3410.2)	04-09-87
	Change 001	02-09-88
	Change 002	10-24-89
3430.3A	Departmental Performance Appraisal System (cancels DOE 3430.3)	08-14-86
	Change 001	05-14-92
	Change 002	07-22-92

DOE No.	Subject	Dated
3430.4A	Senior Executive Service Performance Appraisal System (cancels DOE 3430.4)	08-24-84
3450.1B	Incentive Awards (cancels DOE 3450.1A)	06-23-92
3510.1A	Position Management (cancels DOE 3510.1)	06-23-92
3511.1A	Position Classification (cancels DOE 3511.1)	10-01-84
	Change 001	07-08-92
3540.1A	Performance Management and Recognition System (cancels DOE 3540.1)	08-14-86
	Change 001	03-16-92
	Change 002	05-18-92
3550.1A	Pay Administration and Hours of Duty (cancels DOE 3550.1)	12-22-87
	Change 001	07-16-90
	Change 002	08-21-92
3600.1B	Time and Attendance Reporting (cancels DOE 3600.1A)	02-11-91
	Change 001	12-09-91
	Change 002	04-23-92
3630.1B	Leave Administration (cancels DOE 3630.1A)	12-31-86
3630.2	Voluntary Leave Transfer Program	09-19-89
3710.1A	Labor-Management Relations Program for Federal Employees (cancels DOE 3710.1)	09-30-86
	Change 001	05-18-92
3731.1	Suitability, Position Sensitivity Designations, and Related Personnel Matters	12-19-89
	Change 001	07-08-92
3733.1	Employee Participation in Political Activities	07-05-84

DOE No.	Subject	Dated
3735.1	Dissemination of the Departmental Conduct of Employees Regulations	05-01-80
3750.1	Work Force Discipline	03-23-83
	Change 001	03-11-85
	Change 002	01-06-86
	Change 003	03-21-89
	Change 004	08-24-90
	Change 005	03-09-92
	Change 006	08-21-92
3771.1	Grievance Policy and Procedures	07-02-81
	Change 001	11-29-83
	Change 002	08-13-85
	Change 003	08-21-92
3790.1B	Federal Employee Occupational Safety and Health Program (cancels DOE 3790.1A)	01-07-93
3791.2A	Federal Employee Motor Vehicle Safety Program (cancels DOE 3791.2)	12-24-86
	Change 001	08-21-92
3792.1A	Employee Assistance Program (cancels DOE 3792.1)	05-14-92
3792.3	Drug-Free Federal Workplace Testing Implementation Program	07-29-88
	Change 001	08-21-92
3830.1	Policies and Procedures for Pension Programs Under Operating and Onsite Service Contractors	08-23-82
3890.1A	Contractor Insurance and Other Health Benefit Programs (cancels DOE 3890.1)	06-12-92
3900.1B	Parking (cancels DOE 3900.1A)	05-18-92
4010.1A	Value Engineering (cancels DOE 4010.1)	05-14-92

DOE No.	Subject	Dated
4200.1C	Competition in Contracting (cancels DOE 4200.1B)	01-09-87
4200.3D	Management of Support Services Contract Activity (cancels DOE 4200.3C)	08-31-92
4200.4A	Selection, Appointment, and Termination of Appointment of Contracting Officers (cancels DOE 4200.4)	08-21-89
	Change 001	02-14-92
4210.1C	Designation of Source Selection Officials (cancels DOE 4210.1B)	05-18-92
4210.5A	Operating and Onsite Service Contract Extend or Compete Decisions (cancels DOE 4210.5)	06-23-92
4210.7B	Indirect Cost Rate Responsibilities (cancels DOE 4210.7A, 4210.8, and 4220.1)	12-24-91
4210.9A	Unsolicited Proposals (cancels DOE 4210.9)	01-06-93
4220.4	Organizational Conflict of Interest Processing Procedures	05-19-86
4220.5	Dependent Care Programs for the Department of Energy Management and Operating Contracts	12-19-91
4240.1K	Designation of Major System Acquisitions and Major Products (cancels DOE 4240.1J)	06-23-92
4250.1A	Small Business/Labor Surplus Area Set- Aside and 8(A) Program Review Procedures (cancels DOE 4250.1)	02-27-92
4300.1C	Real Property Management (cancels DOE 4300.1B, DOE 4320.1A)	06-28-92
4300.2B	Non-Department of Energy Funded Work (Work for Others) (cancels DOE 4300.2A)	07-16-91
	Change 001	07-29-91
	Change 002	02-07-92

DOE No.	Subject	Dated
	Change 003	01-07-93
4320.1B	Site Development Planning (cancels Chapters 1 and 2 of DOE 4300.1B)	01-07-91
	Change 001	03-26-92
4320.2A	Capital Asset Management Process (cancels DOE 4320.2)	02-10-94
4330.2D	In-House Energy Management (cancels DOE 4330.2C)	05-18-92
4330.4B	Maintenance Management Program (cancels DOE 4330.4A)	02-10-94
	Change 001	04-09-91
	Change 002	06-20-91
	Change 003	01-06-92
	Change 004	05-18-92
4540.1C	Utility Acquisition and Management (cancels DOE 4540.1B)	06-08-92
4600.1A	<i>Financial Assistance Procedures Manual</i> (cancels DOE 4600.1)	04-01-87
4700.1	Project Management System (cancels DOE 4210.2, 5700.1C, 5700.3B, 5700.4A, and 6410.1)	03-06-87
	Change 001	06-02-92
4700.2	Mission Area Assignments	07-07-87
4700.3	General Plant Projects	09-16-91
	Change 001	11-16-92
4700.4	Project Manager Certification	01-27-93
5000.1B	Institutional Planning by Multiprogram Laboratories (cancels DOE 5000.1A)	04-09-92
5000.2B	Multiprogram Laboratory Appraisals (cancels DOE 5000.2A)	04-09-92
5000.3B	Occurrence Reporting and Processing of Operations Information (cancels DOE 5000.3A)	01-19-93
	Change 001	07-02-93

DOE No.	Subject	Dated
5000.4A	Laboratory Directed Research and Development (cancels DOE 5000.4)	04-09-92
5100.3	Field Budget Process	08-23-84
5100.4	Internal Review Budget Process	10-31-84
5100.5	Office of Management and Budget—Budget Process	07-21-83
5100.6A	Congressional Budget Review (cancels DOE 5100.6)	05-18-92
5100.11A	Budget Execution—Office of Management and Budget Apportionment and Treasury Warrant Process (cancels DOE 5100.11)	05-18-92
5100.12A	Budget Execution—Department of Energy Base Table (cancels DOE 5100.12)	05-14-92
5100.13A	Budget Execution—Rescissions and Deferrals (cancels DOE 5100.13)	05-18-92
5100.14A	Allotment and Approval Funding Program Process (cancels DOE 5100.14)	05-18-92
5160.1B	Reprogramming, Restructuring, and Appropriation Transfer Procedures (cancels DOE 5160.1A)	05-18-92
5300.1C	Telecommunications (cancels DOE 5300.1B)	06-12-92
5300.2D	Telecommunications: Emission Security (Tempest) (cancels DOE 5300.2C)	05-18-92
5300.3D	Telecommunications: Communications Security (cancels DOE 5300.3C)	08-03-93
5300.4D	Telecommunications: Protected Distribution Systems (cancels DOE 5300.4C)	03-04-94
5400.1	General Environmental Protection Program	11-09-88
	Change 001	06-29-90

DOE No.	Subject	Dated
5400.2A	Environmental Compliance Issue Coordination (cancels DOE 5400.2)	01-31-89
	Change 001	01-07-93
5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements (cancels DOE 5480.14, DOE N 5400.4, and 5400.5)	10-06-89
5400.5	Radiation Protection of the Public and the Environment	02-08-90
	Change 001	06-05-90
	Change 002	01-07-93
5440.1E	National Environmental Policy Act Compliance Program (cancels DOE 5440.1D)	11-10-92
5480.1B	Environment, Safety, and Health Program for Department of Energy Operations (cancels DOE 5480.1A)	09-23-86
	Change 001	02-18-88
	Change 002	01-23-89
	Change 003	07-20-89
	Change 004	03-27-90
	Change 005	05-10-93
5480.3	Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances and Hazardous Wastes (cancels Chapter 3 of DOE 5480.1A)	07-09-85
5480.4	Environmental Protection, Safety, and Health Protection Standards (cancels Chapter 1 of DOE 5480.1A)	05-15-84
	Change 001	05-16-88
	Change 002	05-16-89
	Change 003	09-20-91
	Change 004	01-07-93

DOE No.	Subject	Dated
5480.5	Safety of Nuclear Facilities (cancels Chapter 5 of DOE 5480.1A)	09-23-86
5480.6	Safety of Department of Energy-Owned Nuclear Reactors (cancels Chapter 6 of DOE 5480.1A)	09-23-86
5480.7A	Fire Protection (cancels DOE 5480.7)	02-17-93
5480.8A	Contractor Occupational Medical Program (cancels DOE 5480.8)	06-26-92
	Change 001	10-19-92
5480.9	Construction Safety and Health Program (cancels Chapter 9 of DOE 5480.1A)	11-18-87
5480.10	Contractor Industrial Hygiene Program (cancels Chapter 10 of DOE 5480.1A)	06-26-85
5480.11	Radiation Protection for Occupational Workers (cancels Chapter II of DOE 5480.1A)	12-21-88
	Change 001	07-20-89
	Change 002	06-29-90
	Change 003	06-17-92
5480.13A	Aviation Safety (cancels DOE 5480.13)	02-23-93
5480.15	Department of Energy Laboratory Accreditation Program for Personnel Dosimetry	12-14-87
5480.16A	Firearms Safety (cancels DOE 5480.16)	03-04-94
5480.17	Site Safety Representatives	10-05-88
5480.18A	Accreditation of Performance-Based Training for Category A Reactors and Nuclear Facilities (cancels DOE 5480.18)	07-19-91
5480.19	Conduct of Operations Requirements for DOE Facilities	07-09-90
	Change 001	05-18-92

DOE No.	Subject	Dated
5483.1A	Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities (cancels DOE 5483.1)	06-22-83
5484.1	Environmental Protection, Safety, and Health Protection Information Reporting Requirements	02-24-81
	Change 001	06-29-81
	Change 002	08-13-81
	Change 003	11-06-87
	Change 004	10-17-89
	Change 005	03-15-90
	Change 006	06-29-90
	Change 007	10-17-90
5500.1B	Emergency Management System (cancels DOE 5500.1A)	04-30-91
	Change 001	02-27-92
5500.2B	Emergency Categories, Classes, and Notification and Reporting Requirements (cancels DOE 5500.2A)	04-30-91
	Change 001	02-27-92
5500.3A	Planning and Preparedness for Operational Emergencies (cancels DOE 5500.3)	04-30-91
	Change 001	02-27-92
5500.4A	Public Affairs Policy and Planning Requirements for Emergencies (cancels DOE 5500.4)	06-08-92
5500.5A	Public Affairs Policy and Planning Requirements for a Fuel Supply Disruption Emergency (cancels DOE 5500.5)	06-08-92
5500.6B	Shutdown of Departmental Operations Upon Failure by Congress to Enact Appropriations (cancels DOE 5500.6A)	05-18-92

DOE No.	Subject	Dated
5480.20	Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities	02-20-91
	Change 001	06-19-91
5480.21	Unreviewed Safety Questions (cancels paragraph 5s of DOE 5480.5 and paragraph 5x of DOE 5480.6 and paragraph 5o of DOE 5480.1B)	12-24-91
5480.22	Technical Safety Requirements (cancels paragraphs 5h, 7e(4), and 8d of DOE 5480.5; paragraphs 5v, 7e(4), and 8d of DOE 5480.6)	02-25-92
	Change 001	09-15-92
5480.23	Nuclear Safety Analysis Reports [cancels DOE 5481.1B (nuke facil. only); paragraphs 7b(3), 7e(3), 8c of DOE 5480.6; paragraphs 51, 7b(3), 7b(4), 7e(3), 8a, and 8h of DOE 5480.5]	04-10-92
	Change 001	03-10-94
5480.24	Nuclear Criticality Safety	08-12-92
5480.25	Safety of Accelerator Facilities	11-03-92
5480.26	Trending and Analysis of Operations Information Using Performance Indicators	01-15-93
5480.28	Natural Phenomena Hazards Mitigation	01-15-93
5480.29	Employee Concerns Management System (cancels Chapter II of DOE 5483.1A, 6-22-83)	01-15-93
5480.30	Nuclear Reactor Safety Design Criteria	01-19-93
5481.1B	Safety Analysis and Review System (cancels DOE 5481.1A) (Limited to non- nuclear)	09-23-86
	Change 001	05-19-87
5482.1B	Environment, Safety, and Health Appraisal Program (cancels DOE 5482.1A)	09-23-86
	Change 001	11-18-91

DOE No.	Subject	Dated
5500.7B	Emergency Operating Records Protection Program (cancels DOE 5500.7A)	10-23-91
5500.8A	Energy Emergency Planning and Management (cancels DOE 5500.8)	07-08-92
5500.9A	Emergency Planning, Preparedness, and Response to Continuity of Government Emergencies (cancels DOE 5500.9)	07-08-92
5500.10	Emergency Readiness Assurance Program	04-30-91
	Change 001	02-27-92
5530.1A	Accident Response Group (cancels DOE 5530.1)	09-20-91
5530.2	Nuclear Emergency Search Team	09-20-91
5530.3	Radiological Assistance Program	01-14-92
	Change 001	04-10-92
5530.4	Aerial Measuring System	09-20-91
5530.5	Federal Radiological Monitoring and Assessment Center	07-10-92
	Change 001	12-02-92
5560.1A	Priorities and Allocations Program (cancels DOE 5560.1)	05-08-85
5600.1	Management of Department of Energy Weapon Program and Weapon Complex (cancels IMD 6001)	06-27-79
5610.1	Packaging and Transporting of Nuclear Explosives, Nuclear Components, and Special Assemblies (cancels portions Re: Nuclear Explosives Canceled by DOE 5610.10 and DOE 5610.11)	09-11-79
5610.2	Control of Weapon Data	08-01-80
	Change 001	09-02-86
5610.10	Nuclear Explosive and Weapon Safety Program (cancels DOE 5610.3 and portions of DOE 5610.1 regarding nuclear explosives)	10-10-90

DOE No.	Subject	Dated
5610.11	Nuclear Explosive Safety (cancels DOE 5610.3 and portions of DOE 5610.1 regarding nuclear explosives)	10-10-90
5610.13	Joint Department of Energy/Department of Defense Nuclear Weapons System Safety, Security, and Control Activities	10-10-90
5610.14	Transportation Safeguards System Program Operations	05-12-93
5630.8A	Safeguarding of Naval Nuclear Propulsion Information (cancels DOE 5630.8)	07-31-90
5630.11A	Safeguards and Security Program (cancels DOE 5630.11)	12-07-92
5630.12A	Safeguards and Security Inspection and Assessment Program (cancels DOE 5630.12)	06-23-92
5630.13A	Master Safeguards and Security Agreements (cancels DOE 5630.13)	06-08-92
5630.14A	Safeguards and Security Program Planning (cancels DOE 5630.14)	06-09-92
5630.15	Safeguards and Security Training Program (cancels DOE N 5630.2)	08-21-92
5630.16A	Safeguards and Security Acceptance and Validation Testing Program (cancels DOE 5630.16)	06-03-93
5630.17	Safeguards and Security Standardization Program (cancels DOE 5632.10)	09-29-92
5631.1B	Security Education Briefing and Awareness Program (cancels DOE 5631.1A)	12-31-92
5631.2C	Personnel Security Program (cancels DOE 5631.2B)	09-15-92
	Change 001	06-07-93
	Change 002	02-17-94
5631.4A	Control of Classified Visits (cancels DOE 5631.4)	07-08-92

DOE No.	Subject	Dated
5631.6A	Personnel Security Assurance Program (cancels DOE 5631.6)	09-15-92
5632.1B	Protection Program Operations (cancels DOE 5632.1A)	09-08-92
5632.2A	Physical Protection of Special Nuclear Material and Vital Equipment	02-09-88
	Change 001	01-17-89
5632.5	Physical Protection of Classified Matter	02-03-88
	Change 1	07-30-93
5632.6	Physical Protection of DOE Property and Unclassified Facilities	02-09-88
	Change 001	12-05-89
5632.7A	Protective Forces (cancels DOE 5632.7 thru Change 5)	04-13-94
5632.8	Protection Program Operations—Systems Performance Tests	02-04-88
5632.9A	Issuance and Control of Security Badges, Credentials and Shields (cancels DOE 5632.9; 5631.3)	09-23-92
5632.11	Physical Protection of Unclassified, Irradiated Reactor Fuel in Transit (cancels DOE 1540.4)	09-15-92
	Change 001	03-04-94
5633.2A	Control and Accountability of Nuclear Materials: Responsibilities and Authorities (cancels DOE 5633.2)	09-23-92
5633.3A	Control and Accountability of Nuclear Materials (cancels DOE 5633.3)	02-12-93
5633.4	Nuclear Materials Transactions: Documentation and Reporting (cancels DOE 5630.10)	02-09-88
5633.5	Nuclear Materials Reporting and Data Submission Procedures (cancels DOE 5630.9)	05-22-87

DOE No.	Subject	Dated
5634.1B	Facility Approvals, Security Surveys, and Nuclear Materials Surveys (cancels DOE 5634.1A)	09-15-92
5635.1A	Control of Classified Documents and Information (cancels DOE 5635.1, HQ 5635.1)	02-12-88
	Change 001	06-14-93
5635.2B	Protection of Classified National Security Council Information (cancels DOE 5635.2A)	04-19-85
5635.3	Hand-Carrying Classified Matter on Air Carriers	01-29-88
5635.4	Protection of Unclassified Controlled Nuclear Information	02-03-88
	Change 001	04-24-92
5636.1A	Prohibitions on Illicit Wiretapping and Eavesdropping (cancels DOE 5636.1)	06-12-92
5639.1	Information Security Program	10-19-92
5639.3	Violation of Laws, Losses, and Incidents of Security Concerns (cancels DOE 5631.5)	09-15-92
5639.5	Technical Surveillance Countermeasures Program	08-03-92
	Change 001	06-18-93
5639.6	Classified Computer Security Program	09-15-92
5639.7	Operations Security Program (cancels DOE 5632.3B)	04-30-92
5639.8A	Security of Foreign Intelligence Information and Sensitive Compartmented Information Facilities (cancels DOE 5639.8)	07-23-93
5650.2B	Identification of Classified Information (cancels DOE 5650.2A)	12-31-91
	Change 001	03-27-92
	Change 002	04-28-93

DOE No.	Subject	Dated
5650.3A	Identification of Unclassified Controlled Nuclear Information (cancels DOE 5650.3)	06-08-92
5660.1A	Management of Nuclear Materials (cancels DOE 5660.1)	07-08-92
5670.1A	Management and Control of Foreign Intelligence (cancels DOE 5670.1)	01-15-92
5670.3	Counterintelligence Program	09-04-92
5700.2D	Cost Estimating, Analysis, and Standardization (cancels DOE 5700.2C)	06-12-92
5700.5A	Policy and Management Procedures for Financial Incentives Programs (cancels DOE 5700.5)	06-08-92
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Appendix B

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