Material Restrictions Terms and Conditions

Clause - Use of Radioactive Material and Non Radioactive Material listed on Tables I, II, and X, Sealed Radioactive Sources and X-ray generating machines (Radiation Generating Devices).

These materials must have the approval of the Radiation Protection Department prior to bringing to SLAC National Accelerator Laboratory

1. The restrictions on the use of radioactive materials and radiation generating devices at SLAC National Accelerator Laboratory are **very strict**. The SLAC Radiological Control Manual, Article 365, contains the requirements bringing these items to SLAC National Accelerator Laboratory. The purpose for these restrictions is to minimize the radiation dose consequences and to meet strict regulatory quantities related to radioactive materials.

2. Some consumer products, industrial machines and devices contain radioactive sources such as:
   - Nuclear Moisture Density gauges
   - Radiography NDT sealed radioactive sources.
   - Radioactive sources for testing detectors and other equipment.

3. Some machines generate x-radiation as a primary or secondary by-product such as:

   - X-ray diffraction units
   -SEM Scanning Electron Microscope
   - Vacuum tubes
   - klystrons

4. All materials listed in the Table I “Special Nuclear Materials”, Table II “Controlled and Accounted for as Special Nuclear Materials”, and Table X “Other Accountable Nuclear Materials” **MUST have** approval from the Radiation Protection Department prior to bringing to SLAC National Accelerator Laboratory.

If any subcontractor or lower tier subcontractor are considering purchasing, or bringing such material onto the SLAC site, **BEFORE** bringing these or similar materials to SLAC National Accelerator Laboratory, they shall notify and receive authorization from:

- the Radiation Protection Department Field Operations (RPFO) at 650-926-4299
- or by emailing RPFO Group Leader, Henry Brogonia (Brogonia@SLAC.stanford.edu)
- or by emailing RPQA Manager, Marcia Torres (mtorres@SLAC.stanford.edu)
- or notify the Radiation Safety Officer, Sayed Rokni (rokni@SLAC.stanford.edu)

Review and authorization is needed prior to bringing these items on site.

Table I. Special Nuclear Materials

Material Type	Accountable Quantity	Weight Field Used for Element	Weight Field Used for Isotope	Material Type Code
Enriched Uranium (U-235)	1 gram	total U	U-235	20
Uranium-233[3]	1 gram	total U	U-233	70
Plutonium-242[1] (Pu)	1 gram	total Pu	Pu-242	40
Plutonium-239-241	1 gram	total Pu	Pu-239 + Pu-241	50
Plutonium-238[2]	1/10 of a gram	total Pu	Pu-238	83
Uranium in Cascades	1 gram	total U	U-235	89

[1]Account as Pu-242 (MT 40) if the contained Pu-242 is 20 percent or greater of total plutonium by weight; otherwise, account as Pu-239-241 (MT 50).
[2]Account as Pu-238 (MT 83) if the contained Pu-238 is 10 percent or greater of total plutonium by weight; otherwise, account as Pu-239-241 (MT 50).
[3]Account as U-233 (MT 70) if the contained U-233 is 10 percent or greater of total uranium by weight; otherwise, account as U235 (MT 10, 20, or 81).

Table II. Controlled and Accounted for as Special Nuclear Materials

Material Type	Accountable Quantity	Weight Field Used for Element	Weight Field Used for Isotope	Material Type Code
Americium-241**(Am)	1 gram	total Am	Am-241	44
Americium-243**	1 gram	total Am	Am-243	45
Neptunium-237** (Np)	1 gram	total Np	-	82

**Americium and Np-237 contained in SNM are not required to be accounted for until separated. If separated, these materials must be controlled and accounted for as SNM.

Table X. Other Accountable Nuclear Material [FAQ-36]

Material Type	Reportable/Accountable Quantity	Weight Field Used for Element	Weight Field Used for Isotope	Material Type Code
Depleted Uranium (DU)	1 kilogram[1]	total U	U-235	10
Normal Uranium (NU)	1 kilogram	total U	-	81
Curium (Cm)	1 gram	total Cm	Cm- 246	46
Deuterium[2,4] (D)	100 kilograms[3]	D_2O	D_2	86
Enriched Lithium (Li)	1 kilogram	total Li	Li-6	60
Thorium (Th)	1 kilogram	total Th	-	88
Tritium[5] (H-3)	1 gram	total H-3	-	87

[1] For process development with DU, the accountable quantity is at value of 50 kilograms.
[2] For deuterium in the form of heavy water, both the element and isotope weight fields will be used; for deuterium gas, report isotope weight only.
[3] For weapon components with Deuterium the accountable quantity is 1/10 kilogram.
[4] Deuterium and deuterium compounds are subject to export control requirements in 10 CFR 110.24 and 10 CFR 110.54 (a)(1).
[5] Tritium contained in water (H2O or D2O) used as a moderator in a nuclear reactor is not an accountable material.

Use of Exempted Radioactive Consumer Products

These materials must have the approval of the Radiation Protection Department prior to bringing to SLAC National Accelerator Laboratory

1. The restrictions on the unnecessary use of the Nuclear Regulatory Commission exempt radioactive consumer products (such as Tungsten Inert Gas welding electrodes and grinding wheels containing Thorium) are now part of the SLAC Radiological Control Manual. The purpose for these restrictions is to minimize the potential for spread of radioactive contamination or dose consequences related to the inappropriate use of such consumer products.
2. The following requirements are stated in the SLAC Radiological Control Manual, Article 415.
    1. Whenever such products are considered for use at SLAC, the user/ contractor is required to notify the Radiation Protection Department to justify its use, obtain approval, and apply specified engineering controls prior to bringing to the SLAC site.
    2. For **thoriated tungsten welding rods or grinding wheels**, this Manual has been amended to invoke a Radiological Work Permit or Written Procedure (Article 312.2.E) for this process. Engineered controls are required as appropriate (Article 453) to control the airborne activity and the surface contamination.
3. In addition to the restrictions for use of welding electrodes and grinding wheels containing Thorium, there may be restrictions on other consumer products. Such radioactive material may be byproduct material (created in a reactor) or source material (uranium and thorium) and may be used for one of the functions listed in the following table.

Byproduct Material	Source Material
Luminous Timepieces, Hands & Dials	Unrefined & Unprocessed Uranium Ore
Automobile Lock Illuminators	Incandescent Gas Mantles
Balances of Precision	Vacuum Tubes
Automobile Shift Quadrants	Old, orange Glazed Ceramic Tableware
Marine Compasses & Navigational Instruments	Piezoelectric Ceramic
Electron Tubes	Finished Tungsten or Magnesium-Thorium Alloy Products or Parts
Spark Gap Irradiators	Uranium in Counterweights Old, Orange Glazed Ceramic Tableware
	Uranium Shielding in Shipping Containers Piezoelectric Ceramic
Self-Luminous Products	Thorium in Finished Optical Lenses
Gas & Aerosol Detectors	Aircraft Engine Parts Containing Nickel-Thoria Alloy
	Uranium in Fire Detection Units c Finished Tungsten- or Magnesium-Thorium Alloy Products or Parts
	Uranium in Counterweights
	Uranium Shielding in Shipping Containers
	Thorium in Finished Optical Lenses

	Aircraft Engine Parts Containing Nickel-Thoria Alloy
	Uranium in Fire Detection Units

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