U.S. NUCLEAR NEXUS

EXPORT COMPLIANCE GUIDE

DISCLAIMER: Final determinations as to export control applicability are made after a full review by the appropriate USG agency. Use of this Export Compliance Guide does not constitute USG review, is not DOE/NNSA advice or a determination, and is provided for the user's convenience only.

START HERE

Does the export involve physical items (materials, equipment, facilities, etc) or technology/assistance (including software)? [1]

TECHNOLOGY/ASSISTANCE

Does the technology/assistance involve civilian nuclear reactor development, production, or use (i.e. not including production, space, or maritime reactors)? [2]

NO

Is the technology/assistance associated with nuclear fuel cycle activities? [3]

NOT SURE

Submit DOE/NNSA Advice/Determination Request (Consult 10 CFR 810.5).

YES

Continue to Fuel Cycle and Nuclear Material Flow Sheet. (Under Construction)

NO

Submit a DOC/BIS Commodity Classification Request.

Based on your review of the EAR, do you know your export's classification (ECCN or EAR99)? [7]

NO

YES

Does the ECCN have Country Chart based controls for the specific destination? (Consult Part 738 and Supplement No. 1 to Part 738)

NO

YES

Does your ECCN have nuclear end-use or end-user based controls? [8] (Consult part 744 and Supplement No. 4 to Part 744)

YES

NO

Does a license exception apply? (Consult Part 740 and Supplement No. 1 to Part 740)

YES

No export license required.

NO

Submit DOC/BIS license application.

PHYSICAL ITEM

Is the physical item associated with nuclear fuel cycle or nuclear materials? [5,6]

NO

YES

Continue to Fuel Cycle and Nuclear Material Flow Sheet. (Under Construction)

Does the physical item involve components within or attached directly to the reactor vessel; equipment that controls the level of power in the core; and/or equipment or components that normally contain or come in direct contact with or control the primary coolant of the reactor core? (Consult 10 CFR 110.26 & Appendix A to Part 110)

NOT SURE

Consult Appendix A to 10 CFR Part 110 for an illustrative list of examples. If still unsure, contact NRC at IPResource@nrc.gov

NOT SURE

YES

Will the physical item involve end-uses related to advanced reactors? [10]

YES

NO

Is the physical item any of the following: reactor pressure vessels, on-line fuel charging/ discharging machines, complete reactor control rod system, or primary coolant pumps or circulators?

YES

NO

Will the physical item be used in a light- or heavy-water moderated power or less than 5 MWth research reactor?

NO

YES

Is the end-user located in a destination listed in 10 CFR 110.26(b)?

NO

YES

Export is covered by the NRC General License. Follow reporting requirements located in 10CFR 110.54 (a) and (c)

Submit a Specific License Application to the NRC.

Does the technology/ assistance involve components within or attached directly to the reactor vessel; equipment that controls the level of power in the core; and/or equipment or components that normally contain or come in direct contact with or control the primary coolant of the reactor core?

NOT SURE

Submit DOE/NNSA Advice/Determination Request (Consult 10 CFR 810.5).

NOT SURE

Consult Appendix A to Part 110 for an illustrative list of examples. Based on review of this Appendix, does the technology/ assistance involve components within or attached directly to the reactor vessel, the equipment that controls the level of power in the core, and/or equipment or components that normally contain or come in direct contact with or control the primary coolant of the reactor core?

NO

YES

Is the end-user on the Generally Authorized Destinations List (Consult Appendix to 10 CFR 810)? [9]

NO

YES

Export is Generally Authorized. Follow reporting requirements under 810.12(e).

Does the technology/assistance involve any of the following: participating in a DOS exchange program; activities carried out to implement US-IAEA Agreements; or activities carried out by full-time IAEA employees (if sponsored/ approved by DOS)?

NO

YES

Does the technology/assistance involve activities at a NRC-licensed or IAEA-safeguarded facility?

NO

Submit a Specific Authorization Application. (Consult 10 CFR 810.11)

YES

Will the technology/ assistance prevent or correct a current or imminent radiological emergency? (Consult 810.6(c)(1))

NO

YES

Export is Generally Authorized, provided DOE determines the emergency cannot cannot be met by other means and DOE is notified in writing in advance and does not object within 48 hours of receipt of the advance notification.

Will the technology/assistance involve furnishing operational safety information to an existing facility or to an existing or new-build facility in the US? [4] (Consult 810.6(c)(2)–(c)(3))

NO

YES

Export is Generally Authorized, provided DOE is notified and approves the activity within 45 calendar days of the notice. See §810.12(e) and 810.6(c)(2)–(c)(3)) for notification guidance.

Is the transfer to a citizen or foreign national of a country, other than the US, and working at an NRC-licensed facility that meets all of the following criteria? (1) Lawfully employed by or contracted to work for a U.S. employer in the US; (2) Signed confidentiality agreement with the U.S. employer to safeguard the technology from unauthorized use or disclosure; (3) Granted unescorted access in accordance with NRC regulations at the facility; (4) Employer complies with reporting requirements under 810.12(g). (5) No sensitive nuclear technology or assistance described in 810.7 is involved.

NO

YES

Export is Generally Authorized. See §810.11(b) for reporting requirements.

LEGEND

- Decision point
- Action or state
- Department of Energy
- Department of Commerce
- Nuclear Regulatory Commission

National Nuclear Security Administration

U.S. DEPARTMENT OF ENERGY
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Argonne NATIONAL LABORATORY

FOOTNOTES

[1] *Technology* (per 10 CFR 810) means assistance or technical data required for the development, production or use of any plant, facility, or especially designed or prepared equipment for the activities described in §810.2(b).

Assistance (per 10 CFR 810) means assistance in such forms as instruction, skills, training, working knowledge, consulting services, or any other assistance as determined by the Secretary. Assistance may involve the transfer of technical data.

Technical data (per 10 CFR 810) means data in such forms as blueprints, plans, diagrams, models, formula, engineering designs, specifications, manuals, and instructions written or recorded on other media or devices such as disks, tapes, read-only memories, and computational methodologies, algorithms, and computer codes that can directly or indirectly affect the production of special nuclear material.

Physical item means any item not considered technology or assistance, such as materials, equipment, components, plants or facilities.

[2] *Development* (per 10 CFR 810) means any activity related to all phases before production such as: Design, design research, design analysis, design concepts, assembly and testing of prototypes, pilot production schemes, design data, process of transforming design data into a product, configuration design, integration design, and layouts.

Production (per 10 CFR 810) means all production phases such as: Construction, production engineering, manufacture, integration, assembly or mounting, inspection, testing, and quality assurance.

Use (per 10 CFR 810) means operation, installation (including on-site installation), maintenance (checking), repair, overhaul, or refurbishing.

[3] Nuclear fuel cycle activities (including production reactors) include the following activities under DOE jurisdiction (per 10 CFR 810.2(b)):

- Chemical conversion or purification of uranium or thorium from milling plant concentrates or subsequent steps in the fuel cycle;
- Chemical conversion of plutonium or neptunium;
- Nuclear fuel fabrication
- Isotopic separation (enrichment) of uranium, plutonium, or any element when the technology or process may be directly or indirectly applied to uranium;
- Development, production or use of production accelerator-driven subcritical assembly systems;
- Heavy water production and hydrogen isotope separation when the technology or process has reasonable potential for large-scale separation of deuterium (2H) from protium (1H);
- The transfer of technology for the development, production, or use of equipment or material especially designed or prepared for any of the above listed activities. (See Nuclear Regulatory Commission regulations at 10 CFR part 110, Appendices A through K, and O, for an illustrative list of items considered to be especially designed or prepared for certain listed nuclear activities.)

[4] *Operational safety* (per 10 CFR 810) means the capability of a reactor to be operated in a manner that complies with national standards or requirements or widely-accepted international standards and recommendations to prevent uncontrolled or inadvertent criticality, prevent or mitigate uncontrolled release of radioactivity to the environment, monitor and limit staff exposure to radiation and radioactivity, and protect off-site population from exposure to radiation or radioactivity. Operational safety may be enhanced by providing expert advice, equipment, instrumentation, technology, software, services, analyses, procedures, training, or other assistance that improves the capability of the reactor to be operated in compliance with such standards, requirements or recommendations.

[5] Per 10 CFR 110, the NRC defines the following materials:

- *Special Nuclear Material* means plutonium, uranium-233, or uranium enriched above 0.711 percent by weight in the isotope uranium-235
- *Source Material* means:
  1. Natural or depleted uranium, or thorium, other than special nuclear material; or
  2. Ores that contain by weight 0.05 percent or more of uranium, thorium or depleted uranium.
- *Byproduct material* means:
  1. Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or utilizing special nuclear material;
  2. The tailings or wastes produced by the extraction or concentration of uranium or thorium from ore (see 10 CFR 20.1003);
  3. (i) Any discrete source of radium-226 that is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; or
     (ii) Any material that has been made radioactive by use of a particle accelerator and is produced, extracted, or converted after extraction, before, on, or after August 8, 2005 for use for a commercial, medical, or research activity; and
  4. Any discrete source of naturally occurring radioactive material, other than source material, that—
     (i) The Commission, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, the Secretary of Homeland Security, and the head of any other appropriate Federal agency, determines would pose a threat similar to the threat posed by a discrete source of radium-226 to the public health and safety or the common defense and security; and
     (ii) Before, on, or after August 8, 2005 is extracted or converted after extraction for use in a commercial, medical, or research activity.
- *Deuterium* means deuterium and any deuterium compound, including heavy water, in which the ratio of deuterium atoms to hydrogen atoms exceeds 1:5000, that is intended for use in a nuclear reactor. Export of deuterium and deuterium compounds, including heavy water, for non-nuclear end use is regulated by the Department of Commerce.
- *Nuclear-grade graphite for nuclear end-use* means graphite having a purity level better than (i.e., less than) 5 parts per million boron equivalent, as measured according to ASTM standard C1233-98 and intended for use in a nuclear reactor. (Nuclear grade graphite for non-nuclear end use is regulated by the Department of Commerce.)

[6] Nuclear fuel cycle (excluding reactors) and materials include the following facilities, equipment, and materials under NRC jurisdiction (per 10 CFR 110.8 and 110.9):

- Plants for the separation of isotopes of uranium (source material or special nuclear material) including gas centrifuge plants, gaseous diffusion plants, aerodynamic enrichment plants, chemical exchange or ion exchange enrichment plants, laser based enrichment plants, plasma separation enrichment plants, electromagnetic enrichment plants, and especially designed or prepared equipment, other than analytical instruments, for the separation of isotopes of uranium.
- Plants for the separation of the isotopes of lithium and especially designed or prepared assemblies and components for these plants.
- Plants for the reprocessing of irradiated nuclear reactor fuel elements and especially designed or prepared assemblies and components for these plants.
- Plants for the fabrication of nuclear reactor fuel elements and especially designed or prepared assemblies and components for these plants.
- Plants for the conversion of uranium and plutonium and especially designed or prepared assemblies and components for these plants.
- Plants for the production, separation, or purification of heavy water, deuterium, and deuterium compounds and especially designed or prepared assemblies and components for these plants.
- Plants for the production of special nuclear material using accelerator-driven subcritical assembly systems capable of continuous operation above 5 MWe thermal.
- Special nuclear material
- Source material
- Byproduct material
- Deuterium for nuclear end use
- Nuclear-grade graphite for nuclear end-use.

[7] The following dual-use nuclear items and their respective ECCNs shown below are only a portion of those controlled for nuclear or nuclear-related activities:

Category 0—Nuclear Materials, Facilities, and Equipment

- Power generating or propulsion equipment "specially designed" for use with space, marine or mobile "nuclear reactors" (0A002)
- Software (0D001)
- Technology (0E001)

Category 1—Special Materials and equipment:

- High-density (lead glass or other) radiation shielding windows (1A227)
- Turboexpanders or turboexpander-compressor sets (1B232)
- Maraging steels (1C116, 1C216)
- Boron enriched in B-10 (1C225)
- Tungsten, tungsten carbide, and alloys (1C226)
- Beryllium (1C230)
- Hafnium (1C231)
- Helium-3 (1C232)
- Lithium enriched in Li-6 (1C233)
- Zirconium (1C234)
- Radionuclides appropriate for making neutron sources with alpha-n reactions (1C236)
- Radium-226 (1C237)
- Nickel powder or porous nickel metal (1C240)
- Rhenium (1C241)
- Graphite (1C298)
- Software related to above Category 1 items (2D001, 2D101, 2D201)
- Technology related to above Category 1 items (2E001, 2E002, 2E101, 2E102, 2E201, 2E202, 2E203)

Category 2—Materials processing:

- Bellows-sealed valves (2A226 and 2A999.a)
- Generators and other equipment (2A290)
- Equipment (except 2A290) related to nuclear material handling and processing and to nuclear reactors, and parts and components and accessories (2A291)
- Machine tools (2B001 and 2B201)
- Dimensional inspection or measuring systems and related equipment (2B006, 2B206)
- Robots, end-effectors, and control units (2B007, 2B207)
- Remote manipulators (2B225)
- Bellows-sealed scroll-type compressors and vacuum pumps (2B233)
- Software related to above Category 2 items (2D001, 2D002, 2D101, 2D201, 2D202, 2D290)
- Technology related to above Category 2 items (2E001, 2E002, 2E101, 2E201, 2E290)

[8] End-Use and End-User Based Controls for DOC/BIS:
End-use is for a nuclear explosive device; End-use is for heavy water, enrichment, or reprocessing facilities under IAEA safeguards; or End-user is a facility not under IAEA safeguards.

[9] Note that certain destinations in the Appendix to 10 CFR 810 are only authorized for very specific activities, which are noted in the Appendix. Pay close attention to these destinations and any additional requirements specified. For example, transfers to Ukraine have special requirements under 10 CFR 810.14.

[10] Note that the following end-uses require a specific license application:

- Advanced reactors
- Isotope separation
- Chemical processing
- Heavy water production
- Fabrication of nuclear fuel containing plutonium