



NRC Export/Import Licensing 10 CFR Part 110

Gary R. Langlie
Licensing Officer
Export Controls and Nonproliferation Branch
Office of International Programs

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NRC Jurisdiction

▶ Legal Basis:

- Atomic Energy Act of 1954
- Nuclear Non-Proliferation Act of 1978
- Treaties, Conventions and Agreements

▶ Exports: reactors; fuel cycle facilities; components; nuclear grade graphite for nuclear end use; deuterium; source, special nuclear and byproduct materials including when contained in spent fuel or radioactive waste

▶ Imports: reactors; fuel cycle facilities; source, special nuclear and byproduct materials including when contained in spent fuel or radioactive waste



If Subject to NRC Jurisdiction

- ▶ All exports and imports of NRC–controlled commodities (materials and equipment) must be authorized by either:
 - An NRC general export or import license or
 - An NRC specific export or import license or
 - An exemption from NRC requirements for a specific or a general license which may be granted in response to an application requesting an exemption or issued on NRC’s initiative



NRC General Licenses

- ▶ Are issued in 10 CFR 110 after rulemaking and coordination with the Executive Branch
- ▶ Are not exemptions (or NLRs)
- ▶ Authorize exports (10 CFR 110.21–110.26) of small quantities of uranium, plutonium, tritium and minor reactor components to specified countries
- ▶ Authorize imports (10 CFR 110.27) of major reactor components, source, special nuclear and/or byproduct materials to authorized recipients
- ▶ Require record keeping and, for certain exports, filing annual reports to the NRC

NRC General Licenses

- ▶ Do not authorize exports to **EMBARGOED** countries, i.e., a specific license is required for exports to:

Cuba

Iran

Iraq

North Korea

Syria

Sudan

- ▶ Authorize limited exports to **RESTRICTED** destinations – a specific license may be required:

Afghanistan

Andorra

Angola

Burma

Djibouti

India

Israel

Libya

Pakistan

South Sudan



NRC Specific Licenses – Review Process

- ▶ All NRC Form 7 applications made public in ADAMS
- ▶ Some require Federal Register notices
- ▶ Interested parties have up to ~30 days to respond
- ▶ Processing fee ranging from \$1,300 to \$17,400 depends on level of review required (proliferation significance of commodity)
 - Most require interacting with foreign governments and some form of NRC Program Office review
 - Some require review by interested Executive Branch agencies, coordinated by Department of State
 - Some require review and approval by the Commission



Criteria for “Major” Exports (XSNM, XSOU, XR)

- ▶ Agreement for Cooperation (123 Agreement)
- ▶ Full-scope IAEA safeguards in recipient non-nuclear weapon states (NNWS)
- ▶ USG must obtain assurances from the foreign government on a case-by-case basis that material or equipment will be made subject to 123 Agreement with respect to:
 - No nuclear explosive use or R&D on any nuclear explosive device
 - Adequate physical security will be maintained
 - No retransfer or alteration in form (reprocessing) without prior USG consent
- ▶ Not inimical to common defense and security
- ▶ For XR, not an unreasonable risk to the public health and safety of the U.S.

Criteria for “Minor” Exports (XCOM, XMAT)

- ▶ USG must obtain assurances from the foreign government on a case-by-case basis that:
 - IAEA (full-scope) safeguards will apply in NNWS
 - No nuclear explosive use or R&D on such device
 - No retransfer without prior USG consent
- ▶ Not inimical to common defense and security

Part 110 Appendix A

Illustrative List of Reactor Equipment

- ▶ Especially Designed or Prepared Equipment
- ▶ Definition of “Nuclear Reactor:”
 - Items within or attached directly to the reactor vessel
 - Equipment which controls the level of power in the core
 - Components which normally contain or come in direct contact with or control the primary coolant of the reactor core

Part 110 Appendix A

“Major” Reactor Equipment

- ▶ Reactor pressure vessels, i.e., metal vessels, as complete units or major shop-fabricated parts
- ▶ On-line reactor fuel charging and discharging machines
- ▶ Complete reactor control rod system
- ▶ Reactor primary coolant pumps

Part 110 Appendix A

“Minor” Reactor Equipment

- ▶ Reactor pressure tubes, i.e., tubes especially designed or prepared (EDP) to contain fuel elements and the primary coolant
- ▶ Zirconium tubes, i.e., zirconium metal and alloys in the form of tubes or assemblies
- ▶ Reactor internals, .e.g., core support structures, control and rod guide tubes, fuel channels, calandria tubes, thermal shields, baffles, core grid plates and diffuser plates
- ▶ Reactor control rod drive mechanisms, including detection and measuring equipment to determine neutron flux levels within reactor core
- ▶ Heat exchangers – steam generators EDP for the primary, or intermediate, coolant circuit of a reactor or heat exchangers EDP for use in primary coolant circuit of reactor
- ▶ External thermal shields EDP for use in a reactor for reduction of heat loss and also for containment vessel protection
- ▶ Any other components EDP for use in a nuclear reactor or in any of the components described



Illustrative Lists in Part 110 Appendices

- ▶ Appendix B – Gas Centrifuge Enrichment
- ▶ Appendix C – Gaseous Diffusion Enrichment
- ▶ Appendix D – Aerodynamic Enrichment
- ▶ Appendix E – Chemical or Ion Exchange Enrichment
- ▶ Appendix F – Laser-Based Enrichment
- ▶ Appendix G – Plasma Separation Enrichment
- ▶ Appendix H – Electromagnetic Enrichment
- ▶ Appendix I – Reprocessing
- ▶ Appendix J – Uranium Conversion
- ▶ Appendix K – Plants for the Production of Heavy Water, Deuterium and Deuterium Compounds
- ▶ Appendix N – Lithium Isotope Separation
- ▶ Appendix O – Fuel Fabrication



Part 110 Appendix P Radioactive Materials

- ▶ In 2005, Part 110 was amended to address the IAEA Code of Conduct on the Safety and Security of Radioactive Sources and its Import/ Export Guidance
- ▶ 16 radionuclides previously authorized for export or import under a general license became subject to specific licensing
- ▶ In 2010, Part 110 was amended to allow U.S. parties to import under a general license if they are appropriately authorized domestically

Part 110 Appendix P Radioactive Materials

- ▶ If a device or a source for use in a device contains Appendix P radionuclides (Am-241, Am-241/Be, Cf-252, Cm-244, Co-60, Cs-137, Gd-153, Ir-192, Pu-238, Pu-239/Be, Pm-147, Ra-226, Se-75, Sr-90, Tm-170 or Yb-169) a specific NRC export license may be required



What's Next for Part 110?

- ▶ Nuclear Suppliers Group completed its review of the Part 1 and Part 2 control lists
 - NRC will update several Appendices to Part 110 to make conforming changes
- ▶ IAEA INFCIRC/225/Revision 5 – Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities – in effect since 1 Jan 2015

Recent changes

- ▶ Part 810 Rule – updated guidelines – reminder – when NRC regulates via Part 110, there is no Part 810 involvement
- ▶ Exports to Russia – involving Canada and Australia – for NRC XSOU exports need case by case approval of obligated material from CA and AU
- ▶ Iraq – shipping of byproduct material to Iraq – greater EB focus and Commission interest



DOE under NRC Licensing Jurisdiction

- ▶ Per AEA, NRC authorized to license DOE export distribution of SNM and source materials
- ▶ Quantities – <500 grams SNM (U-233, U-235, and Pu), contained in lab samples, medical devices, or monitoring or other instruments; or in emergency situations – no NRC authorization; needed for sources in excess of 3 metric tons/year/recipient
- ▶ Requires DOE to obtain DOS, NRC, & DOD concurrences, foreign assurances, & non-inimicality to common defense and security

NRC CODES

- ▶ Standards incorporated into USG regulations; have force of law:
- ▶ **CAMP**–Code Application & Maintenance Program – assess & improve thermal–hydraulic transient computer codes
- ▶ **TRACE** – analyze operational/safety transients–small/large break loss–of–coolant accidents (LOCA) in PWRs/BWRs; as well as interactions between related neutronics & thermal–hydraulic systems; features a 2 fluid, compressible, nonequilibrium hydrodynamics model that can be solved across multi–dimensional mesh topology
- ▶ **SNAP**–single, standardized graphical user interface (GUI) that is used with many NRC analytical codes and prepare models & interpret results
- ▶ **CAMP Program**–facilitates cooperation & sharing among 30+ countries in areas of thermal/hydraulic research & analysis

NRC CODES (cont.)

- ▶ **SCALE**—nuclear analysis code system to perform independent reactor & criticality safety analyses for existing & new nuclear reactor designs, spent fuel pools, spent fuel storage, & transportation casks
- ▶ **MELCOR** – current state-of-the art in severe accident analysis & containment thermal-hydraulics; fully integrated, engineering-level computer code designed to model progression of postulated accidents in light-water reactors & in non-reactor systems (spent fuel pool and dry cask)
- ▶ **RASCAL** – Radiological Assessment System for Consequence AnaLysis – tool used by NRC for making independent dose & consequence projections during radiological incidents and emergencies
- ▶ **RADTRAD** – Radionuclide Transport, Removal, And Dose Estimation – models doses at exclusion area boundary, low-population zone, and the control room from a release of radionuclides during a design basis accident; licensing analysis tool used to show compliance with nuclear plant siting and control room dose limits for various loss-of-coolant accidents
- ▶ **RAMP** – Radiation Protection Computer Code Analysis & Maintenance Program – NRC program for developing, maintaining, and distributing radiation protection, dose assessment, & emergency response computer codes
- ▶ NUREG-1925, Rev. 3; <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1925/>



To contact the NRC
Office of International
Programs

301-415-1780

THANK YOU!!

Gary R. Langlie
301-415-1739
Gary.Langlie@nrc.gov

