International Nonproliferation Export Control Program

SAND2011-4602 C

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MISSION

Strengthen global efforts to prevent proliferation of WMD-related materials, equipment, and technology

AREAS OF ENGAGEMENT

Proliferation Risk Analysis in the Licensing Process

- Ensure the license review process competently assesses proliferation risks associated with end-uses and end-users, and ensure technical specialists are being utilized

Government Outreach and Enterprise Compliance

- Assist governments to establish outreach programs and promote enterprise compliance at key enterprises and technology holders

WMD-related Commodity Identification Training and reach-back for Customs

- Ensure enforcement personnel are sensitized to WMD-related materials and equipment, and have access to technical/analytical resources and support

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

WMD Commodity Identification Training (CIT)

- **<u>Familiarizes</u> enforcement officers with the materials, components, and equipment sought by WMD procurement programs**

- **<u>Reduces the complexity</u> of the various export control lists, by**
  - Grouping commodities by physical appearance and category rather than by function
  - Focusing primarily on appearance, notable features, key parameters, special markings, typical packaging, sizes, weights, monetary values, etc

- **INECP follows a disciplined indigenization approach, based on our technical partnerships, to establish ongoing, country-led training programs and technical "reach-back" capabilities**

Both front-line familiarity and technical reachback key in dual-use interdiction cases

CIT Modules

Electronic Components	Electronic Equipment	Industrial Equipment – Nuc/Missile	Industrial Equipment – Chem/Bio	Structural Materials	Chemicals	Radioactive and SNM	Fabricated Components	Systems and Subsystems
Detonators	LASERS	Machine Tools	Remote Filling Equipment	Aluminum	Platinized Catalysts	Uranium (various forms)	Multi-walled Pipe	Solid Propellant Motors
Firing Sets	Power Supplies	Filament and Tape Winding or Weaving Machines	Heat Exchangers	Titanium	Helium	Plutonium	Tanks	Liquid Propellant Engines
Capacitors	Frequency Changers	Flow-forming/Spin forming Machines	Agitators	Maraging Steel	Uranium Hexafluoride	Reactor fuel	Valves	Reentry Vehicles
Switching Devices	Flash X-ray	Robots	Chemical Reaction Vessels	Beryllium	Phosphorus Pentasulfide	Industrial radionuclides	Heat Shields	Unmanned Aerial Vehicles
Gyroscopes	High-speed Cameras	Dimensional Inspection Machines	Fermenters	Tungsten	Chlorine Trifluoride	Tritium	Missile Components	Missile Systems and Stages
Photomultiplier Tubes	Radiation Hardened Cameras	Remote Manipulators	Centrifugal Separators	Zirconium	Cyanide Compounds	Alpha-emitting radionuclides	Crucibles	Attitude Control Systems
Manganin Pressure Guages / Quartz Pressure Transducers	Neutron Generators	Gas guns	Cross-Flow Filtration Equipment	Graphite	Heavy Water		Radomes	Turbine Engines
Accelerometer	Neutron Detectors	Mixers & Mills	Freeze-Drying Equipment	Fibrous and filamentary material	Propellant chemicals		RADAR systems	Protective equipment
Toxic Gas Monitors	Pulse Generators	Isostatic Presses	Furnaces		CW Precursor chemicals		Thrust Vector Control Systems	Fogging and Spraying Systems
	Telemetry and Telecontrol	Rate Tables/Motion Simulators	Electrolytic Cells		Metal Powders		Gas Centrifuge Components	
	RADARs	Vibration Test Systems	Aerosol Inhalation Equipment		Sodium Sulfide		Radiation-shielded Windows	
		Balancing Machines	Pumps		Lithium			
			Columns & towers					

eCIT

- **The Commodity Identification Training (CIT) information and approach has been integrated into an online Strategic Commodity Reference Engine**

- **eCIT provides secure, online full-text search of the CIT information and all relevant export control lists through a simple user interface.**

- **The system is designed to be customizable and adoptable by interested countries.**

eCIT 3 panels

contents commodity thumbnails

http://score.anl.gov/score/page/site/dashboard

About Help Language

Search: Go Advanced Print

Commodities | Commodity Types | WMD Uses | Controls

- auger filler
  - Balancing Machines
- ballistic missile
  - Beryllium
- beryllium powder
- bioreactor
  - Bismuth
- bismuth powder
- boron powder
  - Calcium
  - Cameras - Electronic Streak And Framing
  - Cameras - Radiation Hardened
  - Cameras - Rotating Mirror
  - Capacitors
- Carbon Fiber
  - Centrifugal Separators
  - Chemical Reaction Vessels
- Chemical reactors
- Chemical Vapor Deposition Furnace
- chemostat
- Chlorine fluoride
- Chlorine fluoride (ClF3)
  - Chlorine Trifluoride
- Chlorotrifluoride
- Chlortrifluorid
- ClF3
- Cold-cathode tubes
  - Columns And Towers
- compensated ion chambers
- Condensers
- converters
- Coordinate Measuring Machines (CMM)
  - Cross Flow Filtration Equipment
  - Crucibles
- cruise missiles
  - Cyanide Compounds
- D2O
  - Dc Power Supplies
- Decanter Centrifuge
  - Detonators
- Deuterium oxide
- Dideuterium oxide
  - Dimensional Inspection Machines
- dinitrogen tetroxide
- Disodium monosulfide
- Disodium sulfide
- distillation columns
- double containment piping

Centrifugal Separators

Description | WMD Uses | Controls | Civilian Uses | Appearance | Packaging

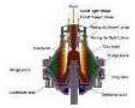
- A centrifuge is laboratory apparatus used to separate heavier from lighter molecules and cellular components and structures by spinning them at high speed. Centrifuges create a sustained centrifugal force, a force due to rotation, that results in the separation of samples into layers according to their density. For example, in the dairy industry skim milk is produced by separating away the cream by centrifugation.
- The basic design of a centrifuge consists of a wheel, or rotor, connected to a motor that spins. Centrifuges are also useful in separating particles or cells from a solution. For example, spinning a sample of liquid growth media in a centrifuge will force any bacteria present to the bottom or sides of the container/spinner bowl. The growth media can then be decanted or suctioned away, leaving the concentrated bacterial cells for further processing.

Must be capable of continuous operation with flow rates > 100 liters/hour

Also Known As...

- Decanter Centrifuge

All | Filtered

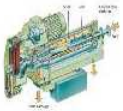


Centrifugal Separator Schematic

Centrifugal Separator

Centrifugal Separator photo and schematic - note inlets and outlets indicating capacity for continuous operation

Decanter centrifuge

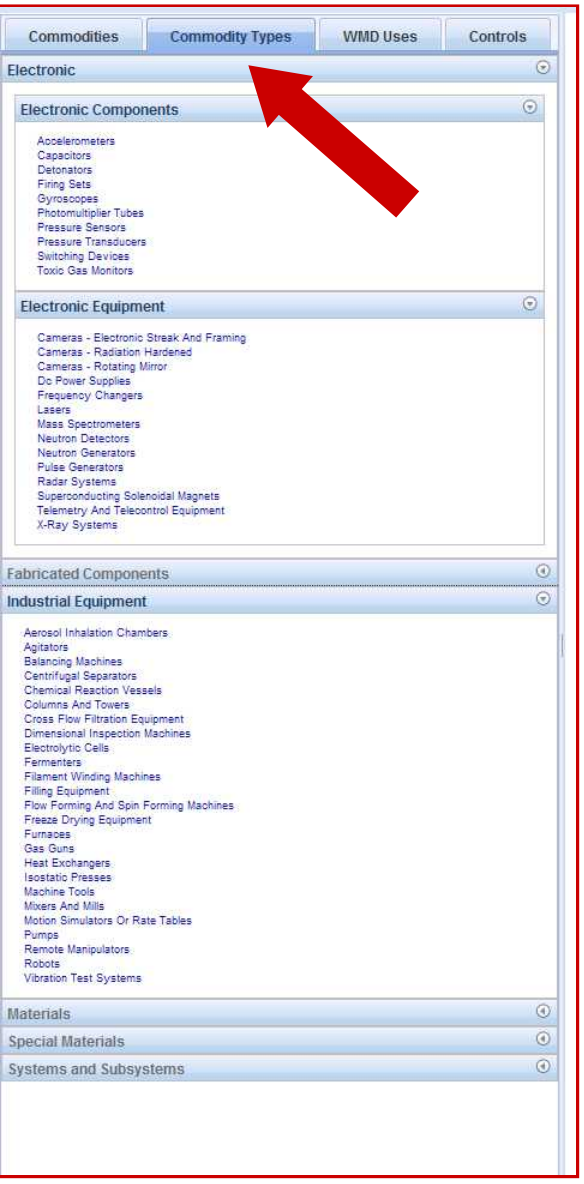


Decanter centrifuge schematic

3 panels: contents, commodity, thumbnails
Contents panel: 4 tabs

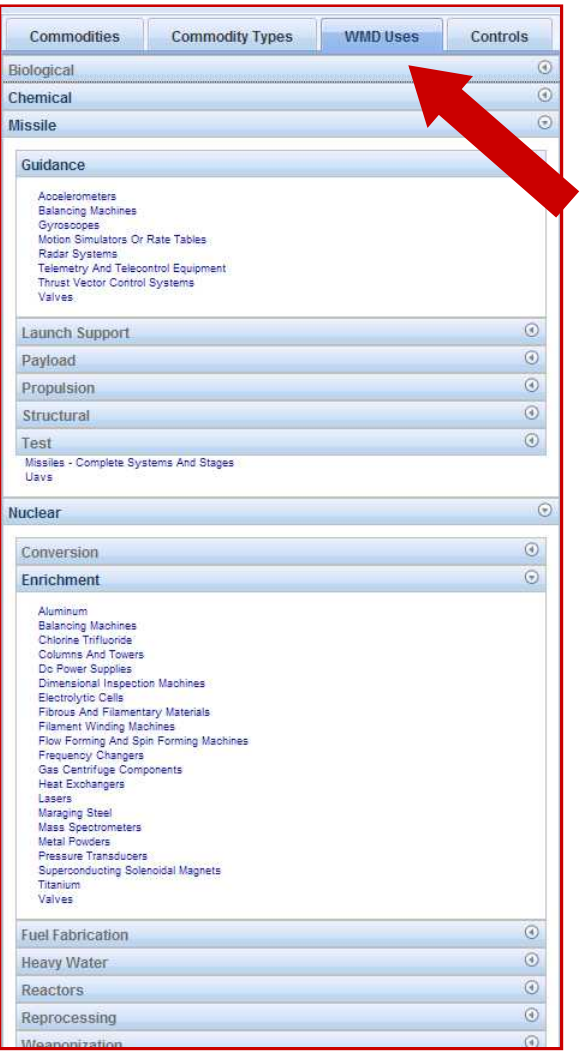
1. **Commodities**
   - Lists all commodities and aliases (AKAs) in the database in alphabetical order
   - Designed to work like an index
   - Aliases can be expanded to link to their commodity entries
   - Clicking on any entry brings up that commodity's information and thumbnails in their respective panels
2. **Commodity Types**
3. **WMD Uses**
4. **Controls**

3 panels: contents, commodity, thumbnails
Contents panel: 4 tabs



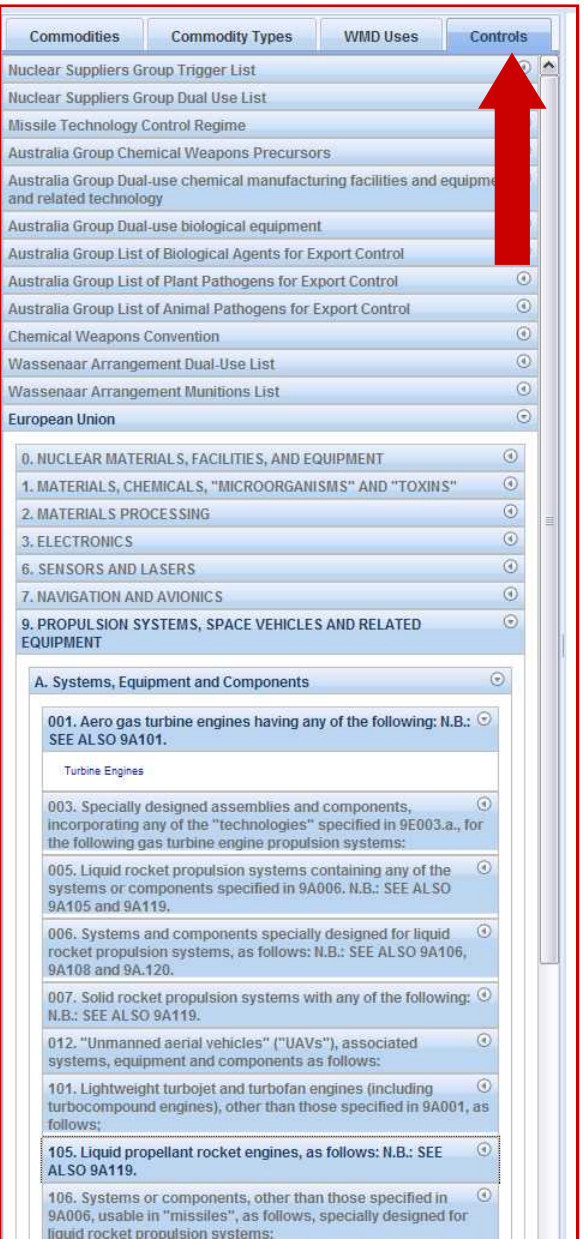
1. **Commodities**
2. **Commodity Types**
   - Lists all commodities in the database in “CIT order”
     - *Commodity Type sections can be expanded and collapsed*
   - Facilitates browsing by commodity type
   - Clicking on any entry brings up that commodity’s information and thumbnails in their respective panels
3. **WMD Uses**
4. **Controls**

3 panels: contents, commodity, thumbnails
Contents panel: 4 tabs



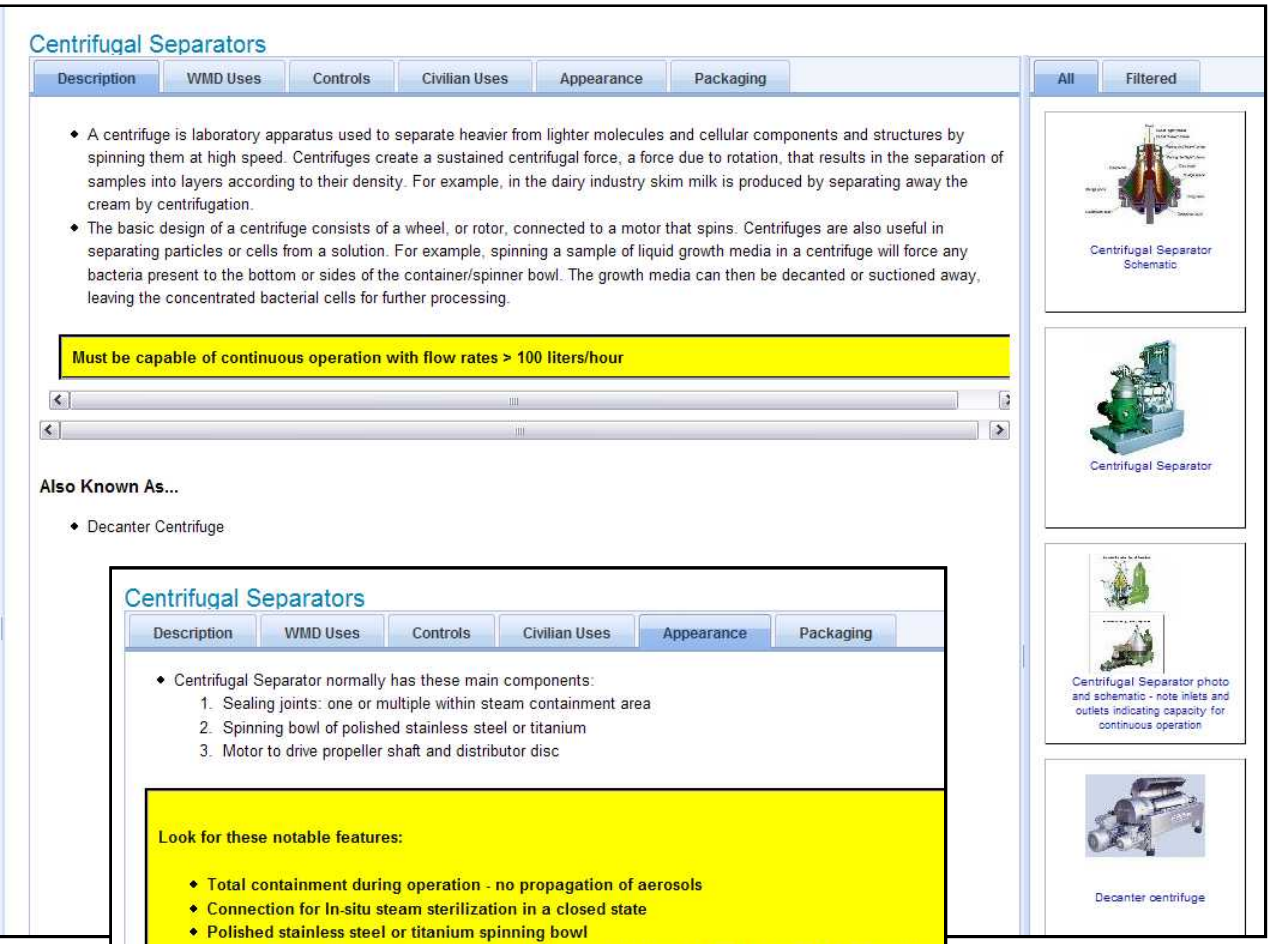
1. Commodities
2. Commodity Types
3. **WMD Uses**
   - Lists all commodities in the database by their WMD applications
     - *WMD Use sections can be expanded and collapsed*
   - Facilitates browsing by WMD Application
   - Clicking on any entry brings up that commodity's information and thumbnails in their respective panels
4. Controls

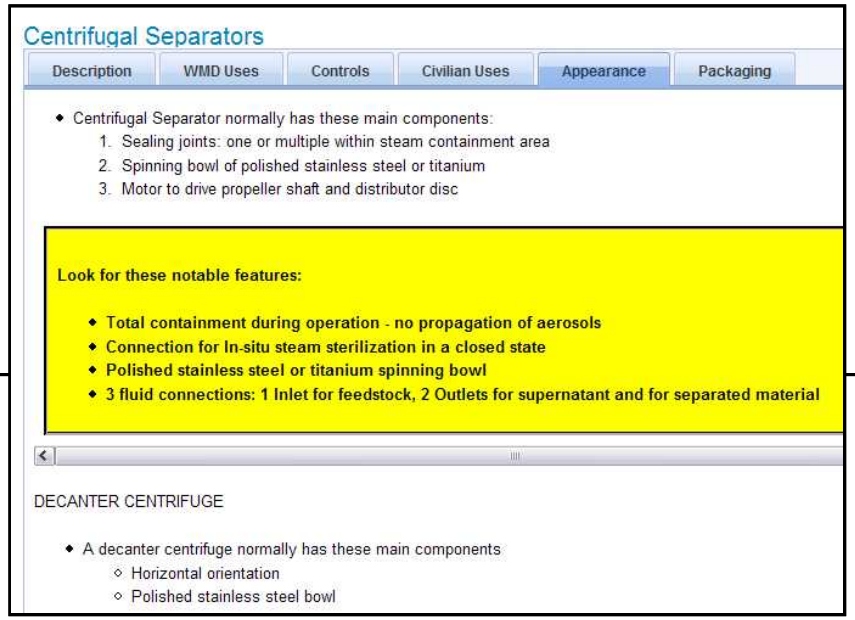
3 panels: contents, commodity, thumbnails
Contents panel: 4 tabs



1. **Commodities**
2. **Commodity Types**
3. **WMD Uses**
4. **Controls tab**
   - Allows browsing the control lists
     - *Control lists and control list sections can be expanded and collapsed*
     - *Includes all control list entries with linked commodities*
     - *Clicking on any entry brings up that commodity's information and thumbnails in their respective panels*

3 panels: contents, commodity, thumbnails
Commodity panel: 6 tabs

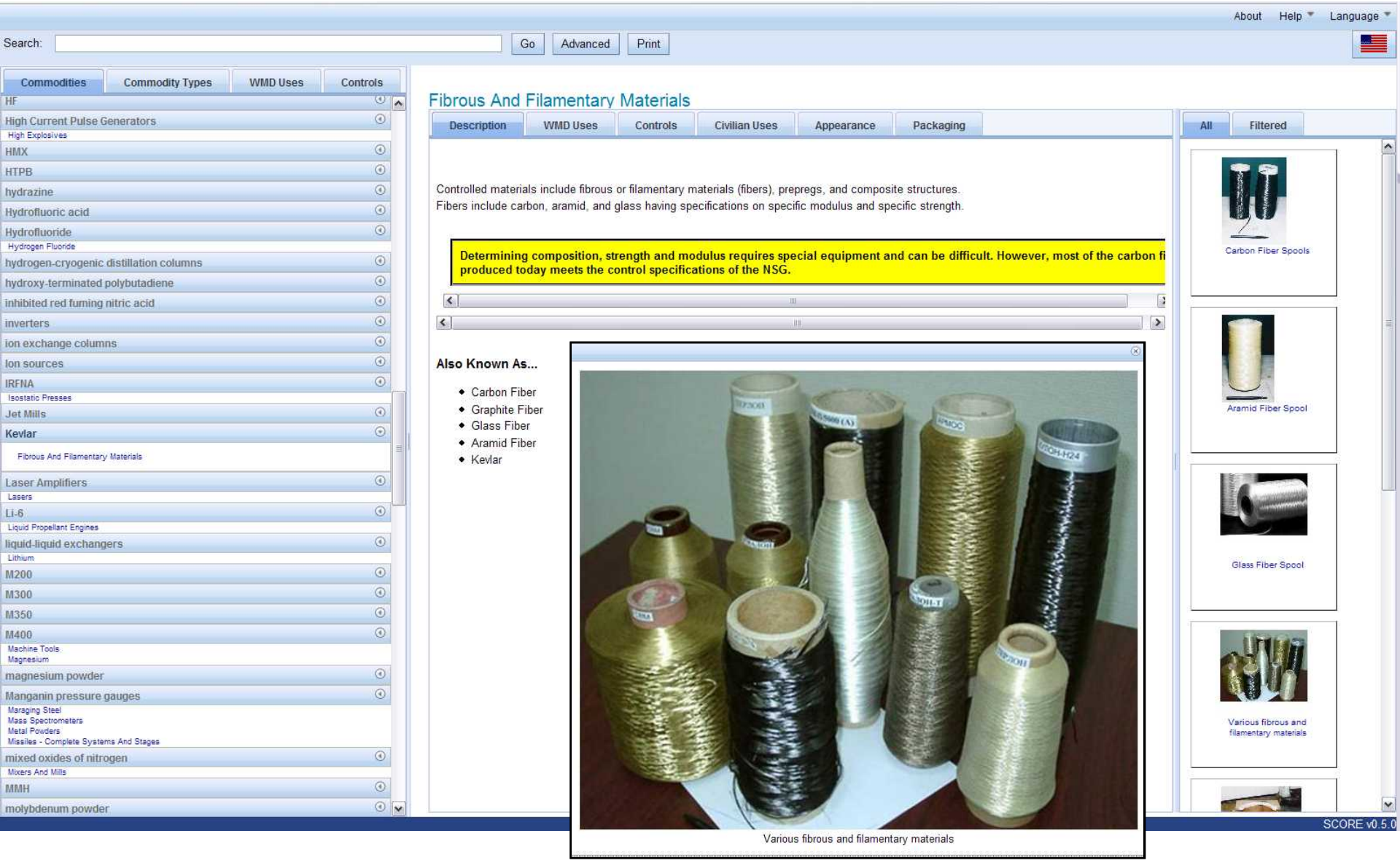




1. Description
2. WMD Uses
3. Controls
4. Civilian Uses
5. Appearance
6. Packaging

- Clicking on a thumbnail brings up an enlargement
- The print button provides a single form with all sections combined for field guides and inspector's reports

Example – Kevlar
Fibrous and Filamentary Materials



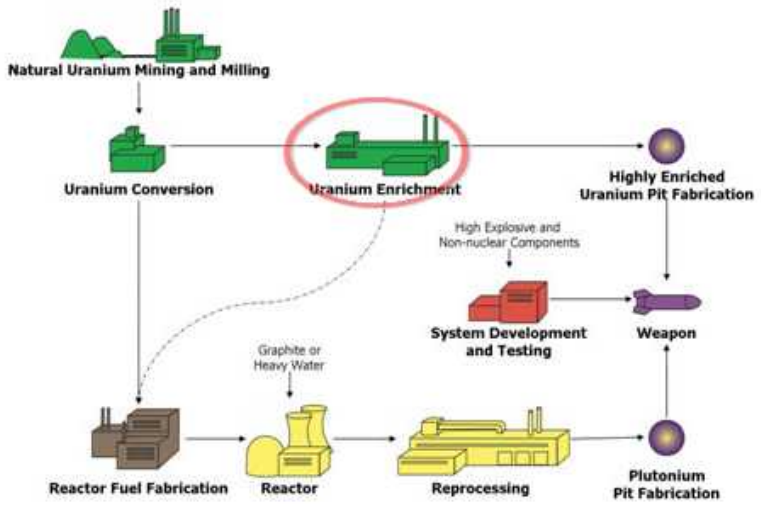
Example – Kevlar
Fibrous and Filamentary Materials

Fibrous And Filamentary Materials

Description | WMD Uses | Controls | Civilian Uses | Appearance | Packaging

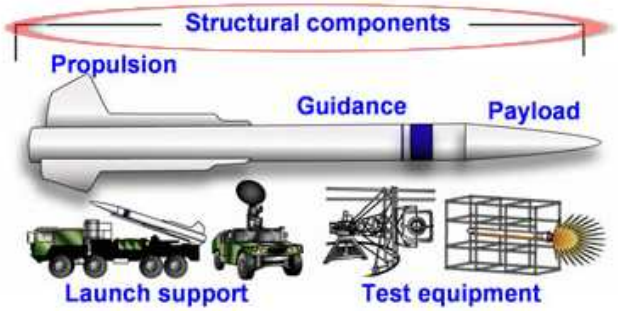
Nuclear

- Enrichment
  - High-speed rotors of gas centrifuges



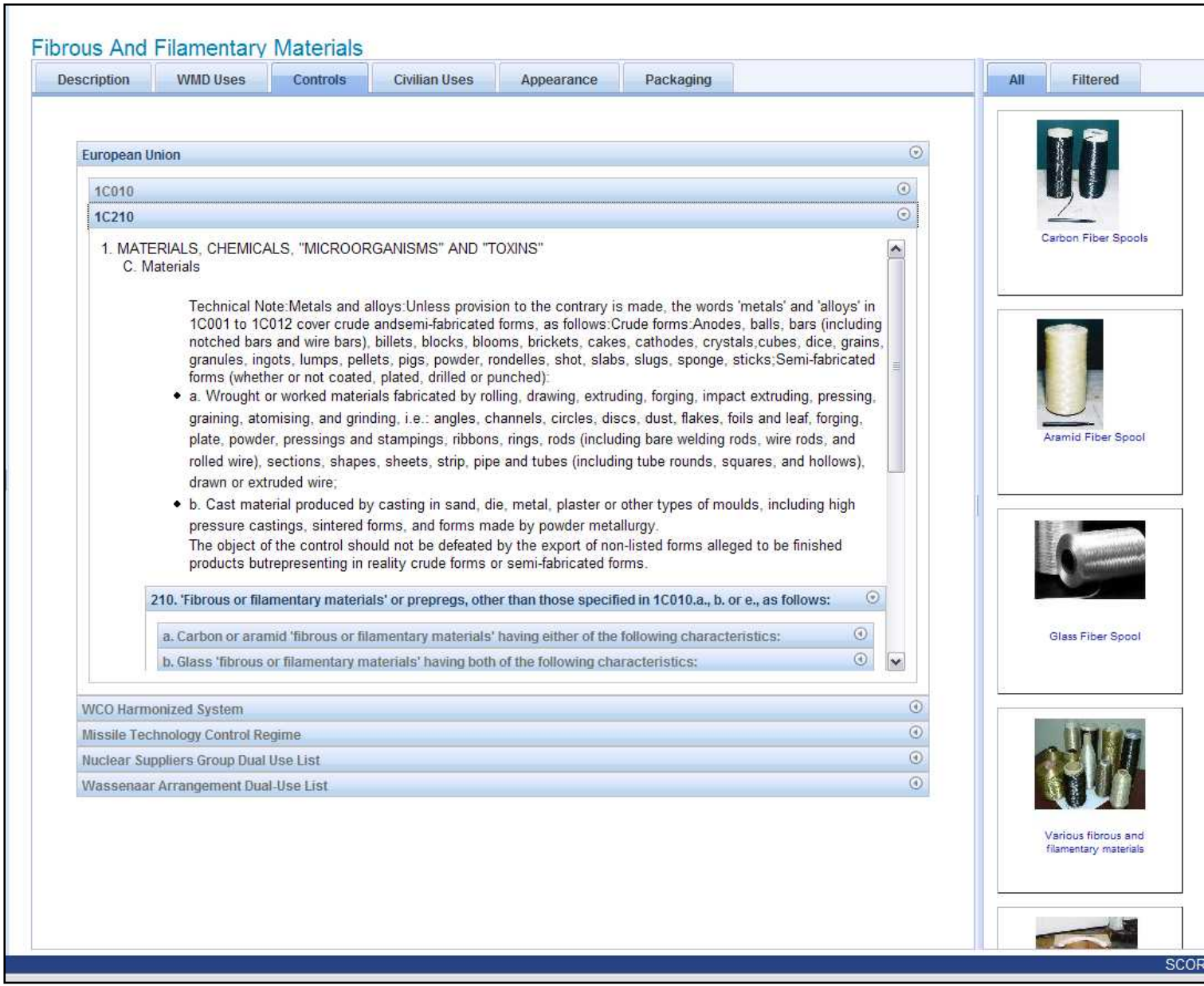
Missile

- Structural
  - Many structural components

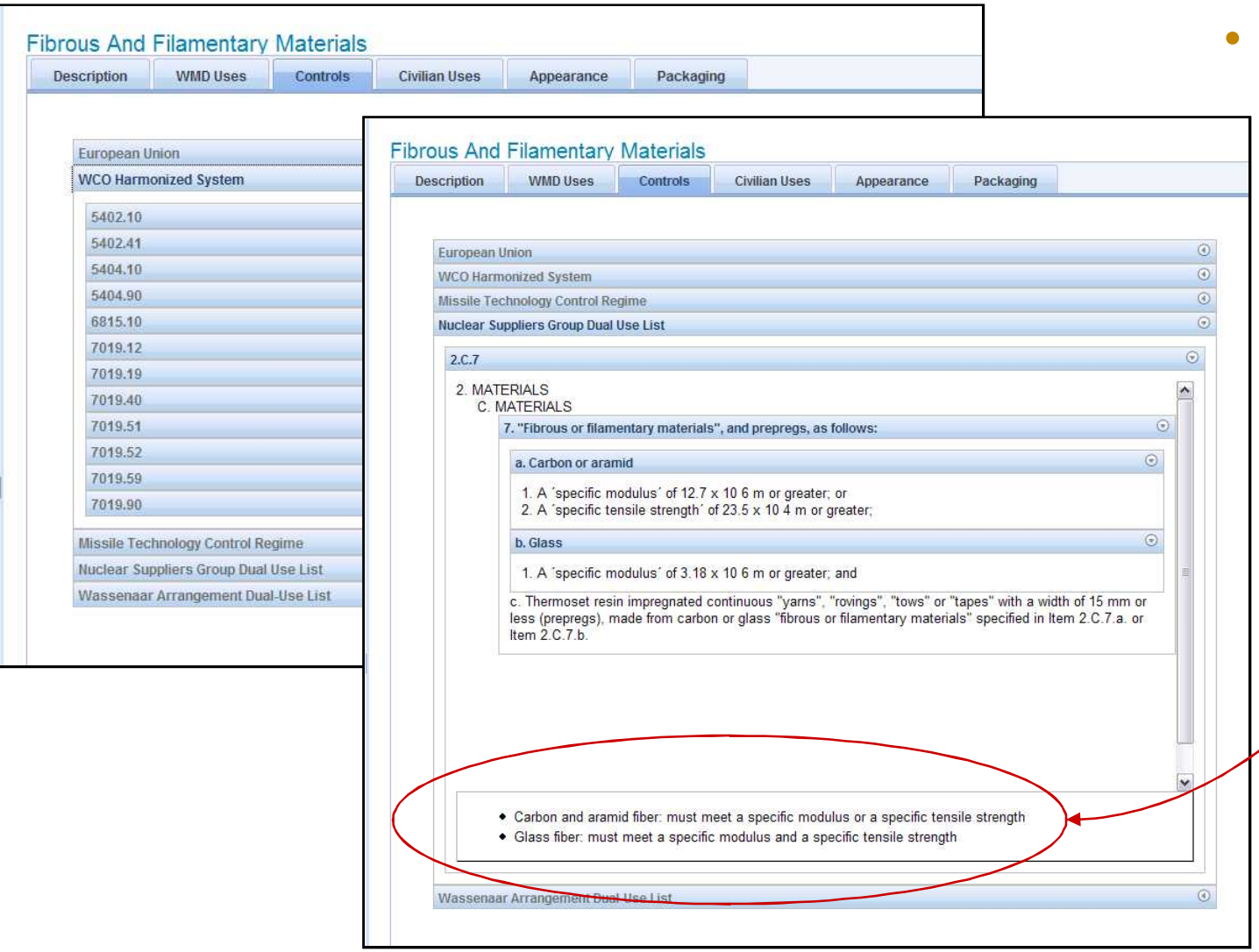


Example – Kevlar
Fibrous and Filamentary Materials

- Controls tab allows easy drill-down access to all relevant control language
- Control list parsing and hierarchical linking very sophisticated "behind-the scene"



Example – Kevlar
Fibrous and Filamentary Materials



- Actual control language and CIT tips and summaries are juxtaposed to guide understanding

Example – Kevlar
Fibrous and Filamentary Materials

Fibrous And Filamentary Materials

Description | WMD Uses | Controls | Civilian Uses | Appearance | Packaging

All | Filtered

- Typically are made up of several thousand individual continuous filaments in a single fiber.
  - The filaments are bundled together to form strands or rovings of parallel filaments and also yarns that are bundles of twisted fibers.
  - Also available in tape form where fibers may be interlaced or arranged in a parallel array and bonded together with a resin.
- The bundles of fibers may be impregnated with an adhesive resin that binds the filaments together or they may be unimpregnated so that the individual fibers can be separated from the bundle.
- Three types of interest
  - Carbon fiber
  - Aramid fiber
  - Glass fiber

- Carbon Fiber
  - black matte appearance and the texture of more common synthetic fibers such as nylon or polyester
  - Sometimes called "graphite fiber"

- Aramid Fibers
  - Yellow
  - Also known as Kevlar

- Glass Fiber
  - Shiny white satin appearance when viewed on the spool


Carbon Fiber Spools


Aramid Fiber Spool


Glass Fiber Spool


Various fibrous and filamentary materials


Aramid Fiber Spool

Example – Kevlar
Fibrous and Filamentary Materials

Fibrous And Filamentary Materials

Description | WMD Uses | Controls | Civilian Uses | Appearance | Packaging

All | Filtered

- Normally covered in shrink wrap, placed in cardboard boxes with spacers or end supports prevent movement of the spools within the box
- There is a major difference for packaging and handling of fibrous materials that have been impregnated with resin before shipping
  - prepreg must be refrigerated
  - normally packed in special containers with provisions for dry ice cooling or it is shipped in refrigerated cargo containers

Glass fiber spool in shipping box

Prepreg Refrigerated Shipping Box

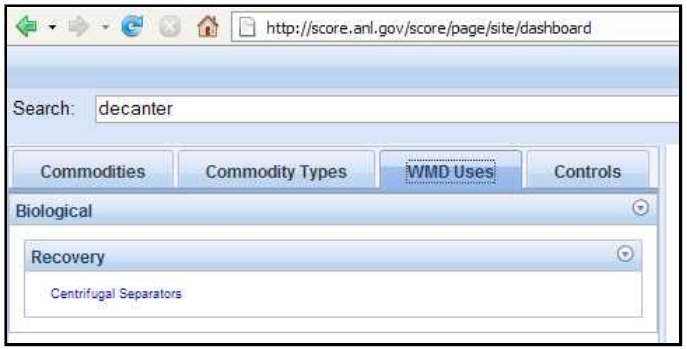
Prepreg Refrigerated Shipping Box

Carbon fiber on spools in shipping box

Glass fiber spool in shipping box

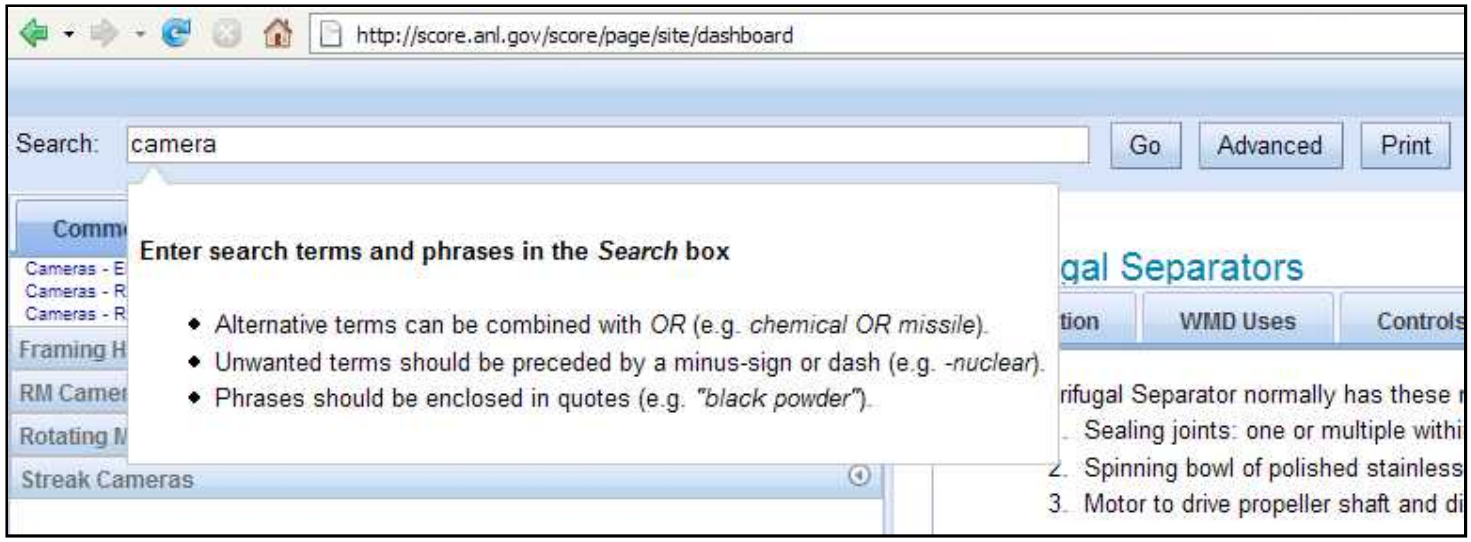
Searching (filtering) the database

- **The interface works the same with a search in effect – each tab limited to entries matching search term(s)**



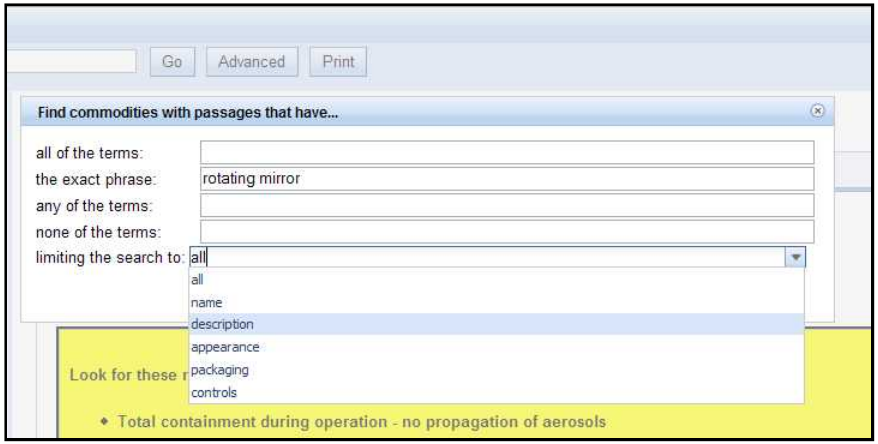
Searching the database

- **Search tips pop up when entering search terms**



- **Alternatively, an advanced search form can be used**

- **Can search against full text, including AKA's, HS codes, UN Hazard numbers, company names, etc.**



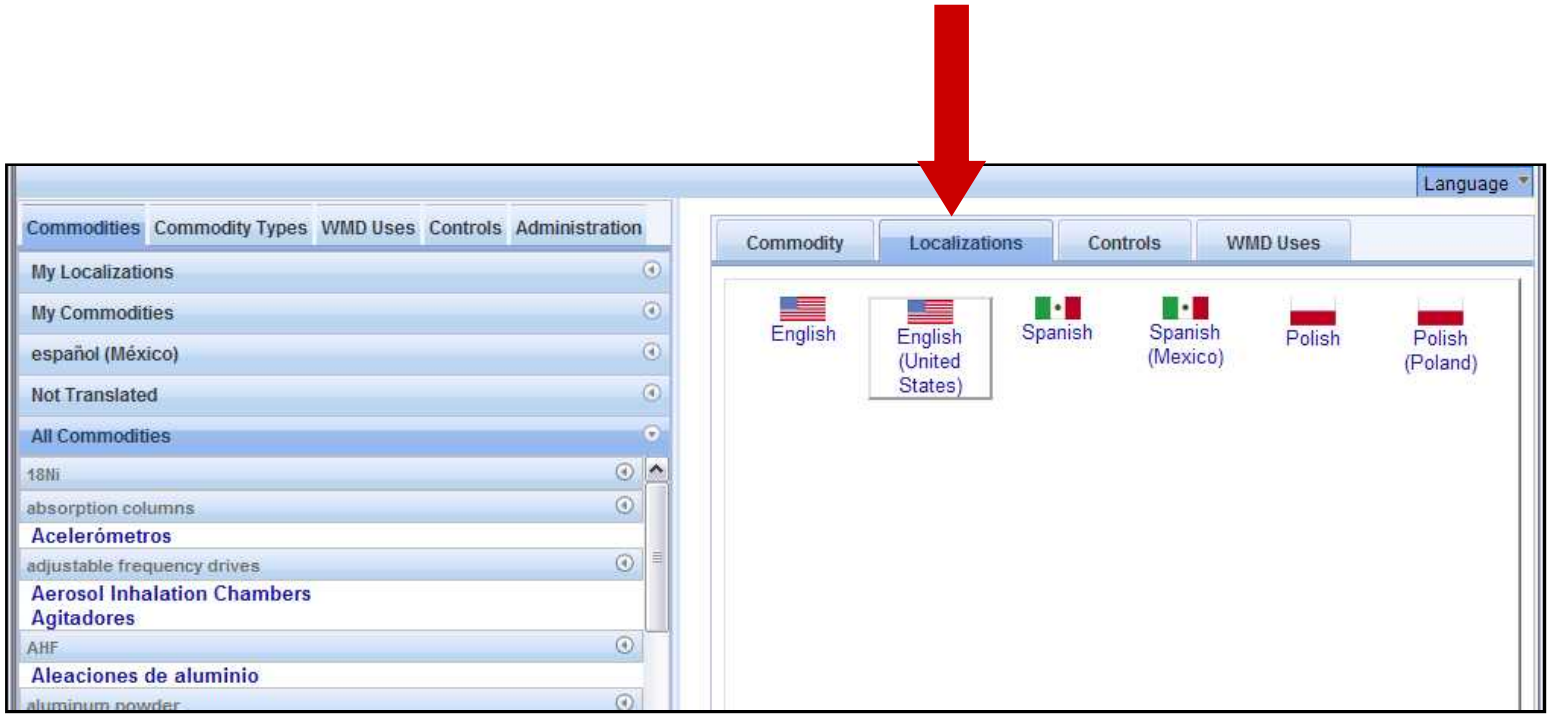
eCIT deployment

- **The system is designed to be easily customizable and adoptable by interested countries.**
  - Built with open source software development tools and server software
  - Multi-lingual support
  - Includes Content Manager application to facilitate the importation and maintenance of translated and national control lists and commodity data.

- **Deployment modes include**
  - **User**
    - *Partners can access our system online*
  - **Hosted**
    - *Partners can use our platform to host their own version, in their own language*
    - *Requires content management, but no software/database development or system administration*
  - **Installed**
    - *Partners can install the system on their own servers and modify/adapt as desired*

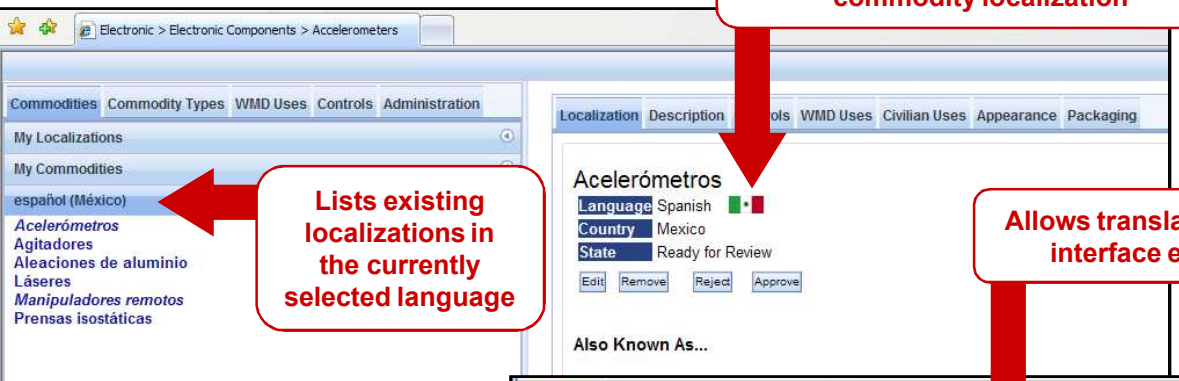
eCIT
Content Manager

- **Allows users with appropriate authority to**
  - Translate the user interface
  - Create localizations (separate, translated instances) of commodity data
  - Input and maintain translated multilateral control lists
  - Input local control lists



eCIT Content Manager

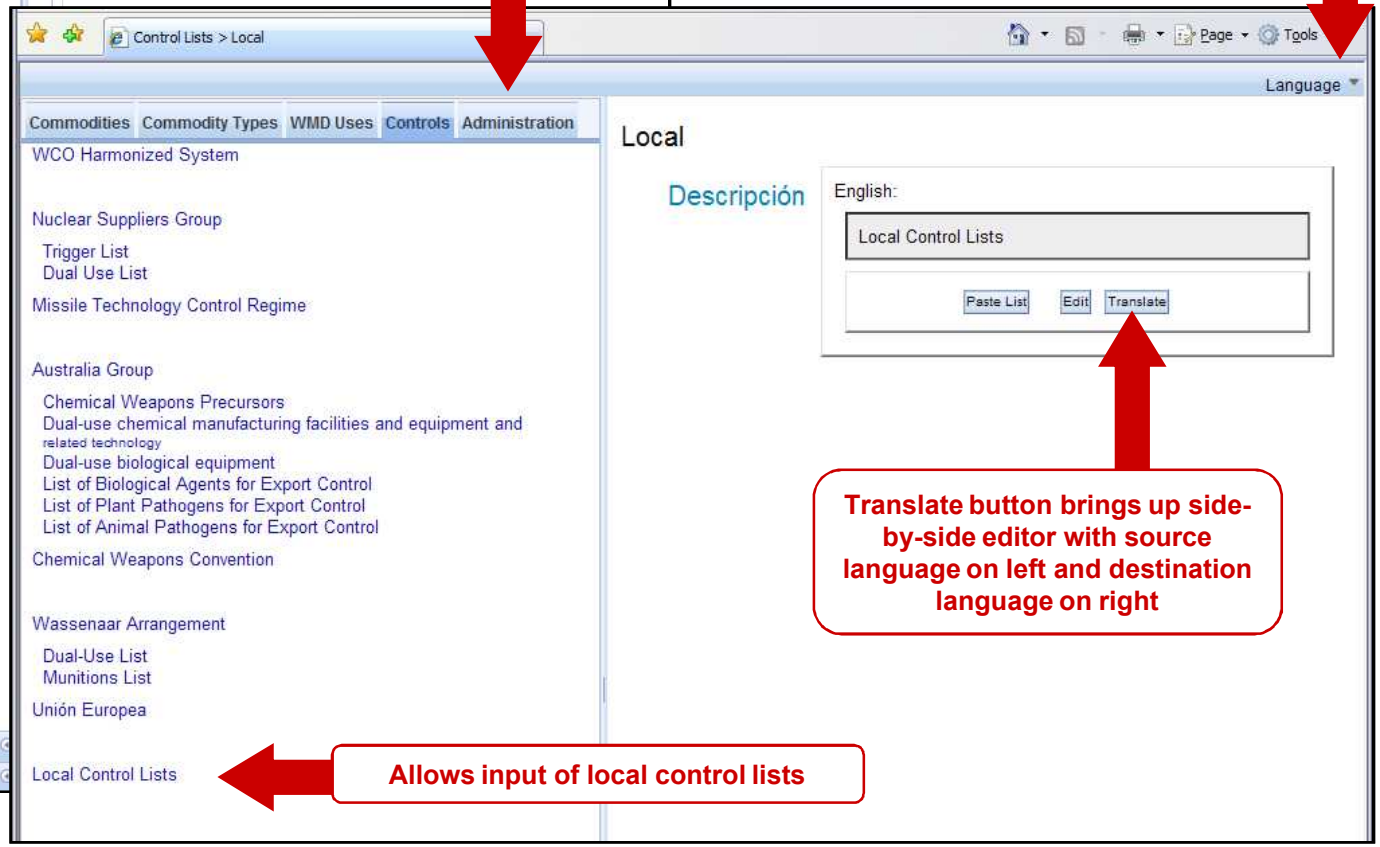
Allows for multi-step data quality assurance process for each commodity localization



Lists existing localizations in the currently selected language

Allows translation of user interface elements

Allows selection among all supported languages



Lists commodities in the database not yet translated to the current language

Translate button brings up side-by-side editor with source language on left and destination language on right

Allows input of local control lists