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Advanced Inspection Tools and Training to Prevent Illicit Shipments of WMD-Related Strategic Commodities

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WCO SAFE Framework of Standards and DOE/NNSA



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- **WCO SAFE Framework of Standards to Secure and Facilitate Global Trade's Customs-to-Customs Pillar calls for:**
 - Targeting and screening to determine high-risk shipments to be inspected (Standard 7)
 - Outbound security inspections of high-risk containers and cargo at the reasonable request of the importing country (Standard 11)
 - Use of non-intrusive inspection equipment during inspections of high-risk containers or cargo (Standard 3)
- **UN Security Council Resolution 1540**
 - Calls upon all States to take and enforce effective measures to prevent the proliferation of nuclear, chemical, or biological weapons and their means of delivery, including related materials, equipment, and technology covered by relevant multilateral treaties and arrangements

WCO SAFE Framework of Standards and DOE/NNSA



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NNSA
National Nuclear Security Administration

- **DOE/NNSA activities on the International Nonproliferation Export Control Program (INECP) support capacity building for targeting and inspections through innovative technologies and training:**
 - Training:
 - *Commodity Identification Training (CIT)*
 - *Electronic reference tools (eCIT)*
 - Advanced inspection tools:
 - *Static field references (hardcopy and electronic)*
 - *Mobile analysis and information delivery*
 - Mobile apps for real-time commodity analysis (eCIT, ChemID)
 - Portable metal analyzers (XRF) for real-time metal-based commodity analysis

Strategic Commodity Identification Challenges



TRAINING

Commodity Identification Training (CIT)

- **Raises** enforcement officials' awareness of global and regional proliferation issues including implementation of UNSCR 1540
- **Familiarizes** enforcement officers with strategic commodities – materials, components, and equipment sought by WMD procurement programs
- **Reduces the complexity** of the various export control lists by presenting commodities based on their physical appearance and category
- DOE/NNSA follows a disciplined train-the-trainer approach to ensure sustainability

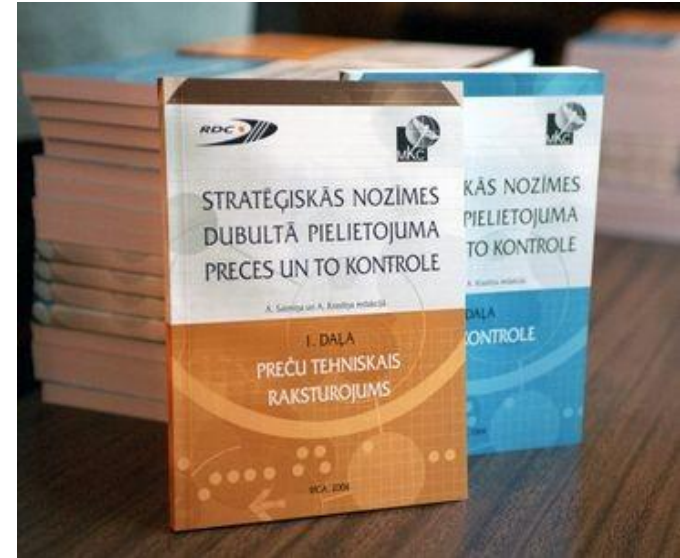


Awareness, targeting, front-line familiarity and technical reach-back are key in improving capacity to identify strategic commodities

TRAINING

Typical CIT Development and Implementation Process

1. Demonstrate CIT for enforcement, licensing, and technical organizations
2. Establish CIT Working Group
3. Develop CIT Implementation Plan
4. Conduct CIT Instructor Training and National Course Development Workshop
5. Prepare/customize training materials
6. Conduct pilot course(s)
7. Incorporate CIT into regular, national training regimen



A national CIT program provides a sustainable means to familiarize key trade control personnel with goods of proliferation concern in a way tailored to national interests and priorities



TRAINING

CIT: Variations in Implementation

- **Course content:**
 - Proliferation awareness
 - UNSCR 1540 implementation
 - Regional proliferation threats/issues
 - National export control laws, customs regulations and procedures
 - Focused on different types of strategic commodities: nuclear, biological, chemical and/or missile
- **Training objectives and student composition**
 - Target Customs administrations and enforcement agencies
 - Customs management at various levels
 - Inspectors: all or specialized units
- **Type and length of course:**
 - Academy or university courses directed at new cadets
 - Centralized, regional, or mobile short courses directed at personnel already in the field
- **Implementing agencies**
 - Technical
 - Export control enforcement
 - Licensing/regulatory

TRAINING

CIT Implementation Example

- **Partner organizations**
 - State Customs Service
 - Customs educational institutions
 - Nuclear regulatory organization
 - Research institutes and universities
- **Target audience**
 - Customs cadets
 - Existing Customs officers
 - Retraining of existing Customs officers
- **Type, length, and content of course**
 - Semester-long for Customs cadets
 - Introduction for new Customs officers
 - Three-day re-training course
- **Course instructors**
 - Technical experts from institutes and universities
 - Government officials
 - Customs Training Center instructors
- **Regional outreach**
 - Instructors teach CIT courses in other countries in the region



**Academy and Training Center Based
Semester/Week-Long Courses
Regional Outreach**

TRAINING

eCIT: Electronic knowledgebase of commodity information and controls

- **The Commodity Identification Training (CIT) information and approach has been integrated into an online Strategic Commodity Reference (eCIT)**
- **eCIT provides secure, online full-text search and browsing of the CIT information, all relevant export control lists and correlations between strategic commodities and tariff (HS) codes through a simple user interface**
- **eCIT content includes:**
 - Control Lists
 - *Nuclear Suppliers Group*
 - *Australia Group*
 - *Missile Technology Control Regime*
 - *Wassenaar Arrangement*
 - *EU Dual-Use List (EC 428/2009)*
 - Commodity information (derived from DOE/NNSA WMD CIT)
 - Harmonized System (HS) references for strategic commodities

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			
Chlorotrifluorid			
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
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- ◆ 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.

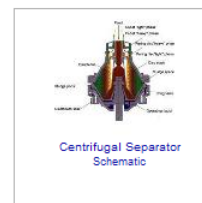
Must be capable of continuous operation with flow rates > 100 liters/hour



Also Known As...

- ◆ Decanter Centrifuge

All	Filtered
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TRAINING

eCIT: Deployment Options



- **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 DOE/NNSA 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*

INSPECTION TOOLS

- Differentiating strategic commodities within an enormous stream of international commerce is extremely difficult
- Fast and non-intrusive identification and sorting of commodities is critical to effective inspection of high-risk containers and cargo
- INECP advanced inspection tools assist enforcement officials with recognizing strategic commodities in the field



INSPECTION TOOLS

Hardcopy and Electronic Field References



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- **Commodity Field Guides**
 - Provide information on specific commodities printed from eCIT and formatted for use in the field
- **Metals Handbook**
 - Assists in recognizing commodities controlled in part or whole based on their material of construction
- **Chemicals Handbook**
 - Assists with determining whether or not a chemical is export controlled
- **All available in electronic (PDF) versions for use on tablets, PDAs, SmartPhones**



INSPECTION TOOLS

Mobile Analysis and Information Delivery



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- **Allow for real-time access to export control reference information and commodity analysis in the field**
 - Mobile apps
 - *eCIT*
 - Commodity information including control specifications, WMD and commercial use, appearance, packaging
 - *ChemID*
 - Cross-reference of chemical names and identifier numbers (CAS, UN, EC) to associated controls and WCO Harmonized System numbers
 - Portable metal analyzers (XRF)
 - *Non-intrusive and rapid (10 – 30 seconds) identification of elements and alloys cross-referenced with strategic commodity information*

INSPECTION TOOLS

Mobile Apps

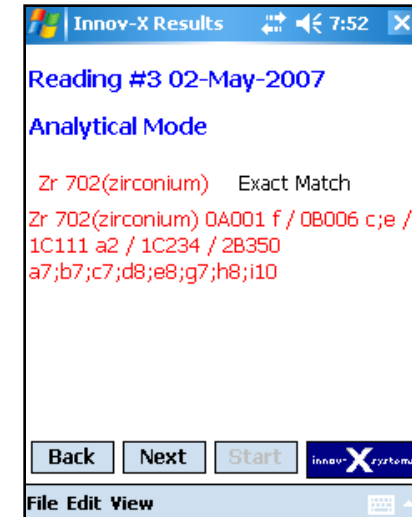
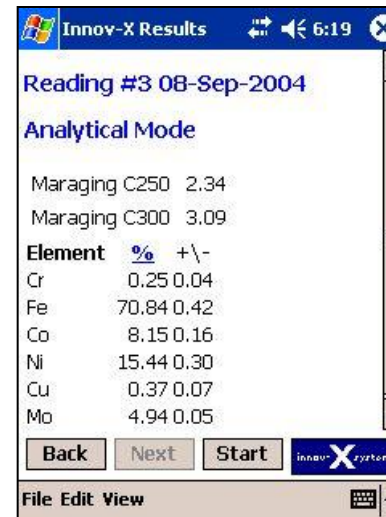
- Cross-platform commodity analysis and information delivery
- Planned ecosystem of applications targeting specific commodity types
 - ChemID



INSPECTION TOOLS

Portable Metal Analyzers

- Commercially available, portable metal analyzers based on x-ray fluorescence spectroscopy (XRF)
- Modified by DOE/NNSA to support inspections of high-risk containers and cargo and other Customs applications:
 - Added capability to identify materials important for strategic commodities and provide relevant reference information
 - Expanded alloy library for
 - *Manifest verification*
 - *Identification of mis-manifested shipments*
 - *Inspection of counterfeit goods*
 - Added analysis mode for
 - *Detection of heavy metal contamination in fish, agricultural produce, plastics and paints*
 - Enabled precious metal identification capability



INSPECTION TOOLS

Portable Metal Analyzer Deployments

- **DOE/NNSA developed a training program for Customs officials in using portable metal analyzers in Customs environment including screening, identification and interdiction of strategic commodities and materials**
- **As part of each deployment, DOE/NNSA works with partner countries to establish a sustainable program for continued use of these tools**
- **Portable metal analyzer deployment options range from full deployments with instrument purchase, modification and training by DOE/NNSA to providing training on Customs use for inspection of high-risk shipments only**



Deployed 59 units in 18 countries to date, and conducted user conference

Points of Contact

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Advanced Interdiction TOOLS AND TRAINING

Foundation

- Training (CIT and CBRNE)
- Research Tools (eCIT)

Hardcopy Field Tools

- Field Guides
- Handbooks (Metals and Chemical)

Electronic Library

- PDFs of hardcopy tools and references

Mobile Device Analysis and Delivery

- Planned ecosystem of mobile apps for access to eCIT based information
 - ChemID
- Export Control information on Portable Metal Analyzers