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***Technology Advances in MC&A and  
Nonproliferation.  
The U.S. Support Program to IAEA Safeguards***

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*Presented at the Nuclear Materials Management Safeguards System  
New Orleans, LA  
May 9-12, 2016*

May 2016

**Nonproliferation and National Security Department**

**Brookhaven National Laboratory**

**U.S. Department of Energy**

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Accountability  
Performance  
Accuracy

The Nuclear Materials Management Safeguards System

**NMMSS**

**2016**

Annual Users Training Meeting

May 9-12, 2016 | New Orleans, LA

Technology Advances in MC&A and Nonproliferation  
The U.S. Support Program to IAEA Safeguards

Susan Pepper  
*Brookhaven National Laboratory*



# International Atomic Energy Agency

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- Established in 1947
- Located in Vienna, Austria
- Affiliated with the United Nations
- Promotes the peaceful uses of nuclear energy and prevents the spread of nuclear weapons





**NMMSS**

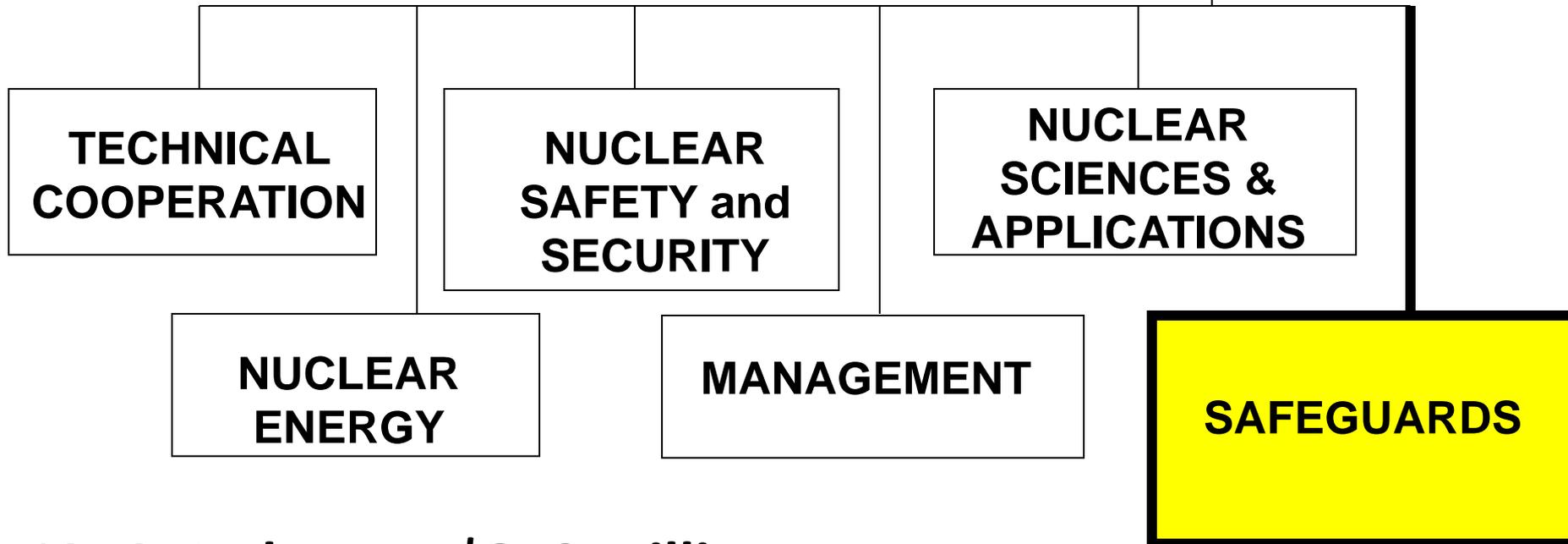
**2016**

# IAEA Organization

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**Director General  
Yukiya Amano**



**IAEA Budget = ~\$350 million**

**Safeguards Budget = ~\$130 million**



# U.S. Support Program to IAEA Safeguards

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**Purpose:** Provide a mechanism to transfer technology available in the United States and augment the IAEA's regular budget for Safeguards activities with U.S.-sponsored expertise, technology, equipment, and techniques

- Established: 1977
- Sponsor: U.S. Department of State
- FY 2016 Funding: \$12 million (over \$345M lifetime)
- Active Tasks: ~80 (over 1200 lifetime)

## One of 21 Member State Support Programs

## International Safeguards Project Office

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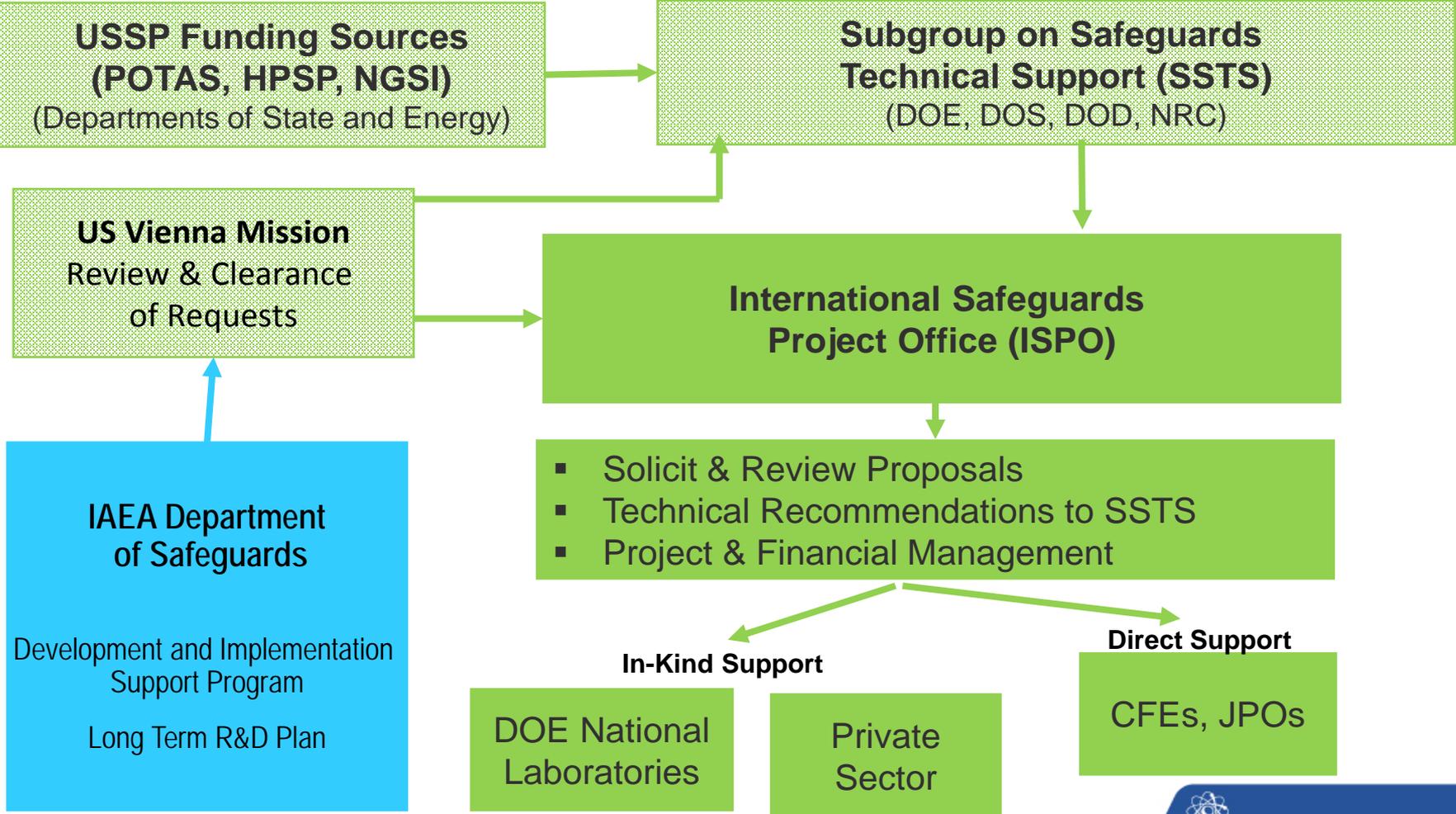
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- Operated at Brookhaven National Laboratory since 1977
- Manages the USSP for the U.S. government
  - Technical oversight/project management
  - Financial tracking
  - Recruitment of U.S. citizens for positions with the IAEA
- Offices at BNL and in Vienna, Austria

# USSP to IAEA SG Department

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# USSP Funded Work

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## Technical Expertise

- CFEs (11)
- JPOs (8)
- Consultants



## Training



## Concepts and Approaches



## Equipment Development & COTS

## Materials Control & Accountability



## Information Management

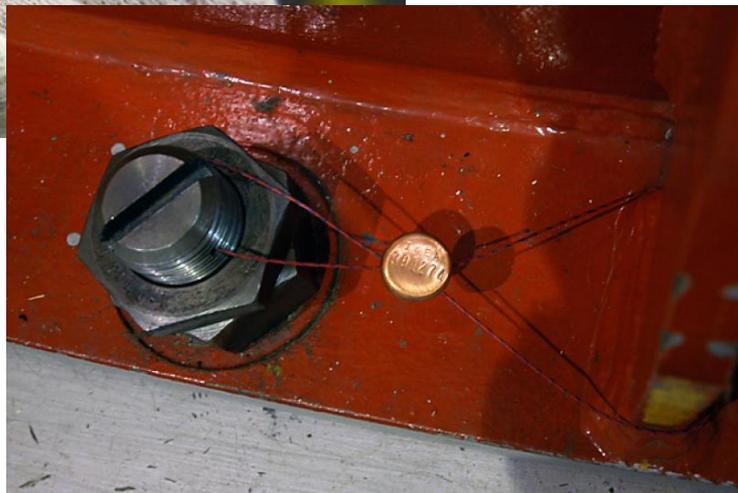
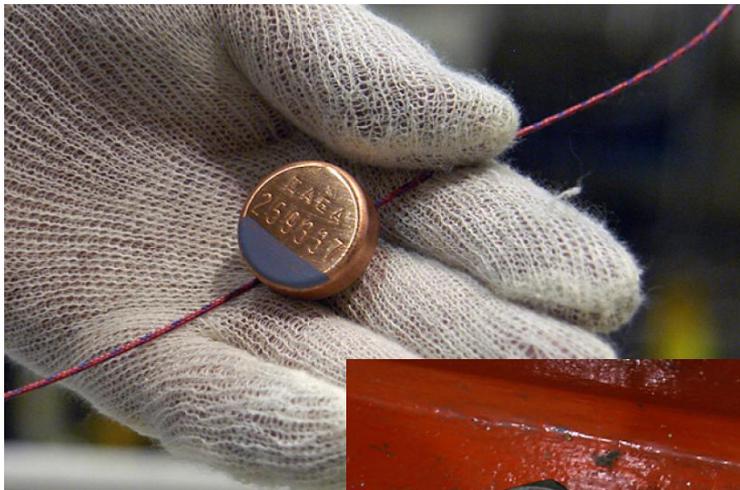


# Tamper Indicating Devices

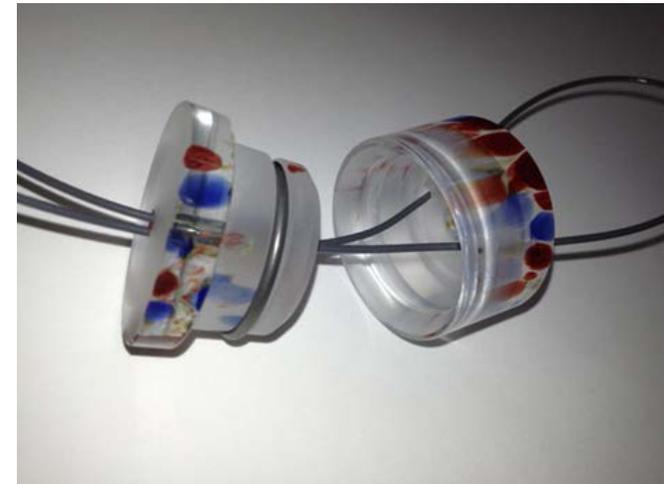
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## Metal Seal



## Glass Seal



# Tamper Indicating Devices

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VACOSS Seal



Ultra Sonic Sealing Bolt

Tamper Indicating Cover



Remote Monitored Sealing Array



# Nondestructive Assay

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## On-line Enrichment Monitor



## Nanoraider



## Unattended Cylinder Verification System

Will provide unattended verification of all cylinders moving through an enrichment plant

# USSP Contractors

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USSP has funded more than 80 U.S. contractors



# IAEA Staffing Needs

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## Education Requirements

- Physics
- Nuclear Engineering
- Chemistry/Chemical Engineering
- Electrical Engineering
- Industrial Engineering
- Computer Science
- Political Science
- Geospatial Information Systems

## IAEA Positions

- Inspectors
- Material accountancy
- Software development
- Satellite imagery analysis
- Training
- Safeguards approaches
- Quality management
- Equipment development, testing, integration, and maintenance
- Open source information analysts





# Benefits of Employment

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- Salaries & benefits of UN Common System  
(Education grant, rental subsidy, dependency allowances)
- Relocation expenses
- Family support services  
(Housing, schooling, child-care center)
- 6 weeks annual leave & home leave
- Compensatory time off
- Medical insurance and pension plan
- Training and staff development
- Flexible working hours





NSA



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# Job Categories

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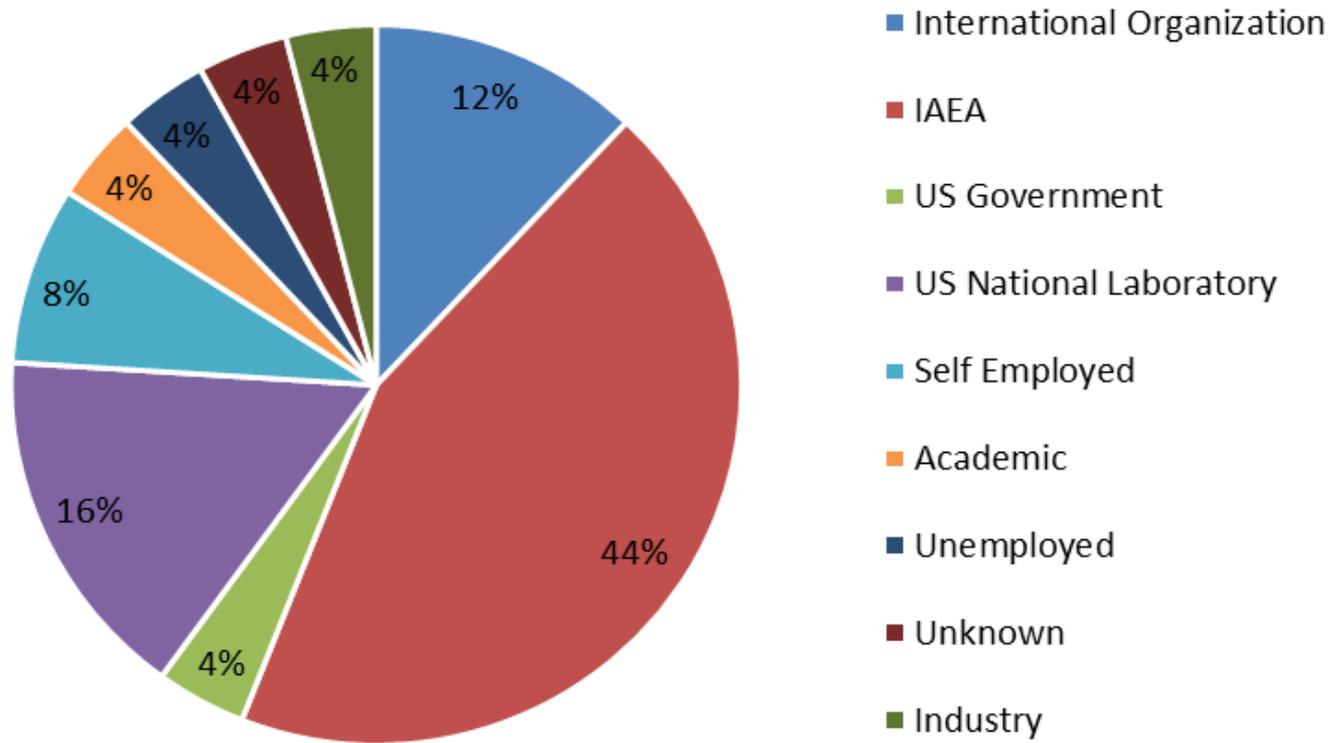
- **Junior Professional Officers - Extrabudgetary**
  - Early career
  - 0-2 years' experience
  - College degree
  - Less than 32 years of age
- **Cost Free Experts - Extrabudgetary**
  - Mid- to late-career
- **Regular Staff – Regular Budget**
  - Mid- to late-career



# Success of JPO Program

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# Summary

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- The USSP assists the IAEA Department of Safeguards by providing access to technology and services available in the United States
  - Equipment Development
  - Training
  - Safeguards Concepts
  - Information Management
  - Technical Expertise
- The International Safeguards Project Office at BNL can assist the public and private sectors and individuals interested in USSP opportunities





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Thank You!!

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[www.bnl.gov/ispo](http://www.bnl.gov/ispo)

Or see me later.

