SAFEGUARDS TECHNOLOGY FOR DISARMAMENT VERIFICATION

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FACILITIES FOR VERIFICATION

- Operating facilities for civilian use;
- Operating facilities for military purposes;
- Shut-down and closed-down facilities;
- Future facilities.

VERIFICATION CHALLENGES

- Facilities not designed for nuclear material accountancy nor international safeguards;
- Operator equipment and systems may be old and in need of updating;
- Safeguards relevant measurement systems may have large uncertainties;
- Access may be restricted due to commercial sensitivity, security concerns ,or radiological hazards;
- Travel logistics to enter and/or travel within the State may be complicated and/or restricted; and
- COST !!!!!

VERIFICATION APPROACH ISSUES

- Evaluate relevance of Significant Quantity (8 Kg Pu, 25 Kg HEU) and Timeliness (1 month) goals;
- Focus on material balance of Pu and HEU and less on D,N,LEU;
- Focus on indicators of operational status;
- Replace continuous or interim inspections with SNRI* for:
  - Verification of Inventory Changes,
  - Interim Inventory Verification for timeliness;
- Install [remote] C/S and unattended measurement and monitoring system;
- Evaluate waste against declared design and operational values; and
- Design Information Verification activities.
- [Introduction of a State Level Approach]

*** Short Notice Random Inspections**

SNRI IMPLEMENTATION

- Would require operators to provide:
  - Advanced declarations of operational schedules, and
  - Continuous and timely declarations of material flows and inventories;
- Unattended measurement and monitoring systems;
- Multi-entry visas; and
- Stream-lined security and safety procedures for country and facility entry.

POSSIBLE INSPECTION EFFORT FOR REPROCESSING FACILITIES

Activity/facility	Inspections/ year	Duration (days)	Number of inspectors per action	Total person days/yr
Short notice random inspection	8	5	3	120 PD
Physical inventory inspection	1	10	5	50 PD
Other activities				30 PD
TOTAL				**200 PD**
RRP	**Continuous**	**250 days oper.** **shut-down**	**4 insp./3 shifts** **1-2 insp./day**	**1200 PD**

RESOURCE REQUIREMENTS

- Retrofitting on-line or in-line measurement and monitoring systems;
- R&D for more robust and reliable unattended measurement and monitoring systems;
- Development of NMA and SG data management systems;
- Human resources for both implementation and routine inspections;
- Introduction of IAEA nuclear material accountancy system; and
- Travel costs.

OTHER FACILITIES

- **EC FACILTIES - Expanded cooperation with Euratom**
  - Authentication of measurement equipment and procedures,
  - Use of joint-use equipment and procedures, and
  - Verify and/or evaluate operator and Euratom measurement systems;
- **OPERATING MILITARY FACILITIES**
  - SG Approach designed on a case-by-case basis,
  - Sensitivity of design and enrichment of military fuel, and
  - Some 'masking' of process may be required;
- **SHUT-DOWN/CLOSED-DOWN FACILITIES**
  - Confirm facility status with low random inspections/visits,
  - Satellite or areal imaging, and
  - C/S or process monitoring, including reagents and off-gases;
- **FUTURE FACILITIES**
  - Design plants for 'safeguardability', and
  - Use of similar SG Approach as in non-NWS facilities.

VERIFICATION OVERVIEW

- Some reduced confidence in meeting current SG Criteria for existing plants, with focus on operational parameters;
- Introduce random, short-notice inspection activities to provide more unpredictability and reduce costs;
- Install unattended measurement and monitoring systems;
- Make use of remote monitoring and C/S, where possible;
- Require near real time reporting by operators;
- Make use of regional inspection/monitoring capabilities;
- Monitor shut-down and closed-down plants; and
- Design 'safeguardability' into future plants to meet SG Criteria.