

## Consequences of Illicit Trafficking of Nuclear or Other Radioactive Materials



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## Illicit Trafficking and Nuclear Terrorism

- Illicit Trafficking is Essential to Nuclear Terrorism
- Loss of Control of *Nuclear Material* or Other Radioactive Material is Essential for Illicit Trafficking to Occur
- Regulations and Legislation are Implemented to Prevent Illicit Trafficking and to Punish Those Involved
- Nuclear Security Plans and Measures Prevent Loss of Control



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## Illicit Trafficking Involves

- Nuclear Material
  - Improvised Nuclear Device (IND)
- Other radioactive material(s)
  - Simple Exposure Device
  - Radioactive Dispersal Device (RDD)
    - Highly radioactive isotopes
    - Nuclear Material for psychological effect
- Stolen Nuclear Weapon(s)



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## Interruption of Illicit Trafficking

- Detection of Illicit Trafficking by Measuring Radiation Requires Instruments
- *Nuclear Material* may be difficult to detect even with proper Instruments
- Normal Police, Intelligence, and Border Control Functions Can Also Detect Illicit Trafficking
- Laws to Allow Search and Seizure and Arrest for Materials and Scam Activities May Need Review



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### Potential Consequences of Illicit Trafficking

- Explosion of a Nuclear Yield Device is probably worst consequence
- Nuclear Yield Device might be a stolen Nuclear Weapon, or an Improvised Nuclear Device (IND)
- IND requires *Nuclear Material, Design, and Construction Ability*
- RDD or use of Radioactive Materials will probably not result in large numbers of casualties

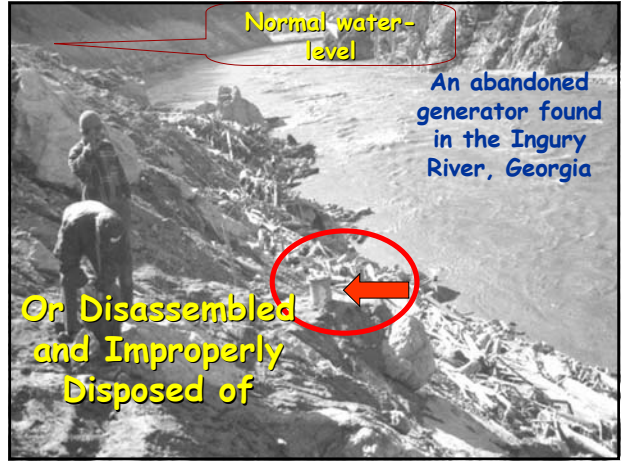
### Potential Consequences of Illicit Trafficking

However:

- Economic Losses can be Enormous
- Non-Technical Effects of Nuclear Trafficking (e.g. Public Panic, Work Disruption, etc.) and Political and Psychological Consequences can far Exceed Technical Consequences

**Illicit Trafficking Involves  
Radioactive Material That is Out of  
Control**





## Exposure to Radioactive Material Can Lead to Short Term and Long Term Effects



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### Thailand (2000)



Unauthorized removal of a  $^{60}\text{Co}$  source - dismantled for scrap

10 people highly exposed - 3 of whom died



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## Georgia (2002)

- Overexposure of 3 persons from orphan Sr-90 sources
- Complex recovery operation



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## Other consequences

- Psychological
- Environmental
- Economic
- Social
- Political

### Result of poor response

- Slow assessment
- Poor communications with people

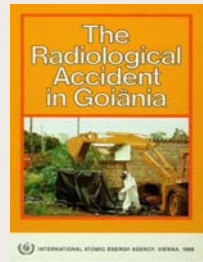


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# A real case

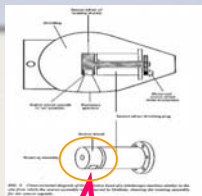
## The Goiânia Accident

- Benchmark for consequences caused by a breach in security
  - Unsecured  $^{137}\text{Cs}$  source in an abandoned radiological clinic
  - Scrap scavengers steal and sold it to junkyard



## The facts

Abandoned



## Source data

- $^{137}\text{Cs}$  (1350 Ci)
  - Physical form = powder
  - Chemical form = CsCl (salt)
    - 93 g of Cs Cl
    - ~ 15 g of  $^{137}\text{Cs}$
- Shows that even small sources (in size) can cause severe consequences



## Social disruption

7 main contaminated areas were identified and isolated



## Social disruption (continue)

- 159 houses monitored, 101 houses contaminated
- 200 persons evacuated from 41 of them
- 42 decontaminated, 6 demolished & 53 recuperated
- 58 different public places were decontaminated including streets, shops, bars and 64 vehicles



## Impact to local population

- Persons monitored = 112.800
- Persons contaminated = 271
  - Clothes and shoes = 120
  - Skin & internally = 151
- Radiation injuries = 28
- Hospitalized = 20
  - Bone marrow depression = 14
  - Acute radiation syndrome = 8
  - Fatalities within 1 month = 4



Goiânia Was A Tragic Accident, but Who Might Do This Intentionally?

### Groups That Threaten and may be Involved in Illicit Trafficking


- Lone individuals
- Criminal Groups
- Identified local or non-aligned terrorist groups
- Internationally sponsored groups
- Domsday cults
- Insurgents

## Summary

- Illicit Trafficking in *Nuclear Materials* and Radioactive Materials Poses a Real and Growing Threat to All Nations
- Consequences can be Extremely Severe to the Public and to a Nation's Economy


- IAEA Believes that Sharing of Information About Illicit Trafficking can Help to Develop Measures to Lessen the Risks
- Increased National and Local Capabilities to Detect and Deter Illicit Trafficking are Extremely Important
- IAEA Offers Assistance to Member States in these areas

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