

**U.S.NRC**

UNITED STATES NUCLEAR REGULATORY COMMISSION

*Protecting People and the Environment*

# **UPDATING THE IAEA INTERNATIONAL NUCLEAR EVENT SCALE**

**Cynthia G. Jones, Ph.D.**

**Office of Nuclear Security and Incident Response**

**52<sup>nd</sup> Annual Meeting of the Health Physics Society  
July 9, 2007**

# Overview

- History
- Main features of the INES Scale
- Basic Structure
- Event rating examples
- U.S. experience (2002-2006)
- Conclusions

# INES History

- Created by several countries with nuclear power programs in cooperation with the International Atomic Energy Agency and OECD/NEA (Nuclear Energy Agency)
- Launched in 1990 for pilot use at Nuclear Power Plants

**WHY?**

*“To help communicate the safety significance of nuclear and radiological events to the public”*

# INES Main Features

- **Prompt** communication to the public
- **Consistency** in terms of safety significance
- Operating successfully in **more than 60** countries
- Can be applied to **any event** associated with radioactive material
- Events are classified on a **scale from 1 to 7**

# INES Classification

Levels 4 to 7 - “Accidents”



Levels 1 to 3 - “Incidents”



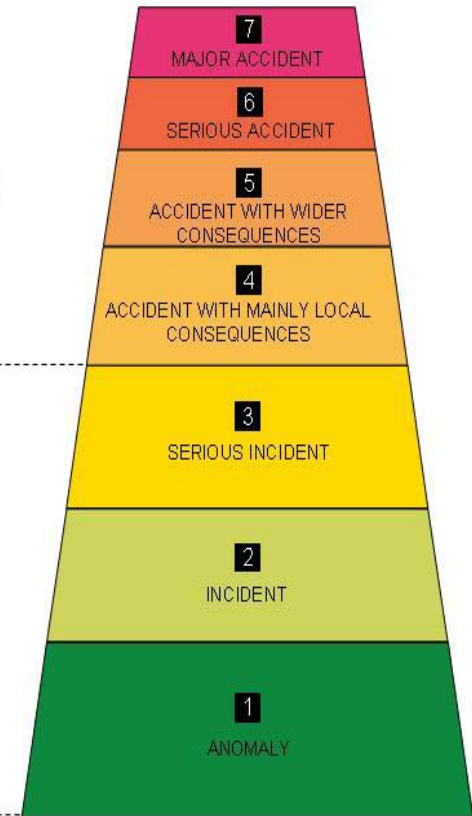
Level 0 – “Deviations”



ACCIDENT

INCIDENT

DEVIATION



0  
BELOW SCALE  
NO SAFETY SIGNIFICANCE

Events with no radiological or nuclear safety significance

# Using INES

## What INES does...

- Contributes to **common understanding** of incidents and accidents
- Events of public interest are disseminated **transparently**
- Brings **uniform** terminology
- Increases **credibility** and **reassurance**

# Using INES

## What INES *does not do*...

- Does not replace the existing national criteria for the reporting of events
- Cannot be used to compare safety or regulatory programs between countries

# INES Criteria

3 different areas considered in evaluating the event:

1. *People and the environment*

- in terms of dose received or activity released

2. *Confinement or control of radiation at facilities*

- as an indicator of the severity of the event inside the facility and the potential harm to the public

3. *“Defence in Depth”*

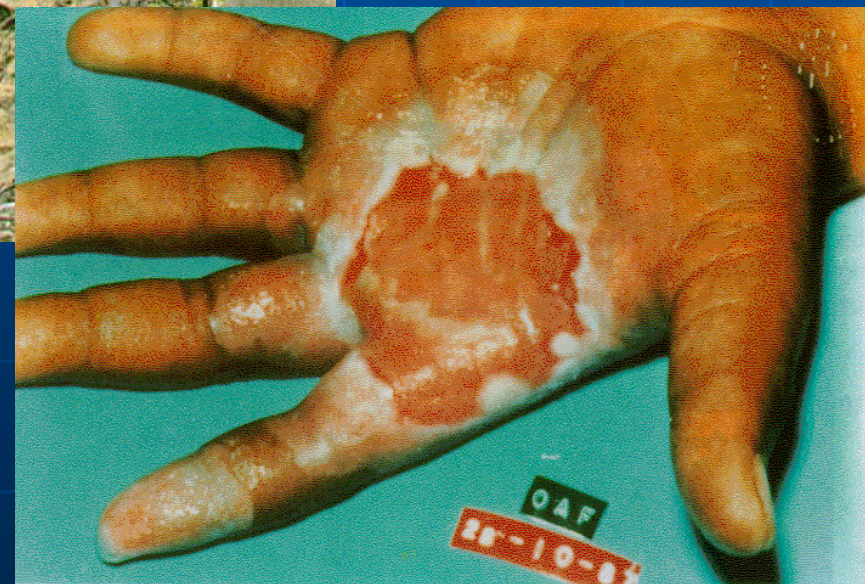
- looking at failures in safety provisions to determine how close the event was to causing actual consequences



# INES Example of Previous Events



Goiânia



# INES Example of Previous Events

Chernobyl



# INES Examples of Previous Events

---

Event	Rating
Chernobyl (1986)	7
Kyshtym (1957)	6
Windscale (1957)	5
Goiânia (1987)	5
Three mile island (1979)	5
Tokaimura (1999)	4
Vandellos (1989)	3
Industrial radiographer worker overexposure	2

---

# U.S. Experience - INES

- NRC responsible for licensing, inspection & oversight of:
  - Nuclear Power Plants
  - Gaseous Diffusion Plants
  - Fuel Cycle Facilities
  - ~4500 Materials licensees
  - Began limited participation in INES in 1993
  - In 2001, NRC increased INES participation to reporting of all Level 2 events and above
  - In 2003, began reporting radiation source & transport events
- 34 Agreement States
  - ~17,500 Materials licensees
  - Began participating in INES in 2002



# U.S. Experience – INES 2006

153 Users in U.S. representing:

- Federal agencies
- State Agencies
- Licensees
- Public
- Media

<http://www-news.iaea.org/news/>

# U.S. Experience – INES 2002-2006

## Summary of U.S. Events

<b>Year</b>	<b>Reactor/ Fuel Cycle Events</b>	<b>Materials Events</b>	<b>TOTAL</b>
<b>2002</b>	2	4	6
<b>2003</b>	0	4	4
<b>2004</b>	0	6	6
<b>2005</b>	2	9	11
<b>2006</b>	2	8	10

# U.S. Experience – INES 2002-2006

## Summary of Materials Events

<b>Year</b>	<b>Radiography</b>	<b>Radiation Sources*</b>	<b>Irradiators</b>
2002	2	2	0
2003	2	2	0
2004	2	3	1
2005	8	1	0
2006	6	2	0

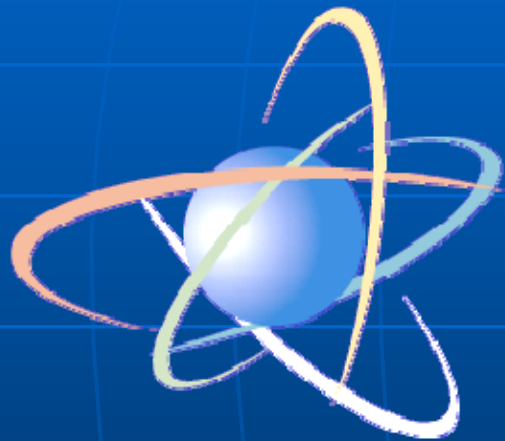
\*Includes Gauges, medical, & R&D licensees

# Conclusions





Thank you!



**U.S. NRC**

UNITED STATES NUCLEAR REGULATORY COMMISSION

*Protecting People and the Environment*

Come visit us at [www.nrc.gov](http://www.nrc.gov)