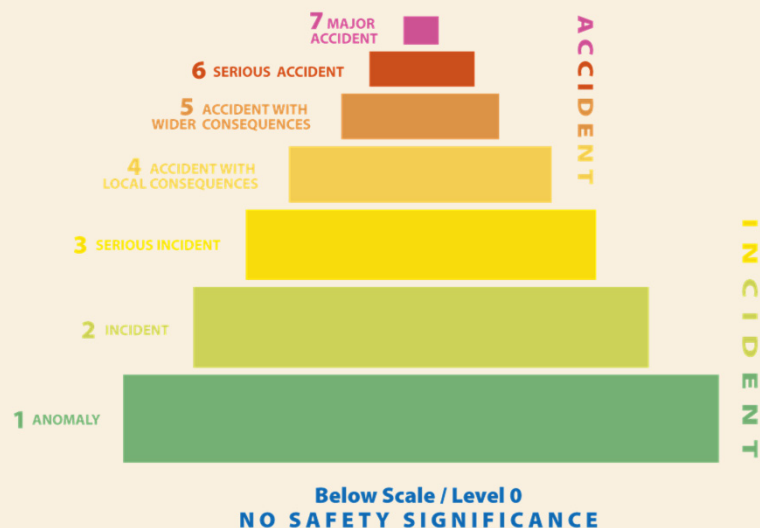


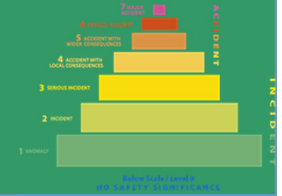
INES

The International Nuclear and Radiological Event Scale

Introduction to INES

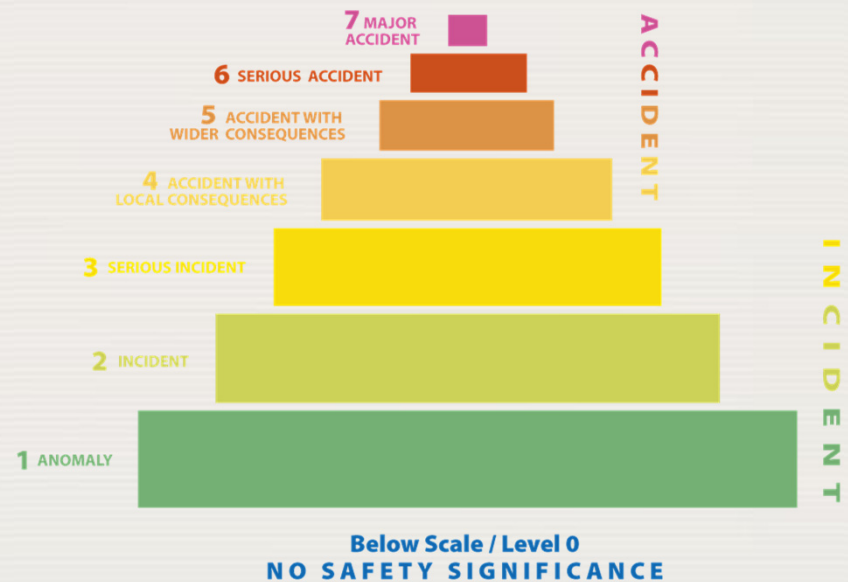


Objectives

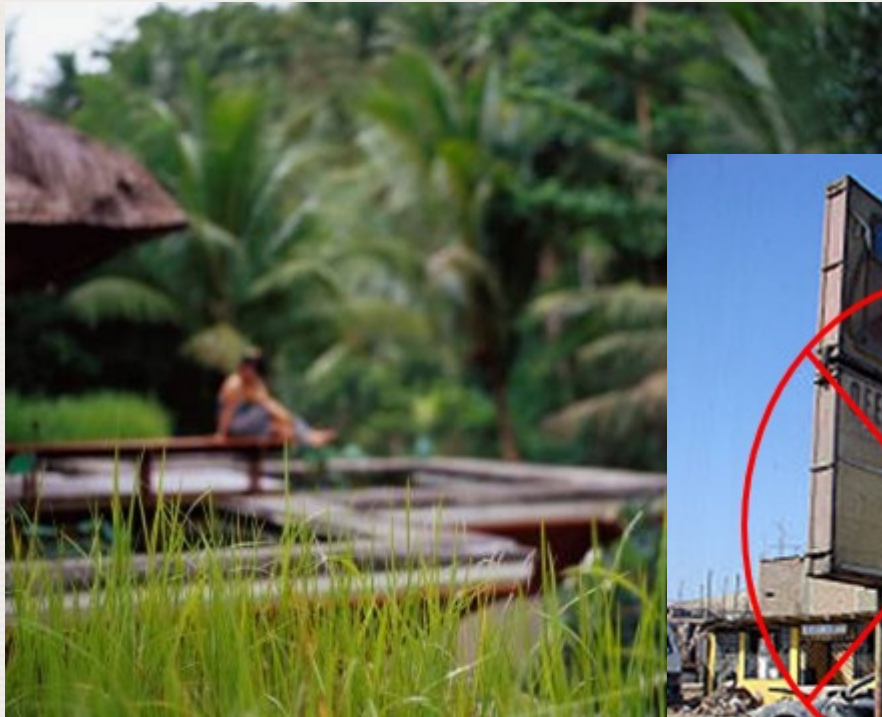
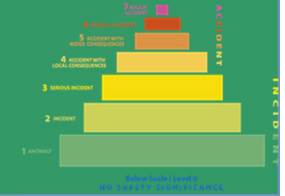


- Explain why to use INES
- Present what is INES
 - History, developments, scope, purpose, main features, terminology
- Present the key criteria for rating events
 - “People and Environment”
 - “Radiological Barriers and Controls”
 - “Defence in depth”

WHY TO USE INES?

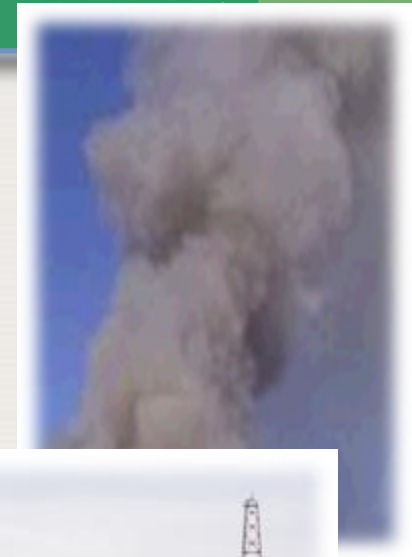


Consider a scenario - 1



Earthquake at 2.2. in the scale Richter!

Consider a scenario: 2

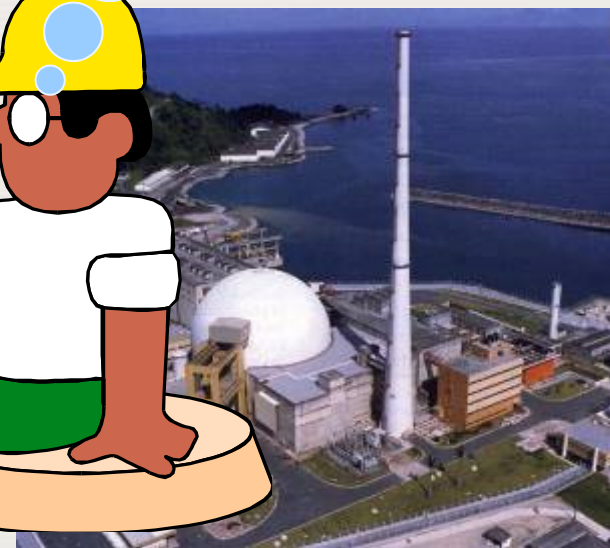


Fire at nuclear power plant !

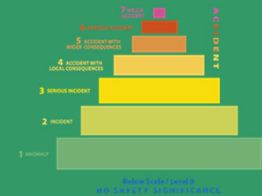
**‘What has happened?’
‘Am I and my family safe?’
‘What is the safe level?’**



**Fire at transformer
Fire extinguished
NPP decreased power
No safety systems
affected**



Communication is good for you



**“Timely and accurate responses
to media and public concerns
avoid confusion and rumour”**

**“Proactive
communication**



builds trust”

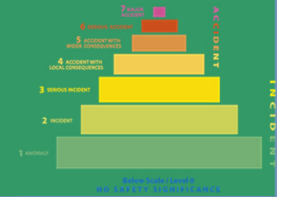
Scales are inherent forms of measurement used in daily life



Richter scale for earthquakes

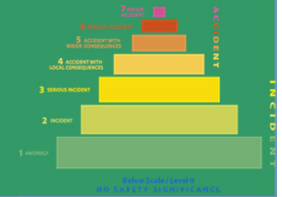
Beaufort wind scale

Celsius or Fahrenheit scales for temperature



Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Why a Scale?



- **Aftermath of Chernobyl**
 - Growth in public concern about nuclear events
 - Same information was not the same from one country to another
- **Initiatives in several countries**
 - Better informing the public about nuclear events
 - Development of severity scales to communicate to the public, in particular in France and Japan (1988)
- **Cooperation between IAEA and OECD/NEA to develop a scale**

What is INES?

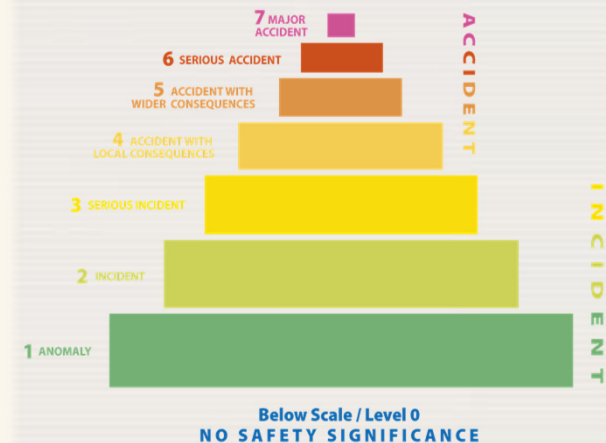
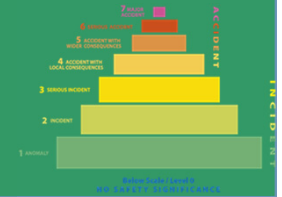
The international event rating scale aiming to communicate the safety significance of nuclear and radiological events to the public, the media and the technical community

Jointly developed by the IAEA and OECD/NEA in 1990

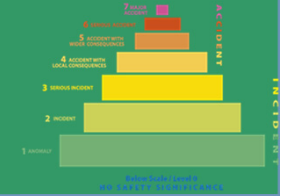
Used at national and international level by more than 70 Member States



Criteria for rating any event associated with the transport, storage and use of radioactive material

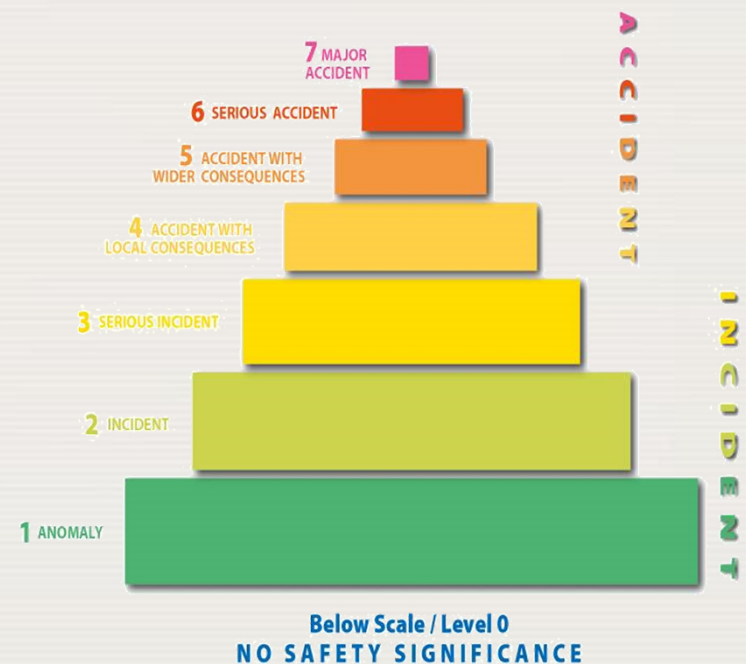


The INES Scale



One tool to help communicate the
right message at the right time

*the safety significance
of events*



INES Developments

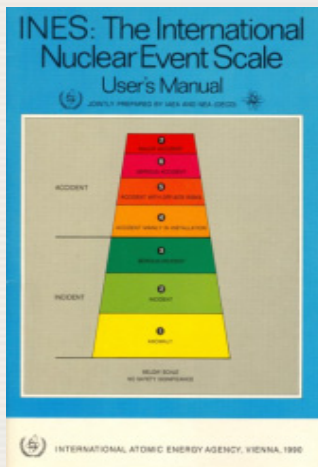


Nuclear power plants

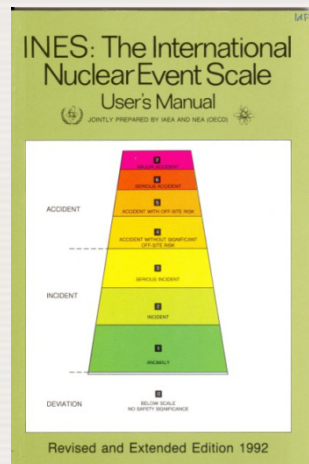
Nuclear Facilities

Nuclear Facilities/
transportation
and exposures

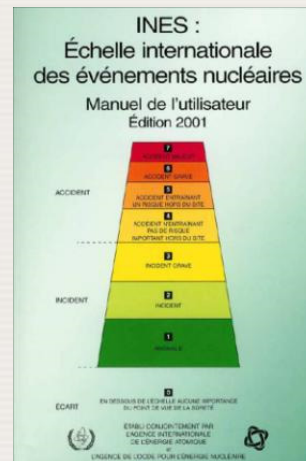
Any event involving
radiation sources and
transport of
radioactive material



1990



1992



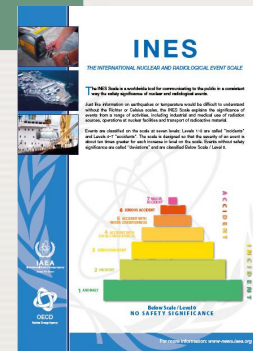
2001



2008

1996 Additional
Clarifications
issued

2006 Additional
guidance for
radiation sources
& transport



INES management process and players



IAEA

coordinates developments and administrates NEWS
(co-sponsored by OECD/NEA)



INES Advisory Committee

Identify areas where additional guidance/clarification is required

Analyse the feedback on the effectiveness of INES

Propose lines of action to the TM



Biennial Technical Meeting of INES (TM) : INES National Officers

Review INES use and developments

Recommend actions

Recommends documents for use



When needed: Working groups with INES AC members

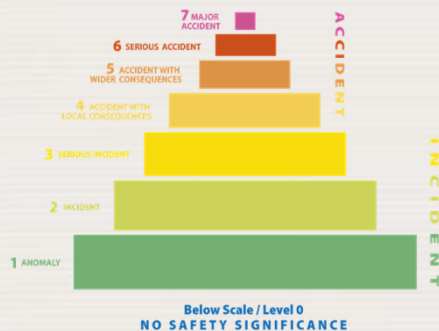
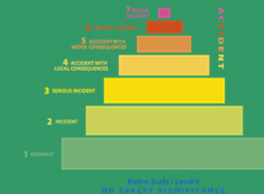
Analyse issues

Prepare proposals

Develop guidance



Key for success



- Simple and easy to understand
- Solid technical basis



- ✓ Support
- ✓ Coordination
- ✓ Commitment



Support of Member States

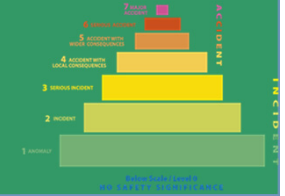


General Conference Resolutions

- 2005, 2006, 2007
- 2008: “welcomed the new INES User’s Manual...”
- 2009
 - “Recognizes the efforts of the Secretariat and Member States in implementing the International Nuclear and Radiological Events Scale (INES)”
- 2012 GC(56)/RES/9
 - “Urges Member States to designate INES national officers and encourages Member States to implement the full scope of INES”



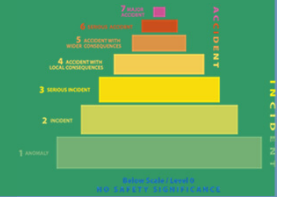
Coordination and Commitment



- **IAEA and OECD-NEA**
- **73 Member States**
 - **Over 90 INES National Officers**
 - **INES Advisory Committee**

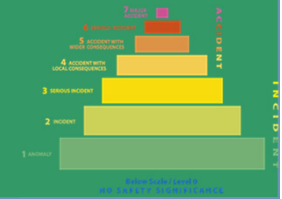


Production of the 2008 Manual



- **Managed by IAEA and OECD/NEA**
- **Wide involvement of experts from ALL areas**
 - **Nuclear facilities**
 - **Radiation safety**
 - **Transport**
- **Reviewed by INES national officers**
 - **63 countries; over 330 comments**

Scope of INES



Any event associated with the transport, storage and use of radioactive material



Radiation sources

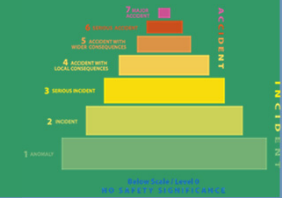


Transport

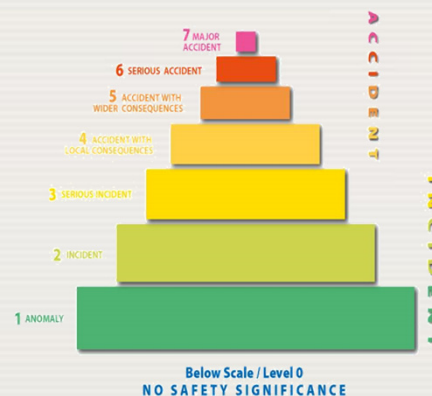


Nuclear Facilities

INES essentials



- Applicable to any event associated with radioactive material
- Classification of events on a scale from 1 to 7
- Prompt communication
- Consistency in terms of safety significance



- Putting the event into **PROPER** safety significance perspective
- Contributing to **COMMON** understanding of incidents and accidents
- Bringing **TRANSPARENCY**
- Bringing **UNIFORM** terminology
- Increasing **CREDIBILITY** and **REASSURANCE**
- Building **TRUST**



What it is

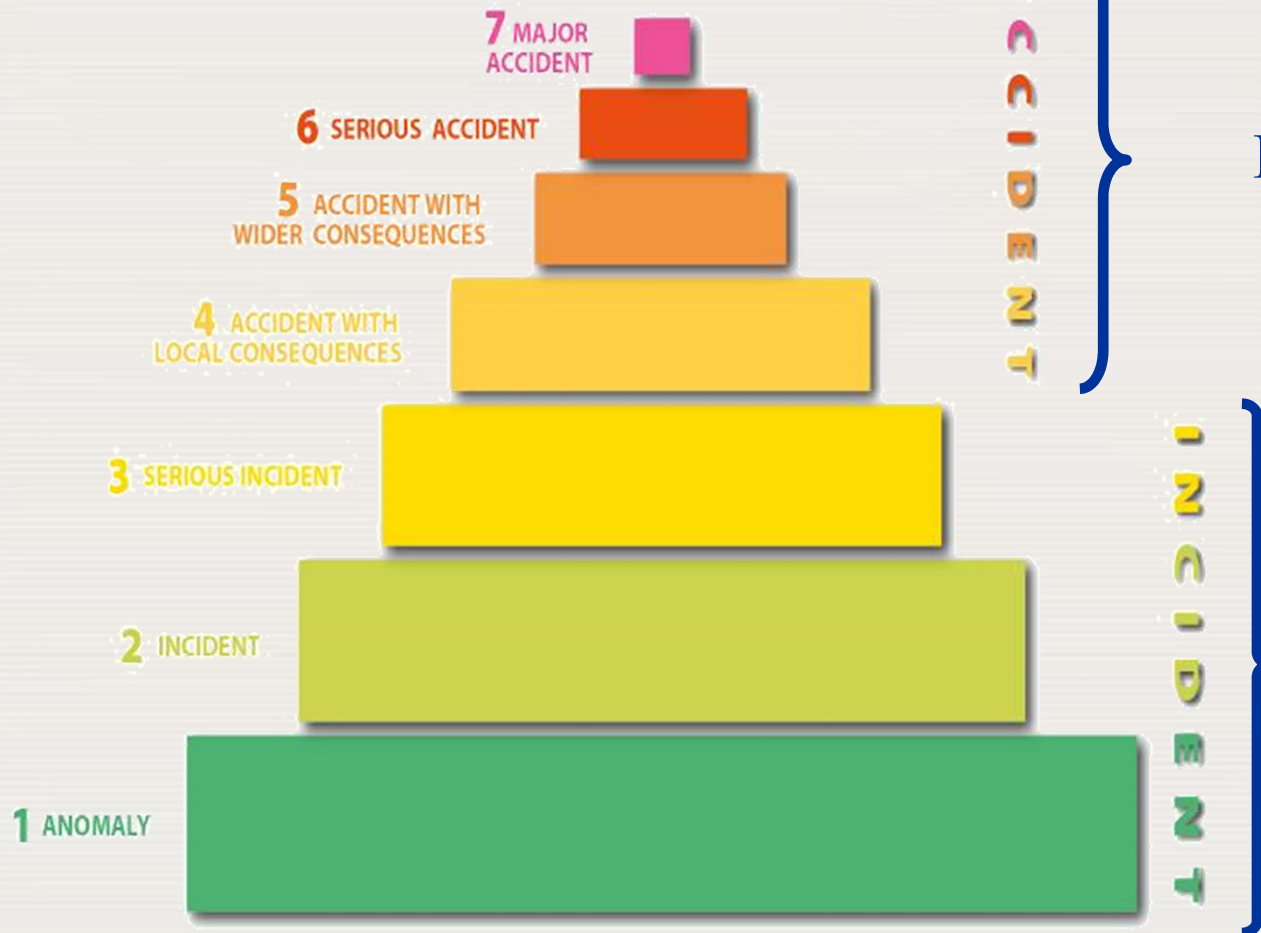
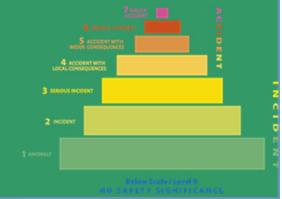
What it is not



- PROPER safety significance perspective
- COMMON understanding of incidents and accidents
- TRANSPARENCY
- UNIFORM terminology
- CREDIBILITY and REASSURANCE

- It does NOT REPLACE the existing national criteria for reporting of events
- It can NOT be used to COMPARE safety or regulatory programmes between countries

Terminology



Levels 4 to 7 -
“Accidents”

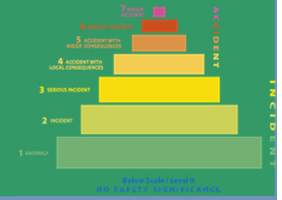
Levels 1 to 3 –
“Incidents”



IAEA

Below Scale / Level 0
NO SAFETY SIGNIFICANCE

Criteria – 3 major areas



1. Impact to people and environment

- Dose received or activity released

2. Impact to radiological barriers and controls

- The severity of the event inside the site of a facility and the potential harm to the public

3. Degradation in “Defence in Depth”

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

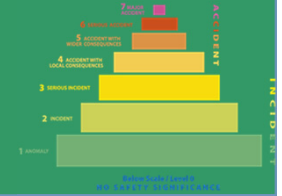
1. Impact on People and Environment



It considers the actual radiological impact to workers and members of public and to the environment

- Assessment based on:
 - **Amount of radioactive material released**
 - **Doses** (measured or estimated) and the number of people involved (who received dose)

2. Damage to radiological barriers and controls



Applicable to events within authorized facilities:

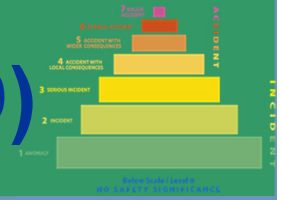
- with a site boundary defined as part of their licensing

and



- where there is the potential for a release of radioactive material at INES level 5

3. Degradation of Safety Provisions (DID)



Three sets of guidance

- Reactors at power



- Major (or „other“) facilities

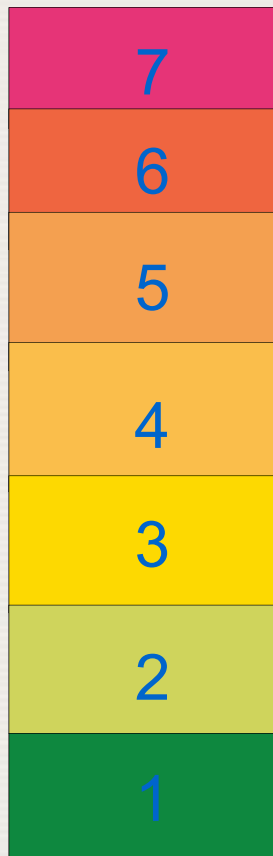


- Transport and Radiation Sources



Summary:

Levels covered by each area of impact

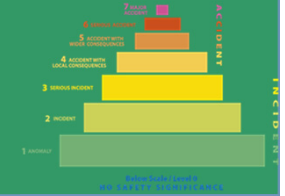


Defence
in Depth

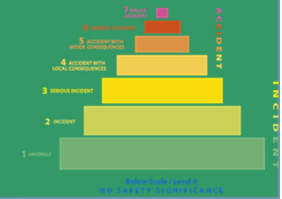
Radio-
logical
Barriers
and
Controls

People
and the
Environ-
ment

Example of events



Chernobyl (1986); Fukushima (2011)	7
Kyshtym (1957)	6
Goiania (1987)	5
Three mile island (1979)	5
Tokaimura (1999)	4
Fleurus (2006)	4
Vandellos (1989) / Sellafield (1992)	3
Oil refinery Gdansk (2009)	3
Industrial radiographer overexposure	2
Loss of radiation source	2



Any questions?