



Inspection of Research Laboratories

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- Researchers were usually one of the first users in a country if not the first one.
- The development of radiation protection followed the development of the use of radiation sources.

Example:

Discovery of x-rays and radioactive sources (1895, 1896)



ICRP (1928)



Role of the SNSA -1



- The *Slovenian Nuclear Safety Administration* (SNSA) has been controlling research laboratories from 2002 when a new law was put in force.
- The SNSA was established in 1987.
- Within the SNSA the inspection unit exists with 5 inspectors for radiation and nuclear safety.



<http://www.ursjv.gov.si/en/>



Role of the SNSA - 2



- From 2004 an extensive campaign of the SNSA has been conducted in order to find orphan sources in the country.
- It includes the research laboratories at different institutions.
- Around 80 inspections were performed at universities, institutes and other research facilities.



Role of the SNSA - 3



- The system of a control of radiation is based on the cooperation between:
 - technical support organisations and qualified experts,
 - users of sources
 - regulatory authorities
 - *Agency for Radwaste Management* (<http://www.arao.si/>)
 - other stakeholders (e.g. producers, suppliers).
- The system to protect people and environment is like a chain.



Who is the weakest link?





Finding

- Very often safety culture in research laboratories is not at the level required by international standards and legislation.
(e.g. no records related to radiation sources exist, personnel is not aware about risks related to sources, radwaste management is not in place)

Appendix

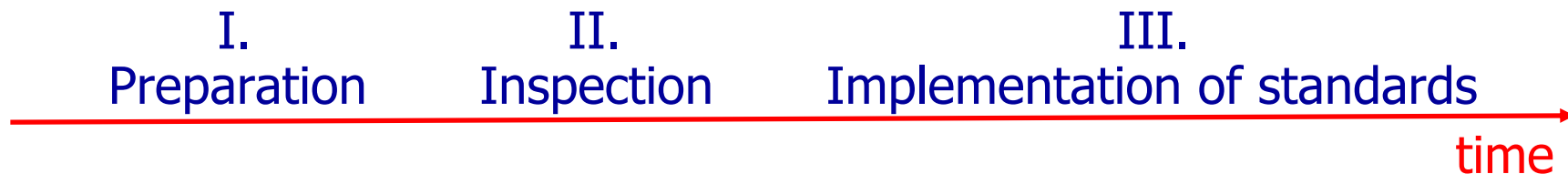
- The implementation of safety rules in research laboratories takes very often more time than in industry not to mention workload and finance costs.





Finding

- The differences between inspection of research laboratories and users in industry exist at both levels, namely in:
 - conduction inspection
 - implementation of safety standards.
- In addition, the preparation for the inspection control should take into account the differences.



Identified Basic Characteristics -1



Why is the inspection of research laboratory different than inspection in industry?

- The responsibilities in laboratories are not well defined.
 - The quality of the research is a primary responsibility of the management but not the only one (e.g. “operator” of a facility).
- The financial aspects of the activity are not very transparent.
 - E.g. The research could be related to a financial success, but financial links between commercial activities in a laboratory, educational activities and research are not always very transparent. The use of ionising radiation could be expensive.
- The “owner” is not well defined.
 - The researches very often do not relate their work to any owner of the institution as it is the case in industry.



Identified Basic Characteristics - 2



- The **time variation** of personnel is very large.
 - The students and others come just for a certain period of time and researches are very often abroad or work in a classrooms etc. It can be difficult even to conduct an inspection.
- The **time variations** in organisational aspects of research institutions are very large.
 - All kinds of grouping exist i.e. project teams, laboratories, sections etc.
- The research programmes **vary** with time.
 - A research is unpredictable but a use of a radiation source requires the control from a cradle to a grave.



Identified Basic Characteristics - 3



Example: change of a research programme

Left: Contaminated equipment (2005), uranium research

Right: Tc – 99 (2007), chemical behaviour of Tc



Identified Basic Characteristics - 4



- The institutions can be extremely complex.
 - Even a small institute i.e. a few hundred persons could have a very complex structure. Only few persons can work on one research project (e.g. Institute IJS <http://www.ijs.si/ijsw/JSI>).
- The environmental and other standards are not applied.
 - E.g. No written procedures are available so that ad - hoc activities are going on. Very often the ISO standards used in a laboratory are related to accreditation if required by a law and in such cases the commercial aspect is present.
- A use of radiation sources is very often related to *state of the art*.
 - Unknown radiation safety issues exist so a certain level of risk could be present (e.g. cataract).



Identified Basic Characteristics - 5



- The researchers do not share among themselves “problems” related to safety culture.
 - E.g. even at the same institutions the flow of information is very often very bad.
- The focus of the personnel is just on their own personal safety and do not relate the risk to all other stakeholders.
 - E.g. The students or cleaning personnel handling waste are not treated on the same level.
- Knowledge about risks is underestimated because no safety culture was present in the past or because other risks also exist.
 - E.g. in laboratories using toxic chemicals.



Identified Basic Characteristics - 6



Example: other risks exist
Chemical or biological laboratories (2005-2007)



Identified Basic Characteristics - 7



- Research has a special legal status and it is not controlled.
 - Especially in the past research or just particular research projects were not controlled as activities in industry so the regulatory regime was different (e.g. authorities).
- Research performed can be done in a very small group so that the knowledge of past activities could disappear easily. In addition, many dislocated facilities used in a past could exist.
 - No sufficient data is available about contaminations or sources used in the past.



Identified Basic Characteristics - 8



Example: past activity

Left: past activities related to uranium (2005)

Right: research institute stored Ra-226 source (2007) used in medicine.



Identified Basic Characteristics - 9



At the end

1. Not all characteristics are identified.
2. Not all are mentioned characteristics could be present at a particular research laboratory.
3. Some of characteristics can be also typical for a particular industrial facility.





Lessons Learned

- The inspection of research laboratories requires comprehensive systematic pre-assessments of all basic characteristics of a particular laboratory including searching for the scientific literature published by the laboratory.
- The conduct of the inspection requires adaptation of the inspection procedure to the particular situation in the laboratory for the best result to be achieved.
- The main task is to achieve clear roles regarding responsibilities within the institution which will sustain variations which will appear with time (e.g. at the top management, research projects).
- In addition, be always prepared for a surprise.