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Environmental surveillance programs and dose assessment. Characterization of individual members of the public

Merle Lust

Estonian Radiation Protection Centre,

Tallinn, Estonia

- ✓ Introduction
- ✓ Environment surveillance programs
- ✓ Dose assessment
- ✓ The representative person
- ✓ Uncertainties of dose assessment and age-specific dose coefficients
- ✓ Summary

Types of Environmental Monitoring:

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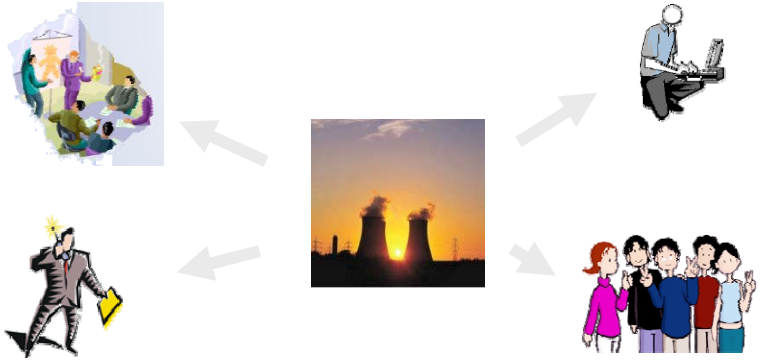
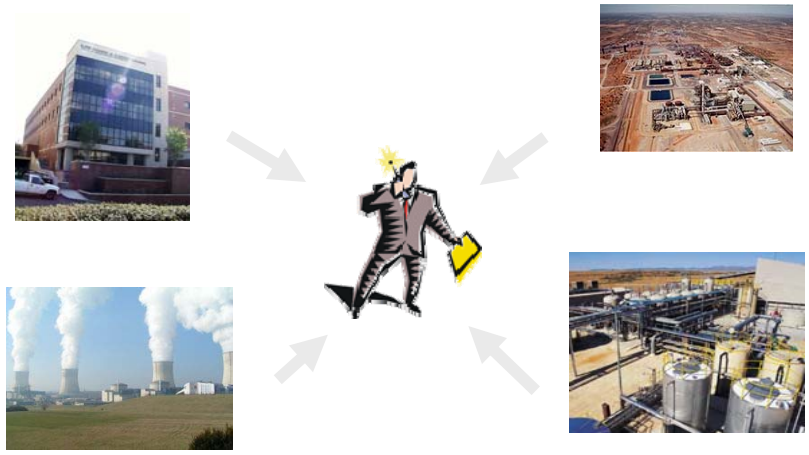
SOURCE RELATED:
Evaluation of the impact of a particular source or practice;



PERSON RELATED:
Evaluation of the impact on a person or group of persons of several sources or practices.



General objectives of monitoring:

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Verify compliance with:

- authorised discharge limits; and
- any other regulatory requirements concerning the impact on the public and the environment;

Check the conditions of operation and the adequacy of controls on discharges

Provide a warning of unusual or unforeseen conditions and, where appropriate, to trigger a special environmental monitoring programme.

Provide information and data:

- for dose assessment; and
- to assess the exposure or potential exposure of critical groups and populations due to normal operation of a practice and accidents or past activities

Other objectives of Monitoring:

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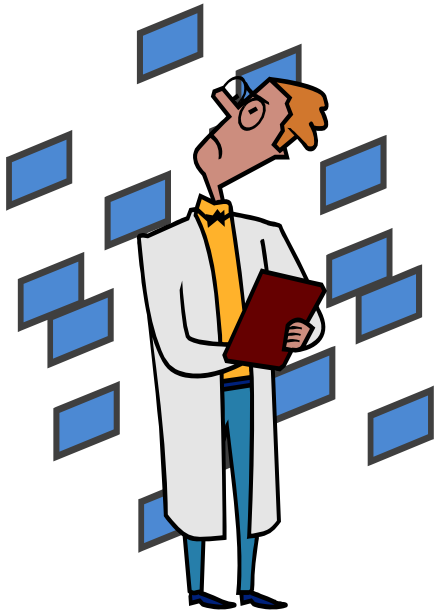
- ✓ To provide information for the public;
- ✓ To maintain a continuing record of the impacts of an installation or a practice on environmental radionuclide levels;
- ✓ To check the predictions of environmental models so as to modify them as appropriate in order to reduce uncertainties in the dose assessment.



Elements to be Considered in the Design of a Monitoring Programme:

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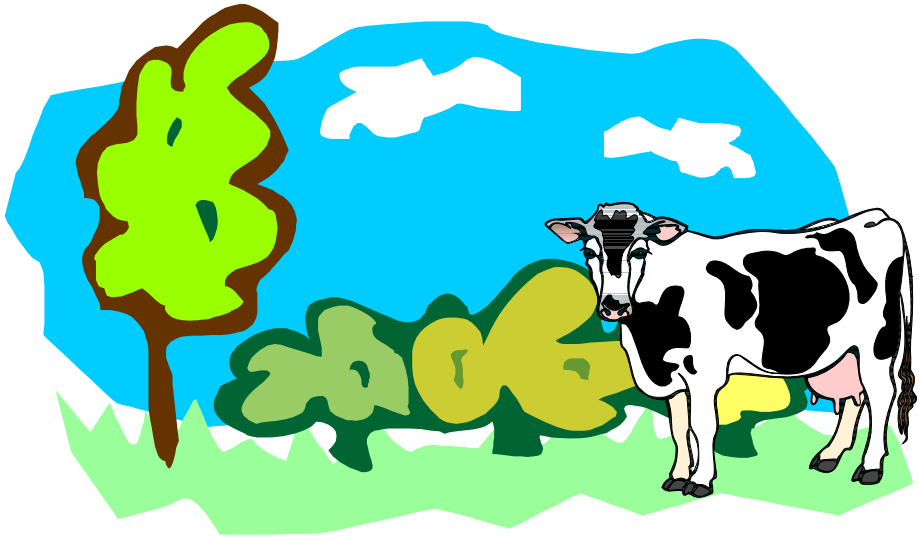
- ✓ Radioactive inventory and radionuclide composition at the source;
- ✓ Space and time features of the radiation fields around the source;
- ✓ Authorized discharges and discharge rates;
- ✓ Possible contributions from any nearby practices or sources, discharge pathways, exposure pathways, environmental features at the site, and features and habits of the population involved;
- ✓ Significance of the annual average doses of the critical group(s) and the environmental radiation levels from planned radioactive releases and possible releases.

Example of national environmental monitoring programme:

- atmosphere
- airborne particles in atmosphere
- river water
- drinking water
- ground water
- surface water
- milk
- mixed diet
- foodstuff (meat, vegetable, crop)
- wild berries and mushrooms
- sea environment (seawater, fish, alga, sediments)
- areas around the radioactive waste management sites



Dose from a source:

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- ✓ Time
- ✓ Location
- ✓ Transport of radionuclides through the environment
- ✓ The characteristics of the individual.

Characteristics include:

- ✓ physiological parameters,
- ✓ dietary information,
- ✓ residence data and
- ✓ any other individual specific information that is necessary to estimate annual dose.

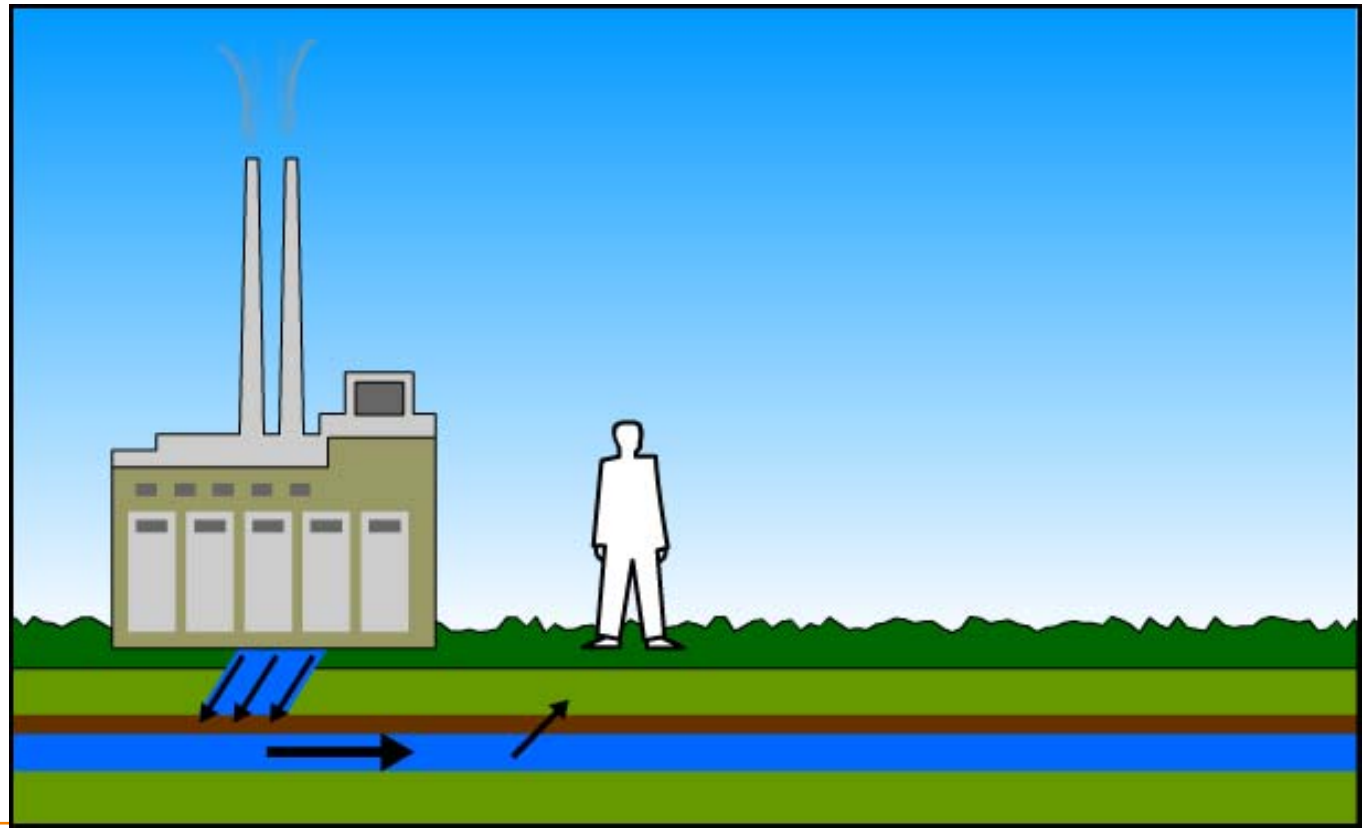
Exposure to Public:

Direct radiation emission from the source;

Radionuclides dispersed in the environment.

Exposure situations:

- ✓ Normal
- ✓ Existing
- ✓ Emergency



Exposure pathways:

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- ✓ External radiation from radionuclides outside the body
- ✓ Internal radiation from radionuclides inhaled, ingested or which cross the skin
- ✓ Depends on type of radiation
- ✓ Influenced by chemical properties of element
- ✓ Many different potential exposure pathways

Important exposure pathways for discharge to atmosphere

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- ✓ Tritium - ingestion of food and inhalation of plume
- ✓ Carbon-14 - ingestion of food
- ✓ Argon-41 - external irradiation from plume
- ✓ Cobalt-60 - external irradiation from deposited activity
- ✓ Iodine-131 – ingestion of milk
- ✓ Caesium-137 – external irradiation & ingestion (e.g. meat)
- ✓ Plutonium-239 - inhalation of plume