Joint ICTP-IAEA Workshop on Advanced Solutions for Field Measurements (SMR 3729), 8-19 Aug 2022, Trieste (Italy)

Radiation Protection and Good-practice on (contaminated) site

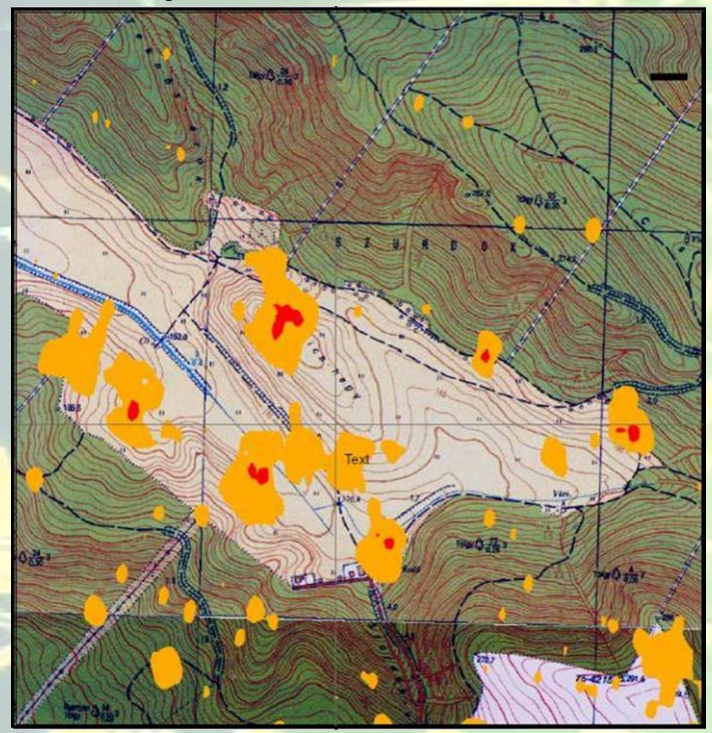
S. Tarjan

Content

- Preparation for field activity
- Plan for measurement
- Plan for sampling
- Measurement and sampling team
- Prerequisite
- Limitations

Preparation for field activity

- Collection of available data:
  - Radiation data (from aerial exploration)
  - Type or origin of the contamination
  - Geographical information
    - Road map
    - Surface waters
    - Elevation
  - Weather forecast
    - Expected temperature
    - Rain or other precipitation
    - Wind



Plan for measurement

- Establish a measurement plan
  - Dose rate monitoring (mapping)
  - In-situ gamma-ray spectrometry
    - Isotope identification
    - Inventory estimation (+estimation of the terrestrial origin gamma dose rate H*(10))
  - Surface contamination monitoring of field objects
- Collect the required equipment
  - Measurement tools
  - Batteries (or other power supplies)
  - Vehicle(s)
  - Navigation systems, maps
- Take care of the appropriate documentation and recording of the measurement results and process
- Set up the team
- Check the sustainability of all
- Establish an emergency plan …

Plan for sampling

- Establish a sampling plan
  - Define clearly the goal of sampling
  - Determine the required quantity of the sample
  - Determine the number of samples
- Select the goal oriented sampling tools
  - Practice the application of all tools in inactive environment
  - Vehicles
  - Navigation systems, maps
- Take care of the appropriate packing and documentation
- Set up the team
- Check the sustainability of all
- Prepare an emergency plan …

Measurement and sampling team

- *Team leader*
- *„Clean" person (administrator)*
- *Assistant*
- *„Dirty" person (who will perform the sampling)*
- *Measurement technician (nuclear + location)*

General rules on the contaminated area:

1. Each operation should be practiced under inactive conditions!!!

2. Think twice about what you are going to touch!!!

3. Be aware to check the max gamma dose-rate when you stop the activity and must turn back anyway !!!

Basic requirements for the gamma dose-rate measurement tools

1. Valid certificate from the local metrological institute

2. The linear operational range must cover the safety dose-rate limit

3. Spare battery (fully charged and tested for performance in advance)

Estimation of the safety gamma dose rate limit

(responsibility of the radiation protection supervisor in charge)

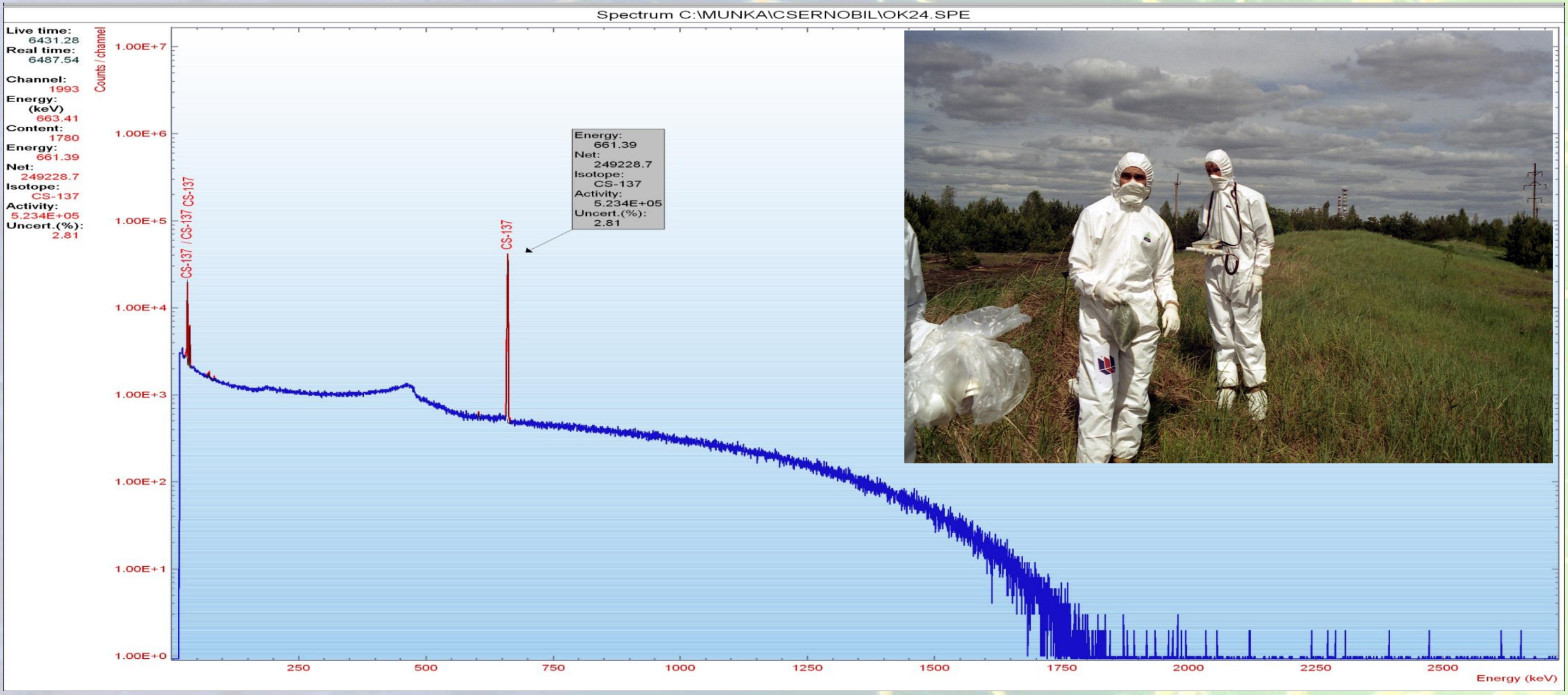
- Input information
  - National regulation (if it does not existing the basis can be a IAEA GSR 3)
  - Dose history of the team members (back to 5 years)
  - Estimated time of the operation on the contaminated site
  - Safety factor (1.5-3 by risk analysis, if something went wrong)

  - Guide numbers, $H_p(10)$

Period	1 year	5 years average	1 year max
Effective dose	20 mSv	100 mSv	50 mSv
Equivalent dose for eye	20 mSv	100 mSv	50 mSv
Equivalent dose for skin	500 mSv		

  - Other considerations:
    - Over 5-10 microSv/hour gamma dose-rate, transistor reset preamplifier and fast electronics required
    - If cannot exclude the presence of alpha emitters take special care to avoid any incorporation

Alpha and/or beta emitters in the contamination, unexpected behaviour of the equipment

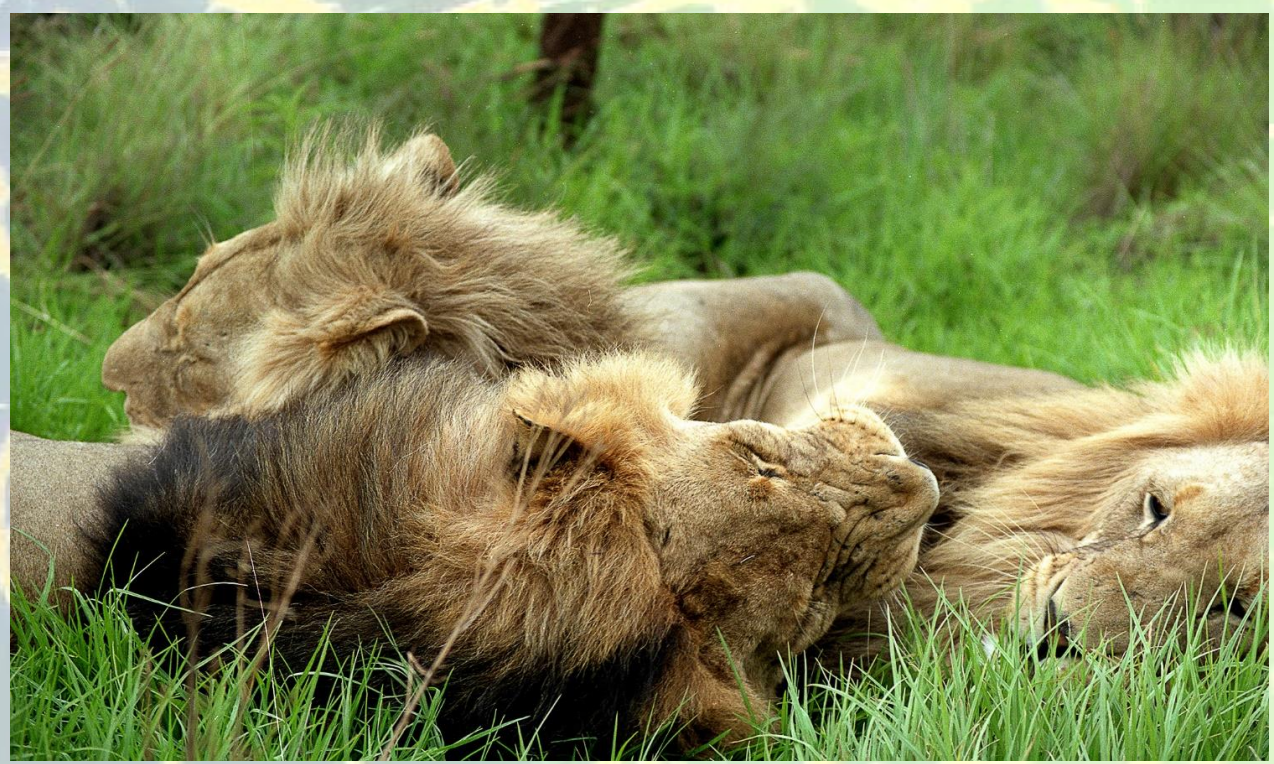


Supporting team(s)

- Dosimetry control team
- Decontamination service
- Sample shipment and custody team (if necessary)
- Supporting military forces or police, etc.

Limitations

- The transport is not safe for any reasons
- Harsh meteorological conditions
- Expected gamma-dose rate is too high
- The contamination risk is high (fresh contaminants, ongoing releases of radioactivity)
- Some dangerous animals are close to the sampling or measurement area…



Thank you and good luck!


MODE
LO
OUTSIDE TEMP
46°C
LO
AUTO
OFF
DUAL
FRONT
REAR
A/C
REAR