



RESULTS OF THE INTERCOMPARISON EXERCISE **ISIS 2007**

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"In-Situ Gamma Spectrometry and Dose Rate Measurement in Emergency Situations"

Jointly organized by



Objectives of ISIS07

Emergency response

- Lab experts and national first responders
- Pressure of time & strict schedule
- In-Situ (in the field)
- Delivery of first results at the end of every day

Searching and Finding

- Dose rate measurements & mapping

Identification and quantification

- High resolution gamma spectrometry

Participants of the ISIS07

Emergency response staff

- 56 international teams
- 182 active participants
- 10 observers
- 6 equipment manufacturer
- (125 first responders - parallel exercises)
- 30 organizing staff

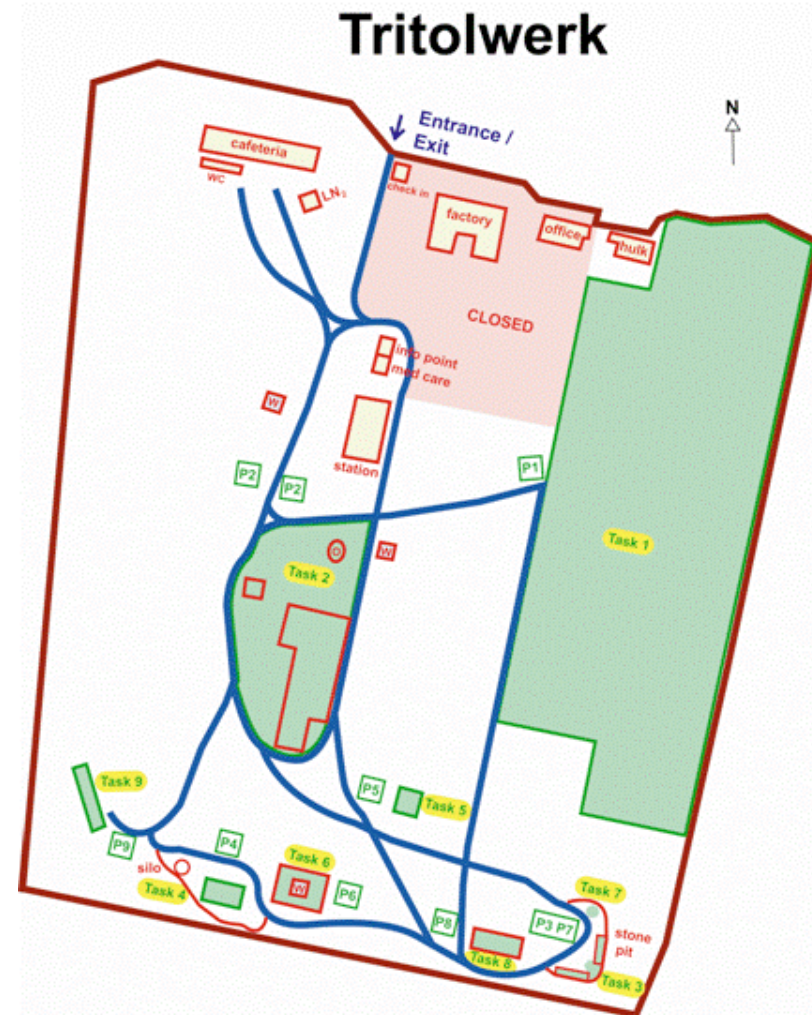
Exercise Design – 10 Tasks

The design of exercise tasks in the frame of
“Emergency Preparedness”

- Mainly typical medical and industrial sources
- Accident scenario - emergency responder
- Environmental monitoring - classical in-situ
- More tricky tasks...

→ Proof, that In-Situ is a “rapid response method”

Exercise Site – Tritolwerk



The 10 Tasks of the ISIS07

- 1 Dose rate mapping
- 2 Drive by
- 3 Complex spectra
- 4, 7, 8 Contamination simulation
(buried grid; buried single; cellar-source)
- 5, 6 Barrel measurement
(shielded; unshielded – distance)
- 9 Buried Sources
- 10 Environmental measurement



Task 2 – Drive By

Setup

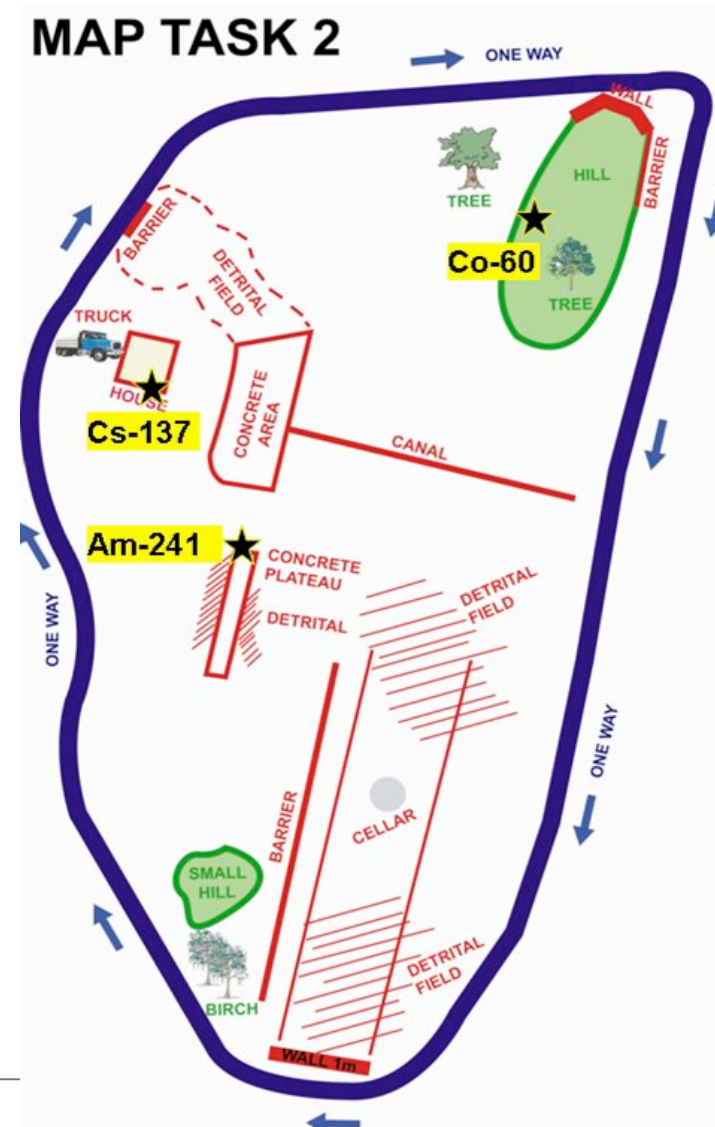
- 5,000 m² area, 3 hidden sources
- ⁶⁰Co at elevated position, 610 MBq
- ²⁴¹Am on top of concrete block, 401 MBq
- ¹³⁷Cs mounted in window frame of the bare brickwork, 6 MBq

Task

- Localisation of sources from outside
- Source position, nuclides, activities
- Duration: 1h 45min

Challenge:

- Combination of sensitive dose rate & gamma measurement necessary, possibly interference with ¹³⁷Cs Chernobyl)



Task 2 – Drive By



Results Task 2 – Drive By

PRELIMINARY RESULTS		⁶⁰ Co	¹³⁷ Cs	²⁴¹ Am
source identified		42 (75%)	21 (38%)	7 (13%)
location determined	<i>correct</i>	11 (20%)	3 (5%)	2 (4%)
	<i>nearby</i>	12 (21%)	7 (13%)	0
	<i>far away</i>	5 (9%)	2 (4%)	3 (5%)
activity determined		22 (39%)	7 (13%)	2 (4%)

FINAL RESULTS		⁶⁰ Co	¹³⁷ Cs	²⁴¹ Am
source identified		50 (89%)	27 (48%)	8 (14%)
location determined	<i>correct</i>	20 (36%)	5 (9%)	3 (5%)
	<i>nearby</i>	18 (32%)	11 (20%)	1 (2%)
	<i>far away</i>	5 (9%)	4 (7%)	4 (7%)
activity determined		39 (70%)	16 (29%)	5 (9%)

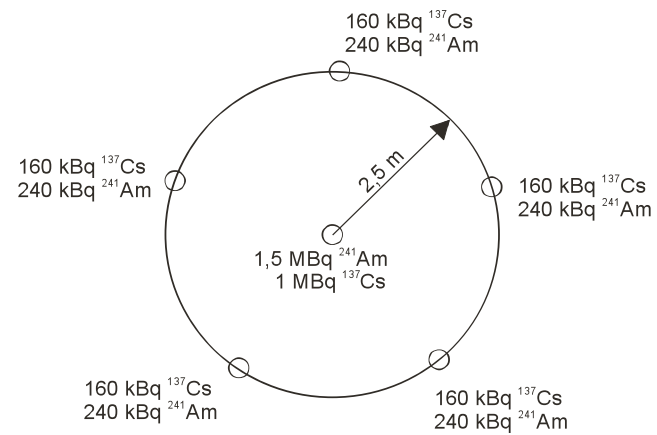
Task 4, 7, 8 – Contamination Simulation

- Setup: Sources simulating area contamination (grid)
- Task: Identification and quantification
- Result: Nuclides and activities per m² - surface
- Duration: 1h per task
- Challenge: Standard in-situ measurements

Task 4, 7, 8 – Contamination Simulation



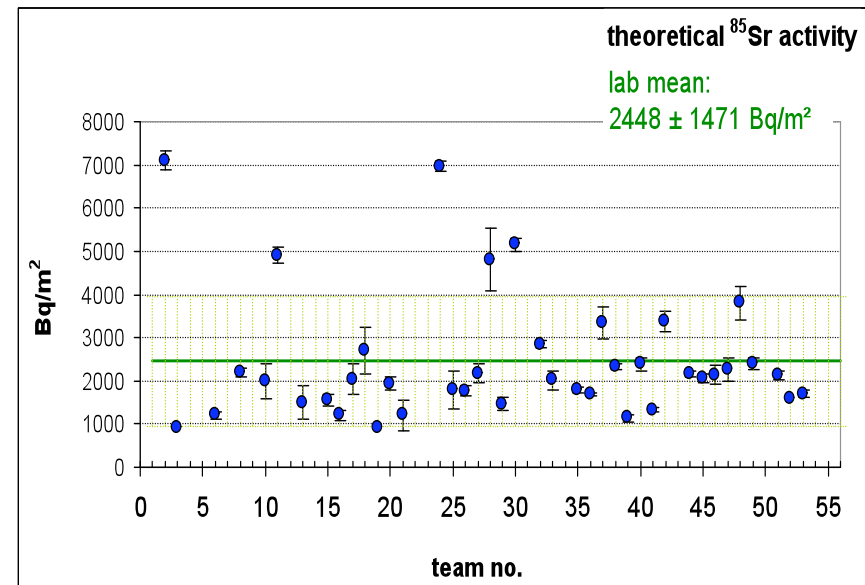
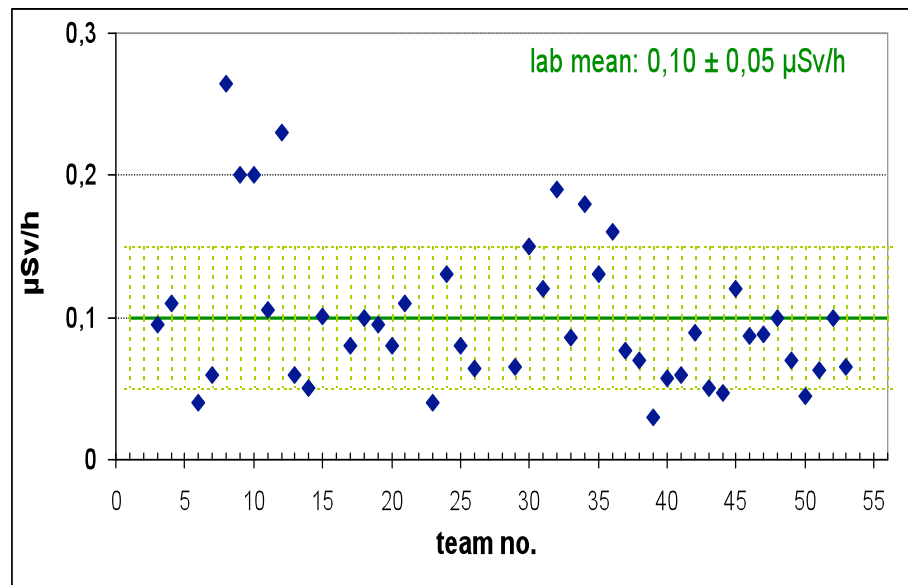
Task 4
25 x Kr-85
(à 230 MBq)



Task 7

Task 4, 7, 8 – Results Contaminat. Simulation

- Excellent results, ca. 30% \pm no difficulties (timeframe)
- Very good calibrations and evaluation tools
- Good technical equipment



Task 4, Final results: Dose rate measurements **Theoretical ^{85}Sr activity (Bq/m^2)**

Conclusion

Time Pressure

- Stress – due to complexity of tasks / terrain / timeframe
- Importance of exercising & preparations

Quality of data

- Standards for units & communications
- Uncertainties – Definitions needed

General comment

- High technical standard, excellent evaluation tools
- Experienced team members important
- 4 person teams optimum

Events – Mobile Lab & Manufacturer Exhibition



Acknowledgements

Austrian Armed Forces

Brigadier N. Fürstenhofer, Captain B. Traxl, Captain P. Mohr (NBC-Defense School)

Brigadier Hercke, Major Häfele (Theresian Military Academy)

International Atomic Energy Agency, IAEA

Dr. Eliana Amaral, Rodolfo Cruz-Suarez (Div. Transport and Waste Safety)

Dr. Gabriele Voigt, Umberto Sansone, Marek Makarewicz
(Agency's Laboratories, Seibersdorf and Headquarters)

Team of the Radiation Safety & Applications Division

(Seibersdorf Labor GmbH)

HIGHLY MOTIVATED PARTICIPANTS!!

