Društvo Slovenije za varstvo pred sevanji
Radiation Protection Association of Slovenia

Benjamin Zorko, JSI, president DSVS

Congratulations

Dear President, dear friends and colleagues,

Congratulations on your amazing anniversary!

Gratulálok a csodálatos évfordulótokhoz!

Acknowledgement

Dear President, dear friends and colleagues,

Thank you very much for inviting me to the 50th Annual Meeting on Radiation Protection in Hajdúszoboszló.

Köszönöm szépen a meghívást az 50. Sugárvédelmi Találkozóra Hajdúszoboszlóra!

Our society, the **Radiation Protection Association of Slovenia (DSVS)**, is a small society that has become a bit more active again in the last two years. We have recently started to organise lectures for our members. We are taking small steps forward, trying to connect with the wider community and to consolidate the Associations's relevance in the field of radiation protection through independent opinions.

DSVS – Identity Card

Društvo Slovenije za varstvo pred sevanji

Jamova cesta 39, 1000 Ljubljana

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- **President:** Benjamin Zorko, JSI
- **Secretary:** Zoran Petrovič, SNSA
- **Members of the Management Board of the DSVS:** President, Secretary, Uroš Čotar, OI
- **Members of the Supervisory Committee:** Denis Glavič-Cindro, IOS, Manca Podvratnik, IOS, Sandi Gobec, JSI

Current status

- Estimated membership: 51 members (registered, likely larger)

  natural scientists and professionals: physicists, medical physicists, chemists, and other related disciplines.

- We depend on small donations to cover essential expenses.
- In 2024, we initiated the development of new framework through a series of lectures.
- Within our available options, we are collaborating with associations from Hungary, Croatia, Serbia, and IRPA

Current status

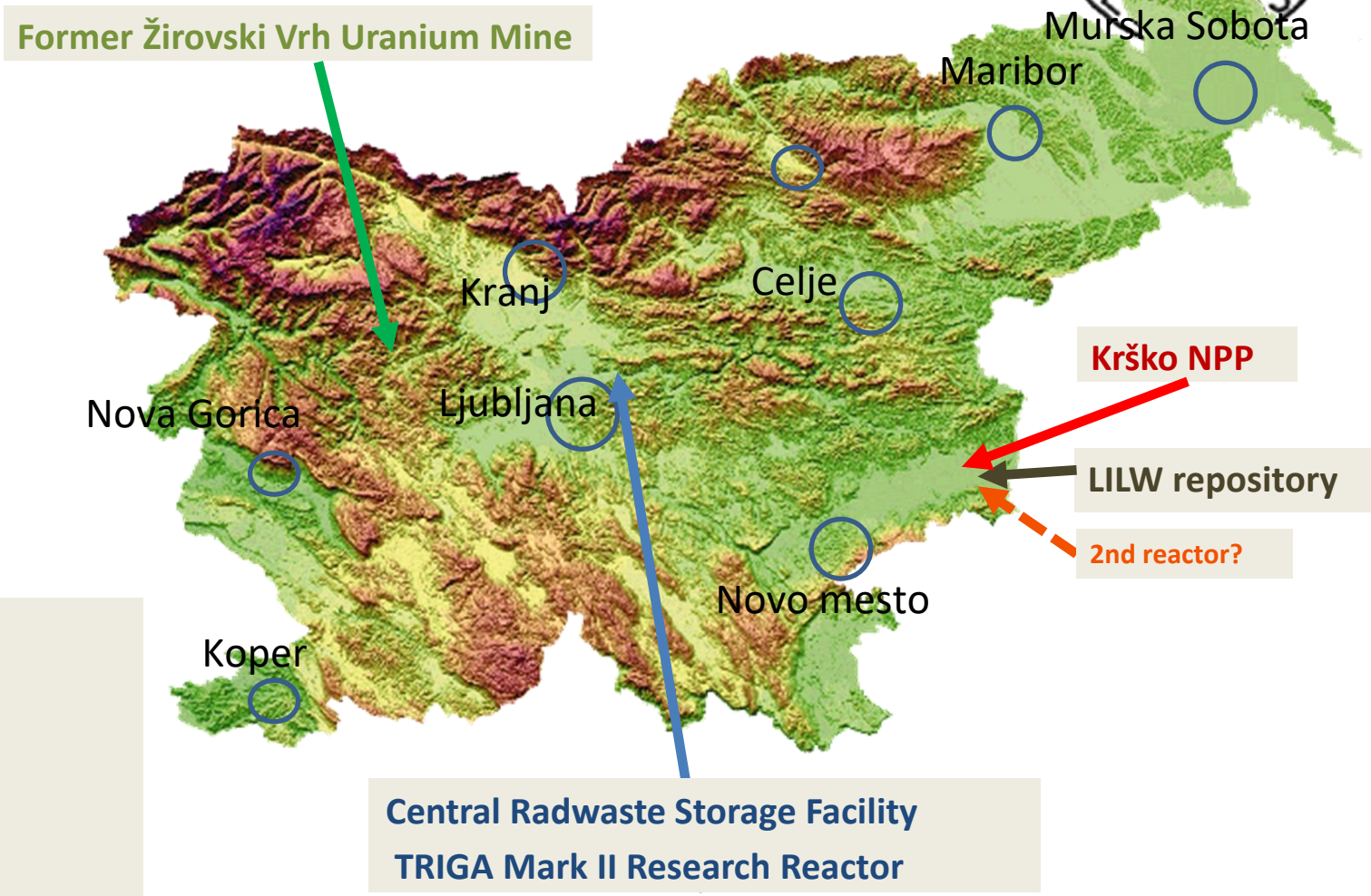
Annual General Assembly of DSVS, at IOS, Ljubljana, 1st October 2024

- *General overview of radiation protection*, Matjaž Koželj (JSI, ICJT)
- *Radiation protection in medicine*, Luka Jensterle (UMC-LJ KNM)
- *Challenges of radiation protection*, Helena Janžekovič (SNSA)

Prospectives

- We are committed to **expanding DSVS membership** by engaging professionals from the medical and industrial sectors.
- **Enhancing our visibility**—especially through social media—will be crucial for promoting ionising radiation applications and advancing radiation protection practices.
- **Topics for the General Assembly**
  - Radon and Natural Background: Understanding environmental exposure
  - Medical Exposures: Addressing safety and innovation in clinical applications.
  - Radioactive Waste Management in Medicine: Exploring the use of radionuclides (such as I-131, Lu-177, and others) in therapies and assessing their environmental impact

Radiation and Nuclear facilities in Republic of Slovenia



Sources in Medicine and Veterinary Medicine:

- Ljubljana (Institute of Oncology, Clinic for Nuclear Medicine, University Medical Centre)
- Celje (General hospital)
- Maribor (University Medical Centre, Institute of Oncology)
- Izola (General hospital)
- Slovenj Gradec (General hospital)
- Nova Gorica (General hospital)

- **Unsealed sources (radiopharmaceuticals):** ^{131}I, ^{99}Mo, ^{123}I, ^{177}Lu, ^{201}Tl, ^{111}In, ^{68}Ge, ^{19}F, ^{223}Ra, ^{99m}Tc, ^{68}Ga
- **Sealed sources:** ^{192}Ir, ^{90}Sr, ^{106}Ru, ^{137}Cs;
- **X-ray devices**
- **Industrial sources:** radiography, NORM
- **Research sources:** Tandem accelerator

(Environmental) Monitoring programmes

- **Off-site radiological monitoring around Krško NPP (NPP)**
- ERM of living environment in Republic of Slovenia(SNSA)
- Monitoring of radioactivity in drinking water (SRPA)
- Independent verification of the operational ERM around Krško NPP(NPP + SNSA)
- Monitoring of radioactivity in fodder (MA)
- Central radioactive waste repository radiological monitoring (ARAO)
- Monitoring of liquid and atmospheric discharges from Krško NPP (NPP)
- Emergency preparedness programme (NPP, URSZR - MOD)
- *Monitoring of radioactivity in the environment of uranium mine Žirovski Vrh (SNSA)*
- TLD measurements of environmental (ambient) and personal doses (various clients)

Authorized laboratories in Slovenia (JSI, IOS)

Off-site radiological monitoring

Krško NPP

- Commercial operation 1983
- Steam Generators replacement 2000
- Westinghouse two loop PWR
- Power 2000 MWt, 730 MWe

Drinking water - sampling

❖Liquid discharges – ERM (drinking water)

Automatic sampler for drinking water in the area of Krško NPP
(190 mL per 3 hours is added to the composite (sampling period: 1 month)

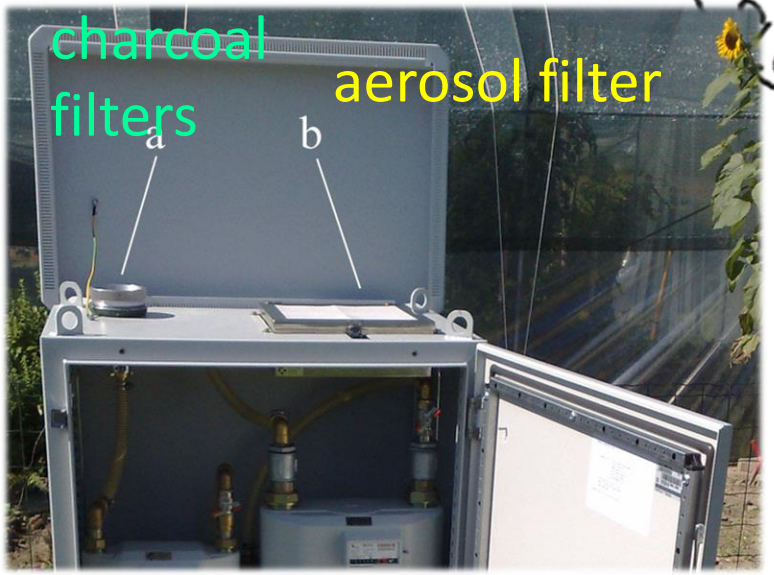
Airborne radioactivity - sampling

- **In-house built devices**
- **Operation: 24 hours per day**

High volume flow rate aerosol sampler

Single suction leg with intake port for aerosols

- Dobova and Ljubljana
- concertinaed fiberglass filter
  - Area: 0.87 m^2
  - Maximum flow-rate of 216 m^3/h
  - 99.96 % retention efficiency for size >0.3 µm



Combined Iodine I-131 and aerosol sampler

Two suction legs with intake ports for:

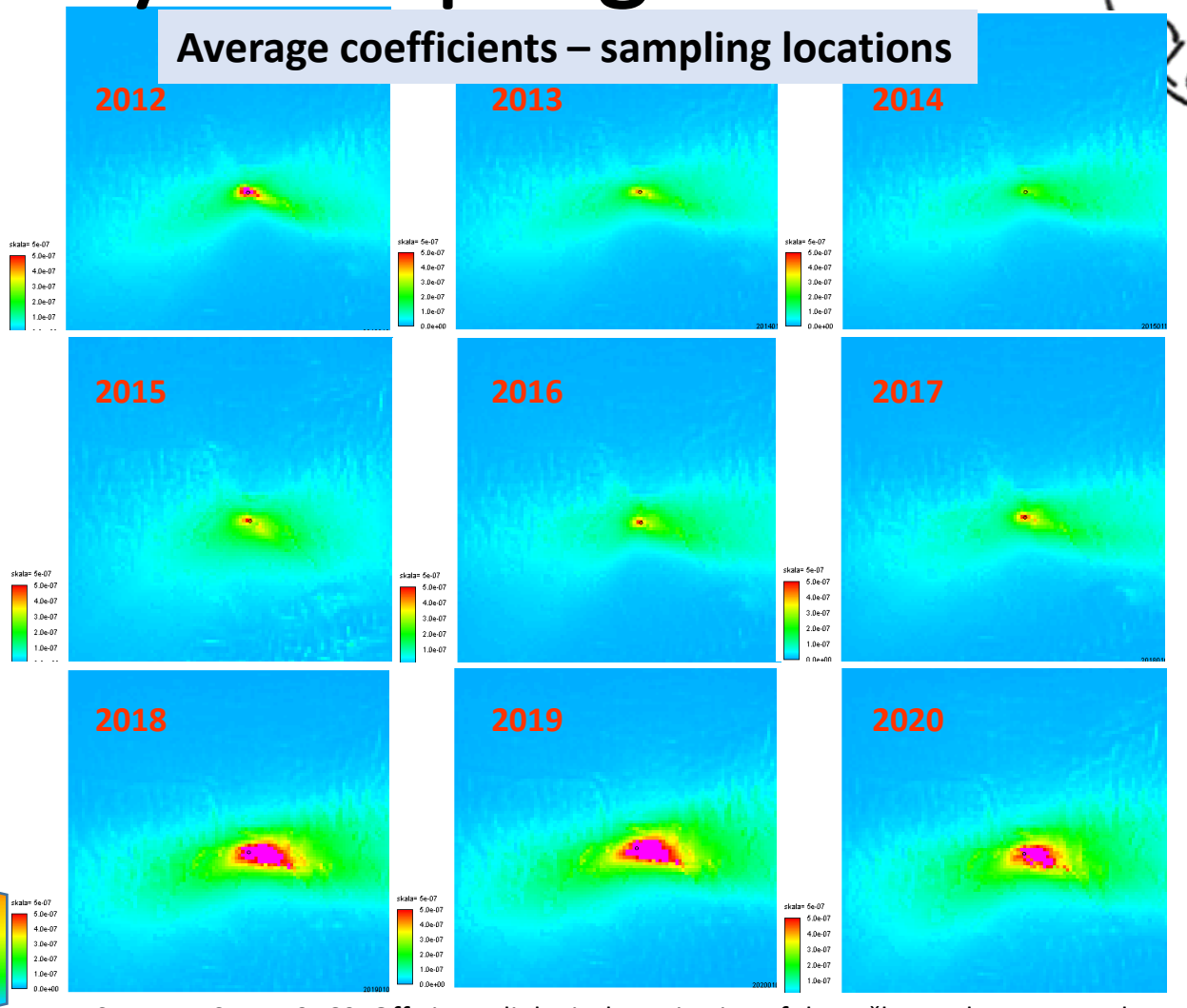
a) ***Charcoal filter***:
- to catch short-lived iodine radionuclides
- Maximum air flow-rate of 3.6 m^3/h

b) ***Aerosol filters***:
- Dimensions: 30 x 30 cm
- 99.96 % retention efficiency; size >0.3 µm
- Maximum air flow-rate of 16.2 m^3/h

Airborne radioactivity - sampling

Airborne transport in a complex terrain

- Lagrangian particle model (Spray) with 3D diagnostic on-line meteorology (MEIS d.o.o. – private company)
  - 4 ground stations
  - RASS – remote temperature measurements
  - SODAR – wind speeds at different heights
  - Operational modes: On-line, automatic (every ½ h)
- *Input*: Real discharge rate [Bq/s]
- *Output*: Dilution coefficients: χ/Q
- *Calculation:* Modelled concentration in the environment [Bq/m^3]



Source: IJS-DP-13760, Off-site radiological monitoring of the Krško Nuclear Power Plant

Summary

Summary of annual exposures in 2023:

- ❖ Atmospheric discharges: 0.044 µSv per year
- ❖ Liquid discharges: 0.006 µSv per year

Total: 0.05 µSv per year

- ❖ Annual Dose Limit: 1 mSv = 1000 µSv
- ❖ Annual Authorized Dose Limit: 0,05 mSv = 5o µSv

- ❖ <0.5 % of the authorized dose limit at the NPP fence
- ❖ <0.01 % of the characteristic unavoidable natural background radiation.

Source	Exposure pathway	Annual effective dose (mSv)
Natural radiation	– gamma radiation and the directly ionizing component of cosmic radiation – neutron component of cosmic radiation	0.60 ** 0.06
	– Building Materials – External Radiation (residential living area)	0.44
	– Ingestion (Food, Water) and Inhalation (Natural Radionuclides)	0.33
	– Inhalation of Rn-222 and its progeny	4.32
	Total natural radiation in the vicinity of the Krško NPP#	**5.75**
Krško NPP - direct radiation at the fence of the Krško NPP	– direct irradiation from the Krško NPP buildings	indeterminable
Krško NPP atmospheric discharges (representative person at the Krško NPP fence****)	– external dose (air immersion) – groundshine (Co-60, Cs-137) – inhalation (H-3, C-14) – ingestion (C-14)	3.8 E–7 5.0 E–11 2.3 E–5 2.0 E–5
Krško NPP Liquid effluent (Sava)	- adult representative person at 350 m downstream from the Krško NPP dam	6.1 E–6
	Total radiation effects of the Krško NPP*	**5.0 E–5**
Chornobyl accident, nuclear-weapons tests	- external dose** - ingestion of vegetable and animal food (without C-14)***** - ingestion of vegetable food (C-14)****** – ingestion of fish	1.4 E–2*** 4.0 E–4 1.45 E–2 3.1 E–4
	Total global contamination in the vicinity of the Krško NPP	**2.85 E–2**

Emergency Preparedness Response - ELME

Main objectives

- **Detection and determination** of accidental pollution of the environment with radioactive substances and specific chemical (and biological) pollutants
- **Expert recommendations and advices** to authorities and organizations responsible for implementation of protective actions (decision makers)
- **Education and training** of first responders and other professional staff in emergency exposure situations

Scope of training and drilling

To facilitate the objectives and to achieve a desired level of competences, a firm and structured system shall be put in place including

—Training and drilling

—Well-documented procedures (SOPs)

—Capacity building

Equipment

Environmental spectrometry – direct radiation, radiation identification, contamination

Hand-held dose-rate meter

telescopic dose-rate meter

Neutron dose-rate and dose meter

Radiation contamination meter

Wipe meter

Equipment

Environmental spectrometry – radionuclide identification

Hand-held Spectrometer

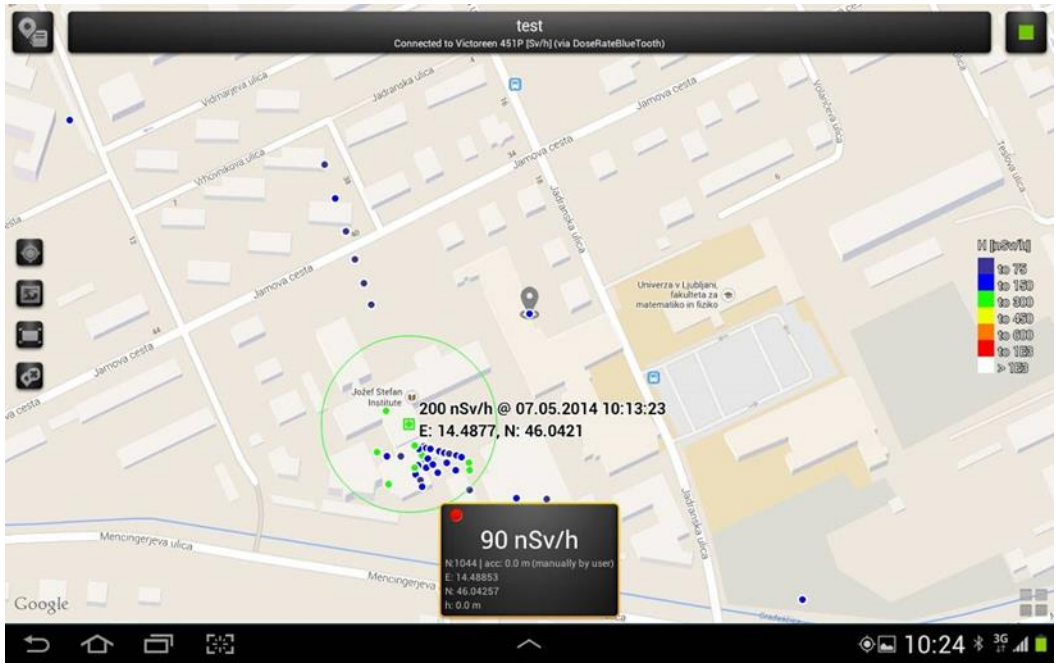
HPGe

Radiation identification and spectrometer

On-line aerosol particulate spectrometer ($CeBr_3$) with high volume aerosol pump was developed and designed

Equipment


☎112
EKOLOŠKI LABORATORIJ


test
Connected to Victoreen 451P [Sv/h] (via DoseRateBlueTooth)
200 nSv/h @ 07.05.2014 10:13:23
E: 14.4877, N: 46.0421
90 nSv/h
Google
10:24

Conclusions

- I wish for this 50th Annual meeting to continue in the great spirit of your previous meetings—with many excellent presentations and enjoyable socializing among all participants.

- Wishing you all a successful and pleasant Annual meeting!
- **Kívánok mindenkinek egy sikeres és kellemes éves találkozót!**