

RADON IN SOIL GAS VERSUS RADON FLOW IN CHARACTERIZATION OF URANIUM TAILING SITES

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PROBLEMS:

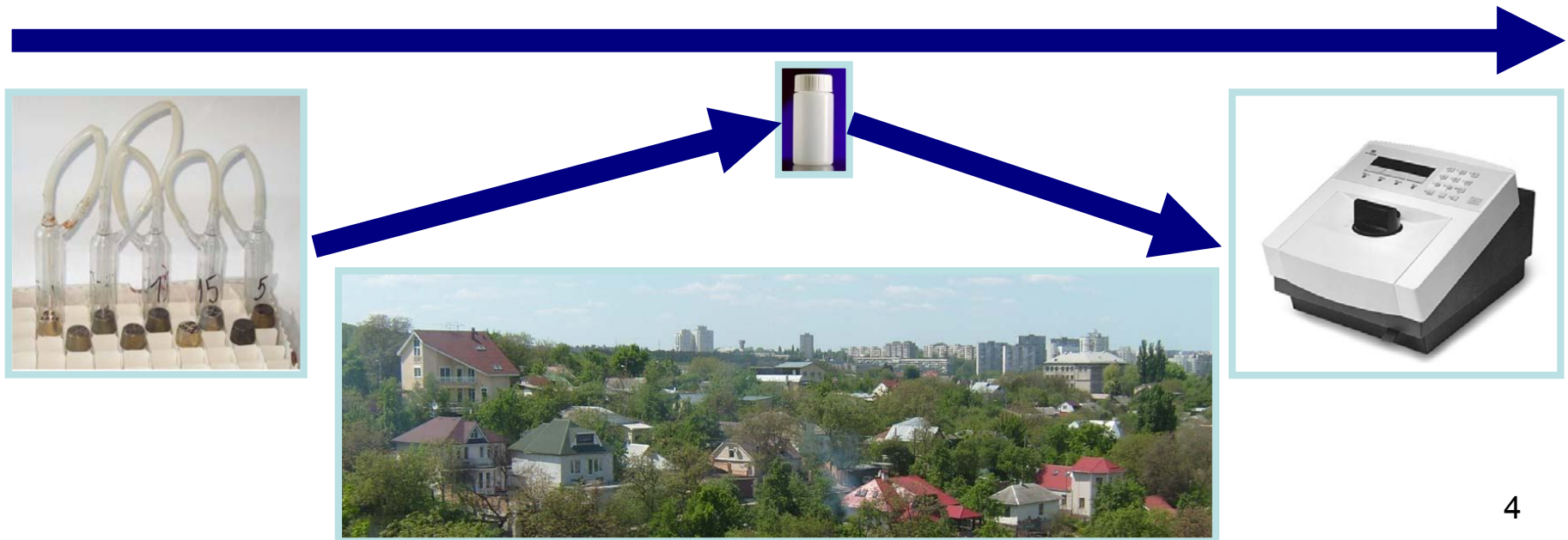
- U-tailings:
- How to locate borders of tailings body with high activity residues of U production?
- How good is tailings isolated (covered)?
- If U-tailings is a source of radon?

- Building sites:
- How high is radon level in soil gas?
- How intensive is radon flow from surface of soil?
- **What is a source generating radon flow ?**

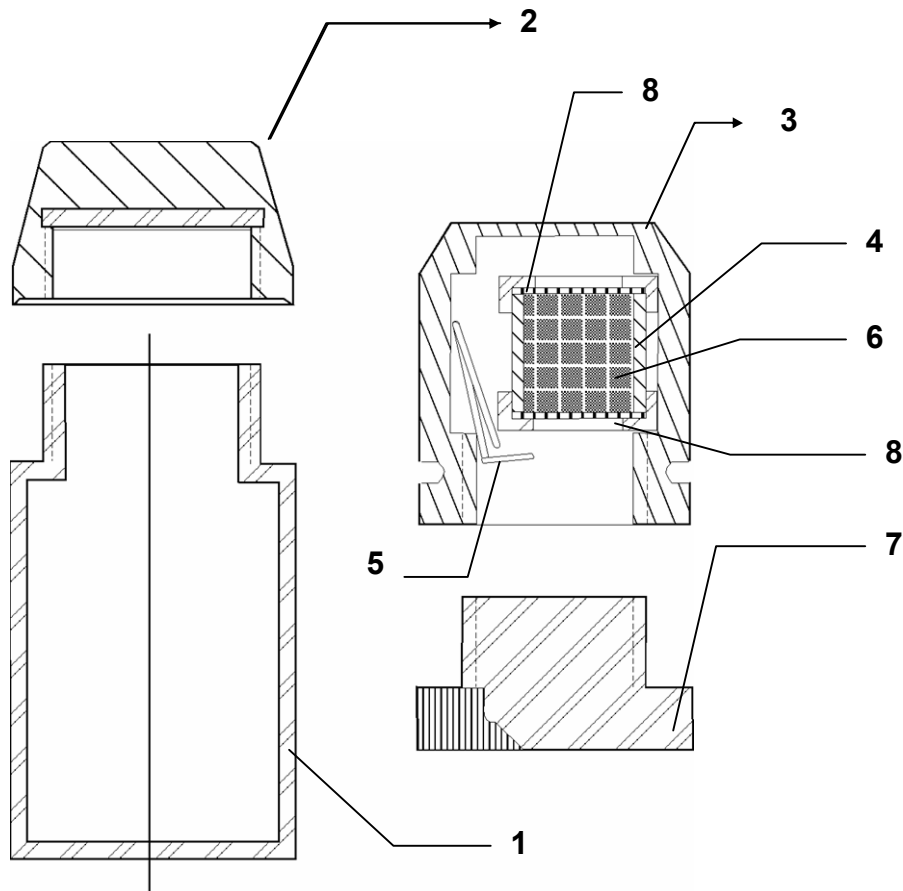
Equipment application concept

- Separate sampling and measurement taking into account weather conditions,
- Simple in use sampling approaches,
- Equipment:
 - Universal,
 - High sensitivity,
 - High throughput,
- High developed technology (because of wide range of application) – **LSC**.

Radon in soil gas measurement



Radon in air measurement system based on charcoal and LSC



1 – Teflon vial, 20 ml; 2 – vial cap; 3 – capsule with activated charcoal; 4 – container for activated charcoal, 5 – Metal spring-holder, 6 – tabulated activated charcoal, 7 – cap for capsule, 8 – metal mesh.

Application:

Integral measurements of radon:

- 1 – in air (1-2 days);
- 2 – in soil gas (1 day);
- 3 – exhalation (radon flow from soil surface (1 day)).

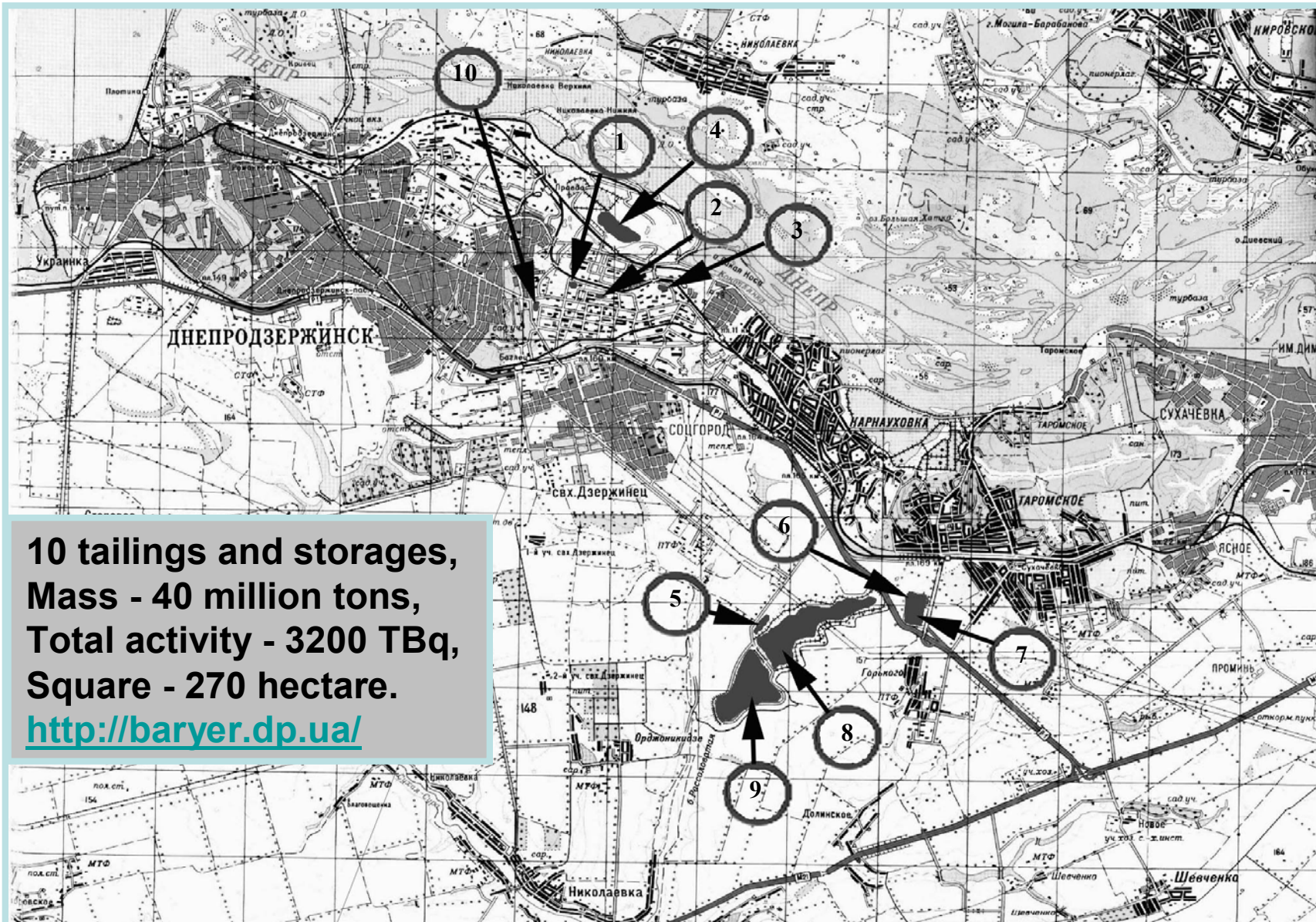
Radon flow measurement



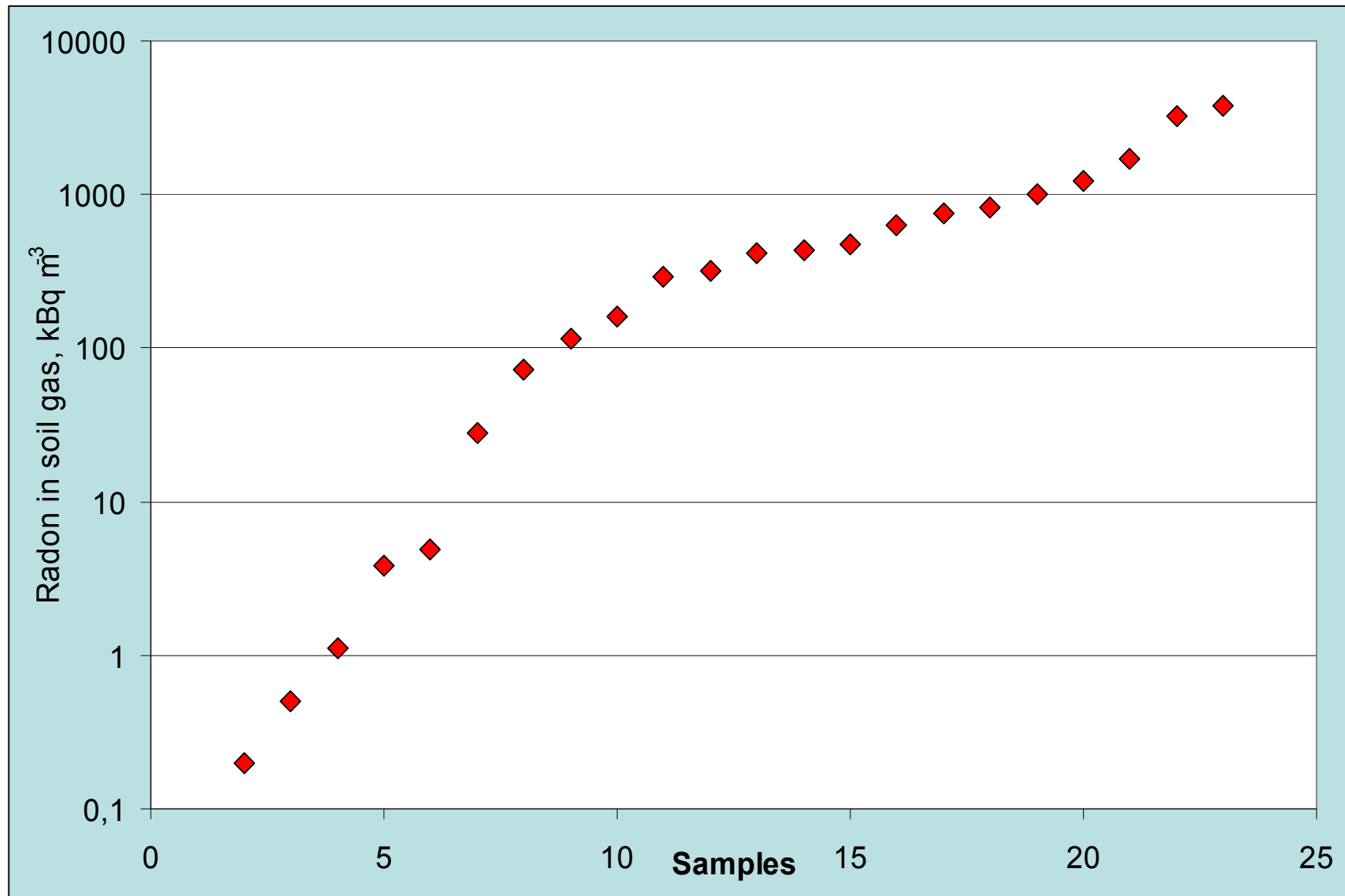




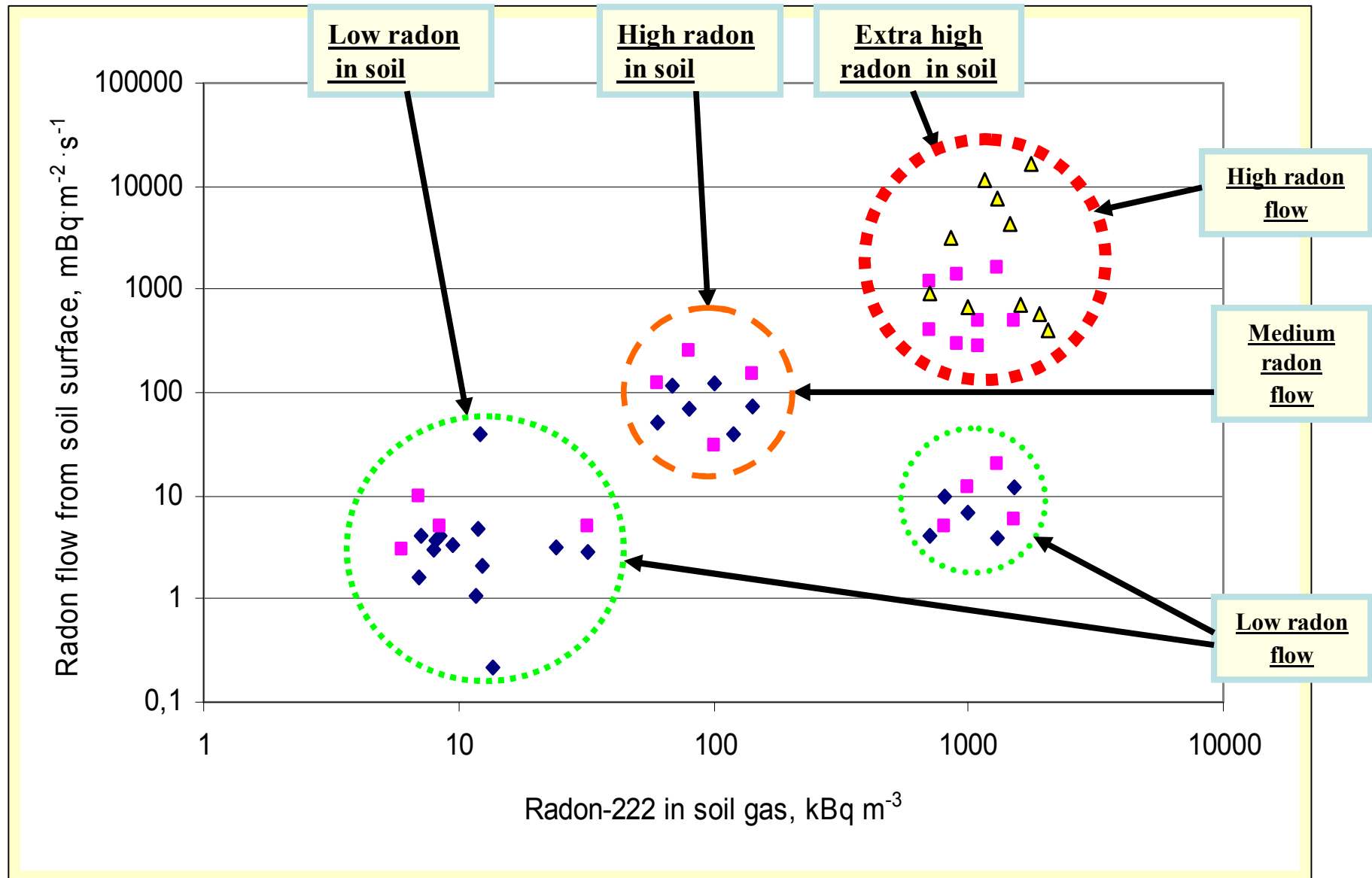
Location of U-tailings on territory of Dniprodzherzhynsk town



Estimation of radon in soil gas measurementon territory of U-tailings



Classification of sampling sites radon in soil gas and radon flow

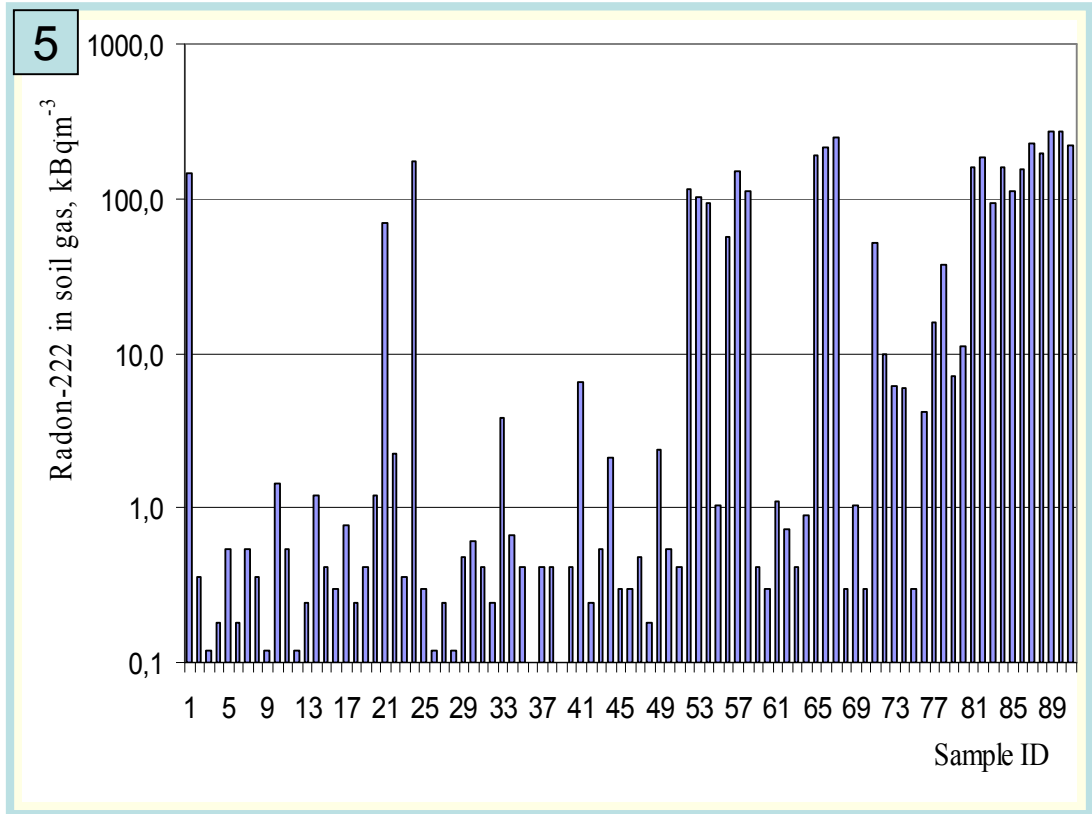


ALL SITES COULD BE CLASSIFIED AS:

- Natural soil (**NS**) with low radon in soil gas and low radon permeability,
- NS with low radon in soil gas, average and high radon permeability,
- Tailings with average radon in soil gas with average and high radon permeability,
- Tailings with **high radon** in soil gas with high radon permeability (UP) and other with thoroughly coating with low radon permeability (DOWN).

Building site case:

1. Air sampling system.
2. Portable LS Counter.
3. Building site view.
4. Sampling.
5. Radon in soil gas distribution.



Literature

1. Michael Buzinny. Methodical approaches for radon in soil gas measurement based on liquid scintillation counting. Hygiene of settled places: Collection of scientific works. - Kiev, 2008. - Vol. 52. - PP. 265-268.(In Ukrainian)
2. Buzinny M. A new approach to determining ^{222}Rn in air using liquid scintillation counting. LSC 1994: proc. of the Int. Conf. on Advances in Liquid Scintillation Spectrometry, Glasgow, Scotland, August 25-30, 1994. [Eds. G. T. Cook D. D. Harkness, A. B. MacKenzie B. F. Miller and E. M. Scott.]. 1995. – Tucson: Radiocarbon. - P. 137 - 140.
3. Buzinny M. Combined LSC Based Method for Radon in Air Measurement. LSC 2008: proc. of the Int. Conf. on Advances in Liquid Scintillation Spectrometry, Davos, Switzerland, May 25-30, 2008. [Eds. J.Eikenberg, M. Jagi, and H. Beer]. 2009. – Tucson: Radiocarbon. - P. 1 - 5.
4. Buzinny M., V.Sakhno, M.Romanchenko LSC-Based Approach for Radon in Soil Gas Measurement. LSC 2008: proc. of the Int. Conf. on Advances in Liquid Scintillation Spectrometry, Davos, Switzerland, May 25-30, 2008. [Eds. J.Eikenberg, M. Jagi, and H. Beer]. 2009. – Tucson: Radiocarbon. - P. 7 - 11.
5. Neznal M. et al. (2004): The new method for assessing the radon risk of building sites. - Czech. Geol. Survey Special Papers, 47. p., CGS Prague.

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