

## Czech Technical University in Prague, Experiment CTU17

**Main topic:** Nuclear security

**Keywords:** VR-1 reactor, nuclear security, physical protection, physical security

**Purpose:** Nuclear safety and security are the two most vital and crucial aspects associated to nuclear technology. Nuclear security consists of physical protection, protection of nuclear installations, nuclear materials against unauthorised use, as well as cyber security and information security. Any nuclear installation can be potential target for sabotage or theft of nuclear fuel which is possessed at a reactor and that is why it should be protected, i.e. nuclear security should be implemented there.

**Level of exercise:**  Basic  Advanced  Complex  
**Level of education:**  BSc  MSc  PhD

### What you will learn:

Learning objective of the experiment is to learn and to understand the basic principles of physical security at a nuclear reactor. Hands-on activities related to physical security are very important for anyone directly involved in the reactor operation, design or reactor safety analysis, and nuclear education. Physical security in practice is highly suitable for students studying nuclear engineering as their major curriculum.

### Important information:

- Minimal size of student group: 3
- Maximal size of student group: 6
- Overall duration of the experiment (in wall clock hours): 3



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Possibility to perform experiment on demand:  Yes  No  
Frequency of occurrence: On demand, several times a year  
Examination modalities: Protocol, evaluation, discussion  
Teaching languages: English, Czech

Pre-knowledge required: Pre-knowledge are not required

### Instruments required for exercise:

- Physical security laboratory
- The VR-1 reactor hall

### Execution:

Physical security in practice at the Training reactor VR-1 explains basic principles of physical protection system at a reactor. Three objectives of a physical protection system (facility characterization, target identification, and threat definition) are explained together with the basic principles of a physical protection system design (detection, delay, and response). The students have chance to see various types of detection elements which are a part of a physical security laboratory (both interior and exterior systems) and to carry out evaluation and risk analysis of a hypothetical research reactor. Hand-on activity on physical security also covers a visit of some security systems of the VR-1 reactor.

### Limitations:

No particular limitation for this experiment, only general requirements for entry to research nuclear installation according to the Czech nuclear legislation should be fulfilled.

