# MODERNIZATION OF PERSONAL PROTECTIVE EQUIPMENT FOR WORKERS AT RADIATION-HAZARDOUS FACILITIES

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**Abstract.** The description of the latest protective clothing, which is intended for emergency and post-emergency work on the territory of a nuclear power plant has been described in the article. The new design of clothing protects against increased radiation background, and high temperatures can be used together with insulating means of respiratory protection

**Keywords*:*** protective clothing, construction.

**Анотація.** У статті наведено опис новітнього захисного одягу, який призначено до виконання аварійних і після аварійних робіт на території атомної електричної станції. Нова конструкція одягу захищає від підвищеного радіаційного фону, високих температур, може використовуватися спільно з ізолювальними засобами захисту органів дихання**.**

**Ключові слова:** захисний одяг, конструкція.

**Introduction**. A significant problem is the possibility of rapid elimination of physical damage to nuclear power plants, in the absence of significant trained human resources and possible leakage of radioactive fuel. In this case, a significant advantage would be the presence of a protective suit for personnel to wear, and the ability to video and audio communication in that costume.

**The purpose of the work**. This paper are a consideration of a possible structure of a universal protective suit for NPP personnel.

**Methods, materials and research results.** The suit should consist of three main parts: the inner part, the middle protective gap and the outer part.

As the innermost layer, the thermal barrier plays a crucial role in the overall performance of the fire suit's assembly. Its main properties are: providing insulation by creating air cushions and micro climate chambers within the garment to favour comfort and minimize heat stress, wicking moisture away from the body to increase wearer comfort, facilitating easy donning/doffing of the garment, a slick liner will provide a perceived sense of comfort as the wearer won't need to fight with the undergarments in order to put on or move in the suit. Protecting the moisture barrier from any damage coming from the inside part of the garment. A communicator and a camera should also be attached to the head part for contact with center and other employees [1].

The middle protective gap must consist membrane facing the body that's provides better breathability and comfort, group of lead plates protecting the body of the carrier, interconnected by a layer of light polymers and attached to both membranes, and membrane facing the body, that's provides better breathability and comfort. The protective part of the head should consist of a thick layer of a mixture of lead and glass, in the form of a hemisphere for a better view of the outer space.

Also, this hemisphere should be covered with a photochromic layer for better performance at different light levels [2].

The outer part mast be made out of metallized material based on wool to withstand external extreme temperatures. Also outer part must have mountings for self-contained breathing apparatus (SCBA). The closed-circuit type, also known as a rebreather, operates by filtering, supplementing, and recirculating exhaled gas [3].

Fig. 1. Theoretical view of the suit

Main benefits:

- High level of protection
- High level of convenience
- Ability to operate in extreme temperatures

Main downfalls:

- High cost of the suit
- High weight of the suit

**Conclusion**. This type of suit gives a good level of temperature and radiation, high manufacturing cost, high weight (about 50-60 kilograms), and intuitively easy to use. On my opinion each employees that works on radiation-hazardous facility, such as the reactor core and protection system, pipelines, primary circuit equipment, holding pools, decontamination sites, liquid radioactive waste disposal systems mast use one of those.

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