

NUCLEAR SECURITY ENHANCEMENT FOR A TYPICAL NUCLEAR FUEL FABRICATION FACILITY WITH ENRICHED URANIUM

Hade Elsayed

ETRR-2 Complex, Egyptian Atomic Energy Authority, Egypt

elsayedhade@yahoo.com

Abstract

In uranium fuel fabrication facilities with low enriched uranium 20% which uses in research reactors, large amounts of radioactive material are present in a dispersible form. This is particularly so in the early stages of the fuel fabrication process. In addition, the radioactive material encountered exists in diverse chemical and physical forms and is used in conjunction with flammable or chemically reactive substances as part of the process. Thus, in these facilities, the main hazards are potential criticality and releases of uranium hexafluoride (UF₆) and U₃O₈, from which workers, public and the environment should be protected. Nuclear facilities are vulnerable to terrorist attacks or thefts of nuclear material, especially for fissile materials which can be used for nuclear weapons. In Nuclear Fuel for Research reactors typically use a form of uranium that is more highly enriched (20 %) than that used for power reactors, which may be a more attractive target for theft. For this reasons, It is very Important to improvement the nuclear security for Nuclear Fuel Fabrication Facility to prevent any Sabotage or threat against the facility or radioactive material. The operations with the fissile materials such as ²³⁵U introduce the risk of a criticality accident that may be lethal to nearby personnel and can lead the facility to shutdown. Therefore, the prevention of a nuclear criticality accident or the sabotage in these facilities should play a major role in the design of a nuclear facility. The objectives of criticality safety are to prevent a self-sustained nuclear chain reaction and to minimize the consequences. In this paper we will perform the nuclear security system exists in the facility and discuss the weak points appear in the facility. And then we will be proposed the upgrade the nuclear security in this facility to overcome these weak points.