

Application of the Additional Protocol to Research and Development Activities

Example One:

Activity: Royal Military College (RMC) or a university sponsored with federal funds is designing a new type of research reactor.

Determination: This is declarable under 2.a.(i) because it contributes to a fuel cycle process (reactors), does not involve nuclear material, and the government either owns the university or is sponsoring the research.

Example Two:

Activity: A hospital is upgrading its x-ray equipment.

Determination: This is not declarable under 2.a.(i) or 2.b.(i) because it does not contribute to a fuel cycle process.

Example Three:

Activity: A uranium mine is researching ways to better extract uranium from the ground.

Determination: This is not declarable under 2.a.(i) or 2.b.(i) because it does not contribute to one of the specified fuel cycle processes. The activity contributes to mining, which is not specified.

Example Four:

Activity: Develop theoretical models for new reactor fuel types. Perform experiments on simulated fuel rods to measure properties to demonstrate the theoretical models are valid. Government-sponsored.

Determination: Declarable under 2.a.(i). This contributes to development of **new** fuel fabrication processes. If fuel with actual nuclear material is fabricated or tested, the nuclear material is declarable under comprehensive safeguards and the activity is declarable under 2.a.(iii) since it is in a building on a site.

Example Five:

Activity: Using a particle accelerator, measure the neutron cross-section of non-nuclear materials. Some of these materials, such as zirconium, are used in nuclear reactors, but the research was not done with the intent of any particular application. Government-sponsored.

Determination: Not declarable under 2.a.(i) or 2.b.(i). This is basic research and is intended to add to a body of scientific knowledge.

Example Six:

Activity: A university is doing research on medical use of radiation to treat cancer.

Determination: Not declarable under 2.a.(i) or 2.b.(i) because the research does not contribute to any nuclear fuel cycle activity, nor is it government sponsored.

Example Seven:

Activity: Develop software for reactor safety analysis of **existing** methods. Government-sponsored.

Determination: Not declarable as the research will not lead to advances in the fuel cycle.

Example Eight:

Activity: Develop software for reactor safety analysis of **new** methods. Government-sponsored.

Determination: Declarable under 2.a.(i). This contributes to development of reactor processes, and it is government funded.

Example Nine:

Activity: A government agency is undertaking a project to consolidate radioactive material such as cobalt and iodine to better protect it from illicit use. It is funding a university to research and develop procedures on storing the material to protect workers and the public.

Determination: This is not declarable under 2.a.(i) or 2.b.(i) because it does not contribute to a fuel cycle process.

Example Ten:

Activity: A private company is funding a professor at a university to study the processing of high level nuclear waste (containing plutonium) by using computer models to develop improvements. The process includes the separation of elements.

Determination: Declarable under 2.b.(i). This is private development of waste processing, as defined in Article 18.

Example Eleven:

Activity: A university is developing a monitoring system to detect cracking in zirconium tubes within a fuel assembly during operation. This is government sponsored.

Determination: Not declarable under 2.a.(i) or 2.b.(i). The monitoring system supports maintenance or monitoring of the reactor, and is not contributing to the development of a fuel cycle process.

Example Twelve:

Activity: RMC or a university using government funds is collaborating with a foreign private laboratory to develop a method to improve reactivity estimates for reactor concept development. The research includes computer simulations and lab testing using surrogate (nonnuclear) materials.

Determination: Declarable under 2.a.(i). The government is funding development of reactors. The research does not involve the use of any nuclear material. Research using computer simulations is no different than traditional modeling under the Additional Protocol.

Example Thirteen:

Activity: A university student's dissertation focuses on simulating a reactor core. The computer model is modifying an existing reactor design to improve neutron economy. This work is being done at a government-funded university and supported financially by a private company with government funds for the work.

Determination: Declarable under 2.a.(i). It contributes to development of an improved reactor process, and the research does not involve the use of any nuclear material.