Plutonium-238 Production Project

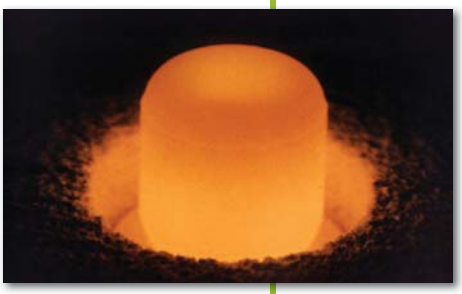
The U.S. Department of Energy's Office of Nuclear Energy

The production of Pu-238 is vital to the continued exploration of space and our national security.

The United States is initiating activities to reestablish the domestic production of plutonium-238 (Pu-238), which is required for radioisotope power systems used for National Aeronautics and Space Administration's (NASA) space missions, and for national security needs.

In the past, the Department of Energy obtained Pu-238 from the Savannah River Site K Reactor, which was taken off-line in the late 1980s. More recently, the Department has augmented its available inventory for non-national security missions by purchasing Pu-238 from Russia, but those stocks are limited, and Russia is no longer producing Pu-238. Only a limited amount of Pu-238 remains available for U.S. purchase under the current contract with Russia, which expires in January 2013.

The production of Pu-238 is vital to the continued exploration of space, and our national security. NASA's plans for an outer planets flagship mission to be launched in 2020 will exhast the remaining available supply of Pu-238. Additional Pu-238 is required. NASA has established Pu-238 requirements to meet the power and heating needs of planned missions to explore the outer planets and a range of other solar system destinations for the next two decades. Its requirement for Pu-238 is expected to remain constant in the more distant outyears.



WHY Pu-238?

Pu-238 was chosen as the heat source material because of its inherent characteristics. This isotope combines a high heat output with a long half-life, which allows radioisotope power systems to remain useful over long mission durations.

HOW WILL Pu-238 BE PRODUCED?

The Pu-238 production process consists of the fabrication of targets, irradiation of the targets in a nuclear reactor, and recovery of Pu-238 from the irradiated targets through chemical extraction. Facilities will have to be modified or constructed to reestablish target fabrication and Pu-238 recovery capabilities. Existing reactors, the Advanced Test Reactor (ATR) at Idaho National Laboratory and the High Flux Isotope Reactor (HFIR) at Oak Ridge National Laboratory, are suitable for target irradiation. As the primary user of Pu-238, NASA will share with DOE the cost of reestablishing this production capability.

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Program Budget

Pu-238 Production
($ in Millions)

	FY 2010 Actual	FY 2011 Request
	$0.0	$15.0

PLANNED PROGRAM ACCOMPLISHMENTS

FY 2011

- Complete National Environmental Policy Act requirements.
- Prepare a Conceptual Design.
- Develop a Safety Design Strategy.
- Prepare a Preliminary Security Vulnerability Assessment.
- Conduct a Technical Independent Project Review.
- Initiate target fabrication using existing laboratory facilities and equipment.
- Initiate target irradiations in ATR and HFIR.
- Finalize separations flow sheets using existing laboratory facilities and equipment.

The Advanced Test Reactor (ATR) has the capability to support production of Pu-238.