

## 2 PURPOSE AND NEED FOR ACTION

The United States Navy currently has 131 nuclear-powered warships in operation; in addition, 33 vessels either are under construction or are authorized for construction. These vessels, which represent more than 40 percent of the Navy's major combatant fleet, include all the ballistic missile submarines. Powering those vessels now in service requires the operation of 150 reactors. In addition, nine prototype naval reactors are in operation at DOE facilities to test designs and to train operators. The fuel for these reactors is enriched uranium that has been fabricated into reactor fuel cores.

Figure 2-1 shows the production cycle for the fuel used by naval reactors. This production fuel cycle is part of the Naval Nuclear Propulsion Program, which is sponsored jointly by the U.S. Departments of Energy and Defense. The cycle consists of the following steps:

1. Conversion of the enriched uranium, which is produced at a Department of Energy (DOE) Gaseous Diffusion Plant, into fuel materials at a commercial facility.
2. Manufacture of the fuel materials into reactor cores at a core manufacturing facility.
3. Shipment of the reactor cores to the naval reactors.

Figure 2-1 also shows the action described in this environmental assessment--the addition of a second facility to augment the existing commercial fuel materials facility. The purpose of this document is to assess the potential environmental impacts of the proposed action to construct and operate a new Fuel Materials Facility and of the alternatives to the proposed action.

### 2.1 NEED FOR SECOND SOURCE

This section presents part of the May 1981 Congressional testimony by Admiral H. G. Rickover on the need for a second source of fuel materials to be used in naval reactors (Rickover, 1981).

The Naval Nuclear Propulsion Program is currently dependent on one supplier for the nuclear fuel used in the production of cores for the Navy's nuclear powered ships. Such dependence subjects the Program to the risk of prolonged disruption in fuel supplies because of strikes, operational or regulatory directed shut-down, natural catastrophes, or other unanticipated problems. A four-month disruption in the supply of naval nuclear fuel in [1979] reduced the already limited inventory of fuel available and temporarily stopped new fuel development work having significant potential for future naval nuclear propulsion plants. Depending on a single source of production for all naval nuclear fuel imposes an unacceptable risk to the Program's ability to fulfill National security requirements.

An assured supply of naval nuclear fuel is vital for production of reactor cores since these cores are used to power over 40 percent of the Navy's combatant fleet. Existing inventory does not provide an acceptable contingency against unforeseen events. Within approximately six months, loss of production from the sole supplier would begin to impact on the core manufacturers. Moreover, capacity limitations at the sole supplier and anticipated program demands preclude the buildup of a significant fuel inventory over the next five years. Accordingly, the Naval Nuclear Propulsion Program has undertaken, as a matter of high priority, the development of a second source for naval nuclear fuel.

## 2.2 SELECTION OF SECOND SOURCE

Considerable effort has gone into finding a second supplier for naval fuel material. Because of differing core design and operating requirements, naval nuclear fuel material is unlike that used in civilian reactors. Moreover, the process used to manufacture naval fuel is different from that used by manufacturers of fuel for nonmilitary purposes. Naval fuel material must be chemically pure and specially processed to meet the stringent performance requirements needed to assure reliable naval reactor operation.

A survey of commercial firms that have experience with uranium fuel fabrication showed that only the current fuel materials supplier and the naval core manufacturers have the necessary experience to build and operate the new facility at a reasonable cost and in a reasonable timeframe. This finding was based on the unique product requirements and controls required by the specialized nature of naval fuel material manufacture. The core manufacturers have extensive experience with these requirements because of their core fabrication work and their close working relationships with the current fuel material supplier.

The current fuel material supplier rejected a request to establish a second facility. Both core manufacturers expressed interest in the project, but only if the Government would finance the construction effort and guarantee both business and profits. These firms cited the following reasons for their positions: the high investment, the relatively low volume of work, and the many other financial and regulatory uncertainties involved. In other words, they felt that the construction and operation of a fuel materials facility are unattractive as a private business venture.

Discussions with these potential suppliers showed that a fuel materials facility would not be commercially attractive unless the Government would provide funds and take the risks. In effect, the result would be a Government-owned, contractor-operated plant, built on private property where the contractor, rather than the Government, would have control.

For these reasons, the Department of Energy decided that public funds should not be spent to construct such a facility at a contractor-owned site. The Department proposed, therefore, to establish the second source of naval fuel materials at an existing DOE site.

REFERENCE FOR CHAPTER 2

Rickover, H. G. 1981. Testimony before the Committee on Armed Services, U.S. House of Representatives, on H.R. 2969, March 9, 1981.