NEW UF₆ PROCESS has made possible continuous production of uranium hexafluoride. In the operation pictured here, uranium dioxide is hydrofluorinated to uranium tetrafluoride in a special reactor with three Inconel alloy tubes. Inconel alloy is used because of its resistance to HF, even at high temperatures.

**Inconel alloy holds down corrosion as flowing HF soars to 1000°F**

A new continuous process provides an uninterrupted supply of fissionable uranium for nuclear reactors. The process is in use at the Paducah Gaseous Diffusion Plant in Kentucky, which is operated by the Union Carbide Corporation for the U.S. Atomic Energy Commission.

**Converts UO₃ to UF₄**

Uranium trioxide is reduced to the dioxide by hydrogen. UO₂ is fed into a reactor for conversion to UF₄. This is done by counterflowing anhydrous hydrogen fluoride at temperatures varying from an initial 500°F at entrance to a final 1000°F at the UF₄ exit.

The reactor used here consists of three Inconel® nickel-chromium alloy tubes. They are arranged horizontally, one above another, equipped with motor-driven ribbon screws.

Inconel alloy was selected for this application because it resists attack by HF and UF₄. It also provides the superior strength needed to stand up at 1000°F at the UF₄ exit.

**Then, UF₄ to UF₆**

Uranium hexafluoride is produced by reaction of the tetrafluoride with fluorine in a vertical water-cooled flame reactor constructed of Monel® nickel-copper alloy. The reactor wall temperature is 1000°F and Monel alloy is used because of its stubborn resistance to attack by fluorine at this temperature.

Both Inconel alloy and Monel alloy have the additional advantages of being easy to fabricate and weld. And both are readily available, usually from warehouse stocks.

**Are fluorine or fluorine compounds giving you trouble?** You can get lots of good, solid help in our recently published 24-page booklet, "Handling Fluorine and Fluorine Compounds." Write for a free copy today. *Inco trademark*