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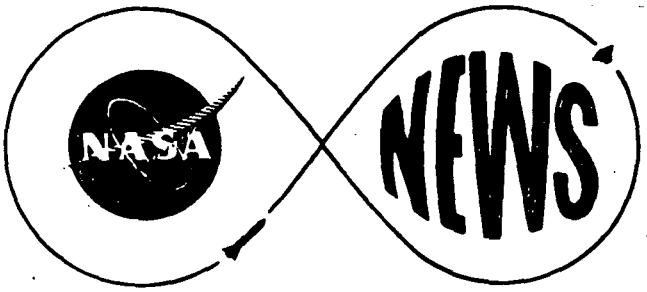

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NUCLEAR SYSTEM THAT BURNS ITS OWN WASTES SHOWS PROMISE

A nuclear fission energy system, capable of eliminating a significant amount of its radioactive wastes by burning them, shows considerable promise, scientists and engineers from NASA report.

A study of the system, a theoretical investigation conducted by computer analysis, is based on use of gaseous fuel nuclear reactors. Gaseous core reactors using a uranium plasma fuel have been under study and development for space propulsion by NASA for several years, in conjunction with the programs of the former AEC/NASA Space Nuclear Systems Office.

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The problem is to handle safely various long-lived high-level radioactive wastes produced in the fission process. Some wastes have a half-life of many thousands of years.

One answer may be to transform such radioactive wastes into harmless materials by bombarding them with neutrons, sub-atomic particles of matter which sustain the power-producing chain reaction in a nuclear reactor. The study shows that such a nuclear energy system might eliminate a significant amount of its own radioactive wastes.

Their unique characteristics make gaseous fuel reactors especially suited to burn up nuclear waste materials. They have a large neutron population. The fuel, a gaseous compound of uranium, can be readily circulated and returned to the reactor to burn up radioactive materials produced in the fuel.

NASA research on radioactive waste burn-up was conducted for a gaseous fuel reactor system, using a computer code for analyzing rates of production and elimination of high-level, long-lived waste products.

Computer analysis showed that a gaseous fuel reactor, after three years of operation, can establish a balance in rates of production and elimination of these waste products. Once this equilibrium has been established, no additional long-lived radioactive wastes will be produced, no matter how long the reactor is operated.

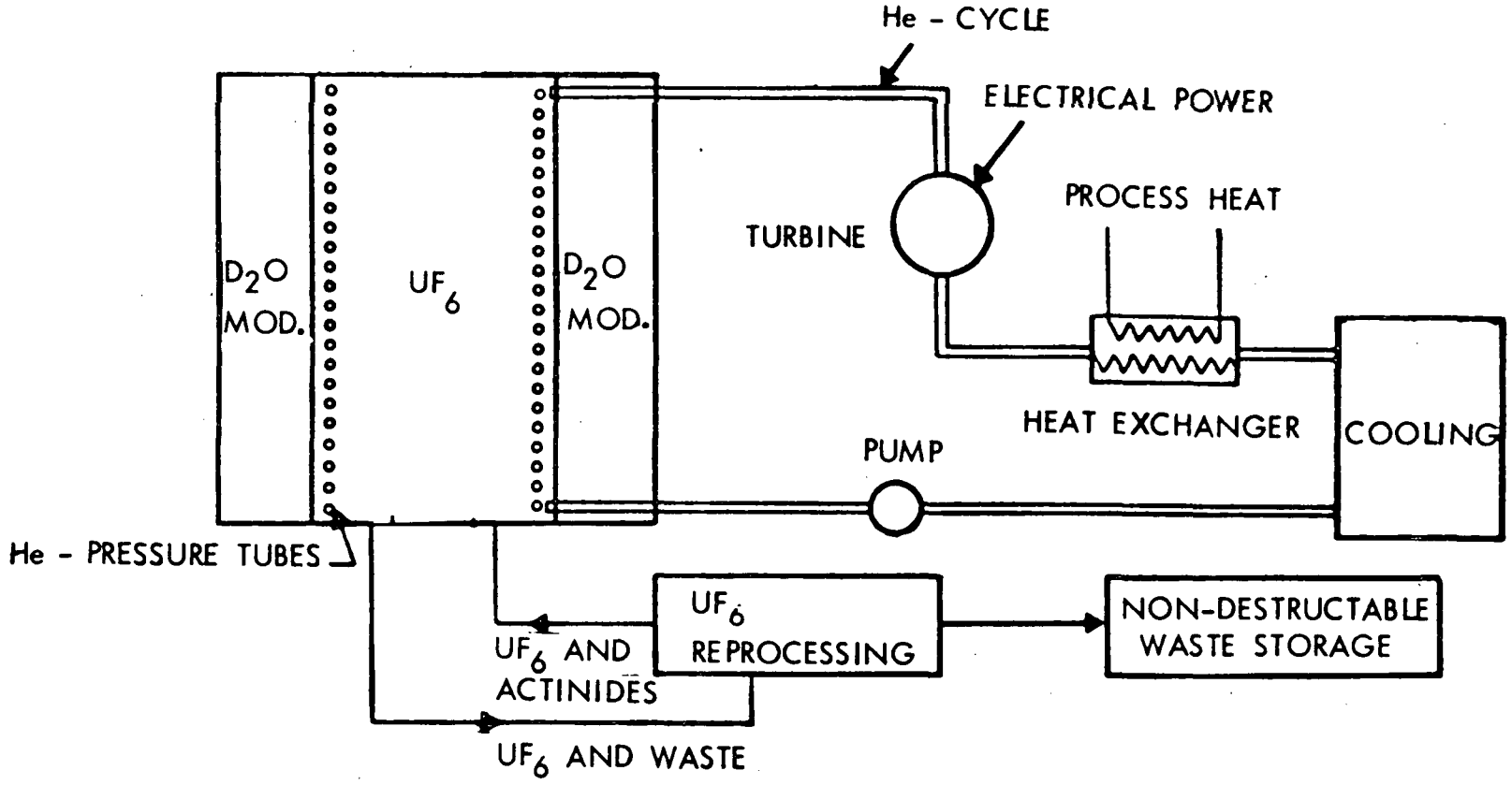
Such gaseous fuel reactors could also be designed to burn up wastes from conventional nuclear fission reactors.

According to Dr. Karlheinz Thom of NASA, the analysis did not include all wastes from fission energy. But results to date encourage expectations of even more innovations in the future. "After all," Dr. Thom said, "nuclear energy is only one generation old and it is presumptuous to assume that following generations could not contribute to nuclear safety."

Results of this theoretical study were described in a paper by R. Paternoster, and Drs. M. J. Ohanian, R. T. Schneider, University of Florida, and K. Thom, NASA. It was presented to the 1974 winter meeting of the American Nuclear Society in Washington, D.C.

Sponsored by NASA, the work on advanced nuclear power and propulsion systems for space use has the additional goal of making its results applicable to problems on Earth.

UF_6 NUCLEAR REACTOR SYSTEM



A nuclear fission energy system capable of eliminating a significant amount of its own radioactive wastes and waste products from conventional nuclear reactors shows considerable promise, according to a recently completed study.

The study is a theoretical investigation conducted by computer analysis and is based on gaseous fuel nuclear reactors.

Computer analysis shows that a gaseous fuel reactor, after three years of operation, can establish a balance in the rates of production and elimination of these waste products. This means that once this equilibrium has been established, no additional long-lived radioactive wastes will be produced, no matter how long the reactor is operated.

The gaseous fuel reactor could also be designed to burn up wastes from conventional nuclear fission reactors.

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