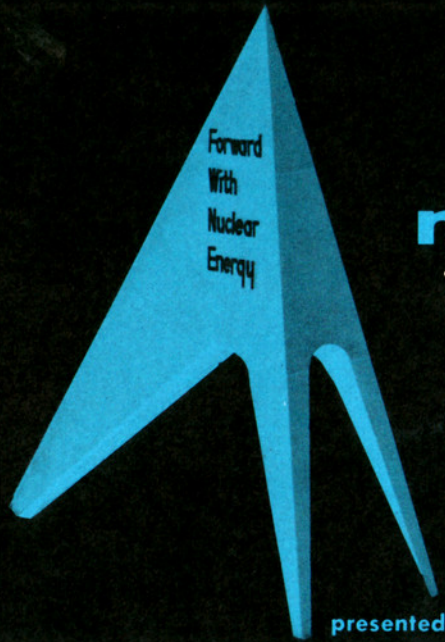
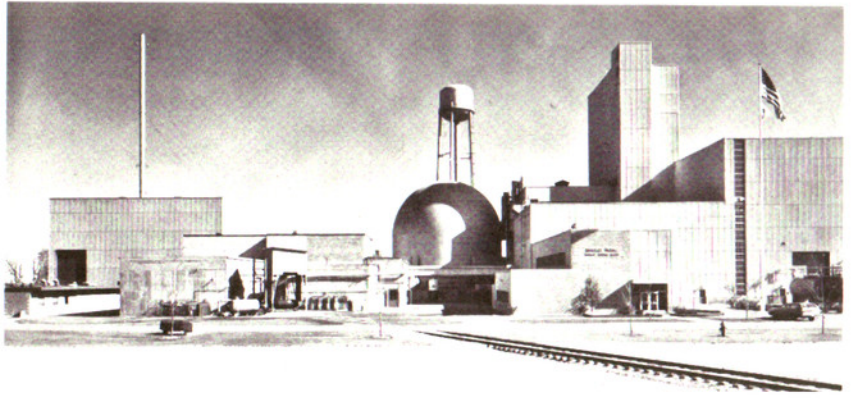


monroe faces tomorrow

THE STORY OF THE ENRICO FERMI ATOMIC POWER BREEDER REACTOR

presented as a community service by PEOPLES FEDERAL SAVINGS AND LOAN ASSOCIATION of monroe

The Enrico Fermi Atomic Power Breeder Reactor



A WORD OF INTRODUCTION

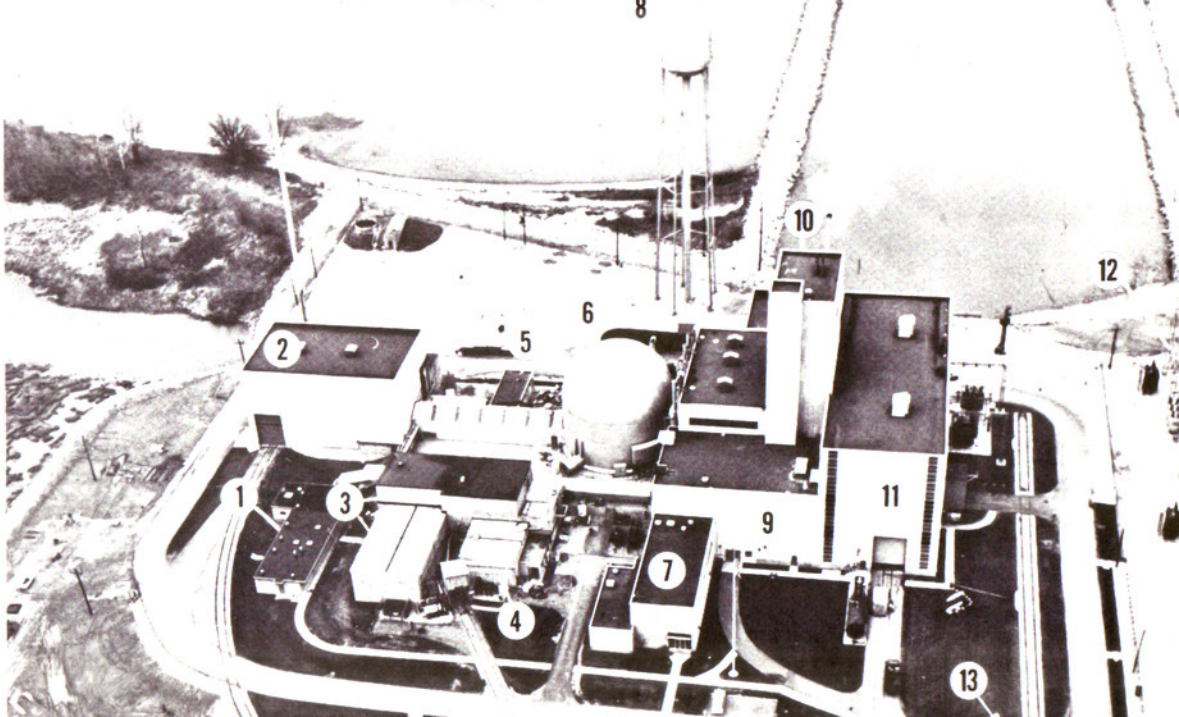
World interest has been generated concerning Monroe, with the construction of the Enrico Fermi Atomic Power Breeder Reactor—one of the world's first major uses of atomic energy for purposes of peace.

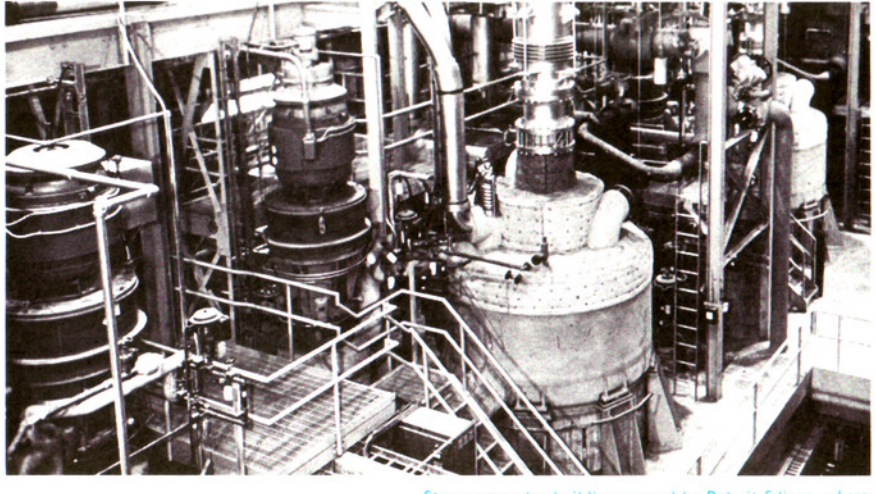
We at Peoples Federal felt that the preparation of this booklet would be beneficial in highlighting a few of the many ramifications of the atomic plant. It is for this reason that it has been prepared—to give you an insight into the operation of the plant, its objectives and history.

Winston Scheer, sr.

Winston Scheer, sr.,
President
Peoples Federal Savings and Loan Association

1. Health Physics Building
2. Fuel Element & Repair Building
3. Sodium Purification & Storage
4. Inert Gas Building
5. Ventilation Building
6. Reactor Containment Building
7. Plant Offices
8. Water Storage Tank
9. Control Center
10. Steam Generator Building
11. Turbine-Generator Building
12. Electrical Switching Station
13. Atomic Information Center





Steam generator building, owned by Detroit Edison, where steam will be produced for use in the turbine-generator.

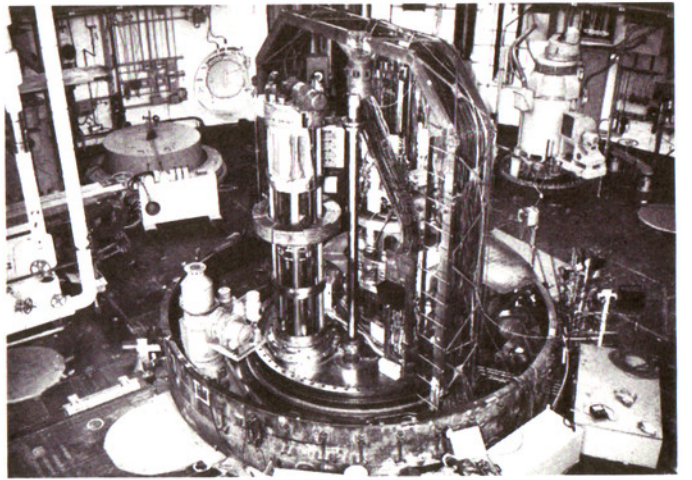
SIMPLIFIED PRINCIPLES OF MONROE'S ENRICO FERMI REACTOR

As its fissionable fuel, the fast breeder reactor uses alloy pins containing uranium partially enriched with fissionable U-235, assembled in the reactor core. Surrounding the fuel elements is a "blanket" containing non-fissionable uranium from which the U-235 has been removed.

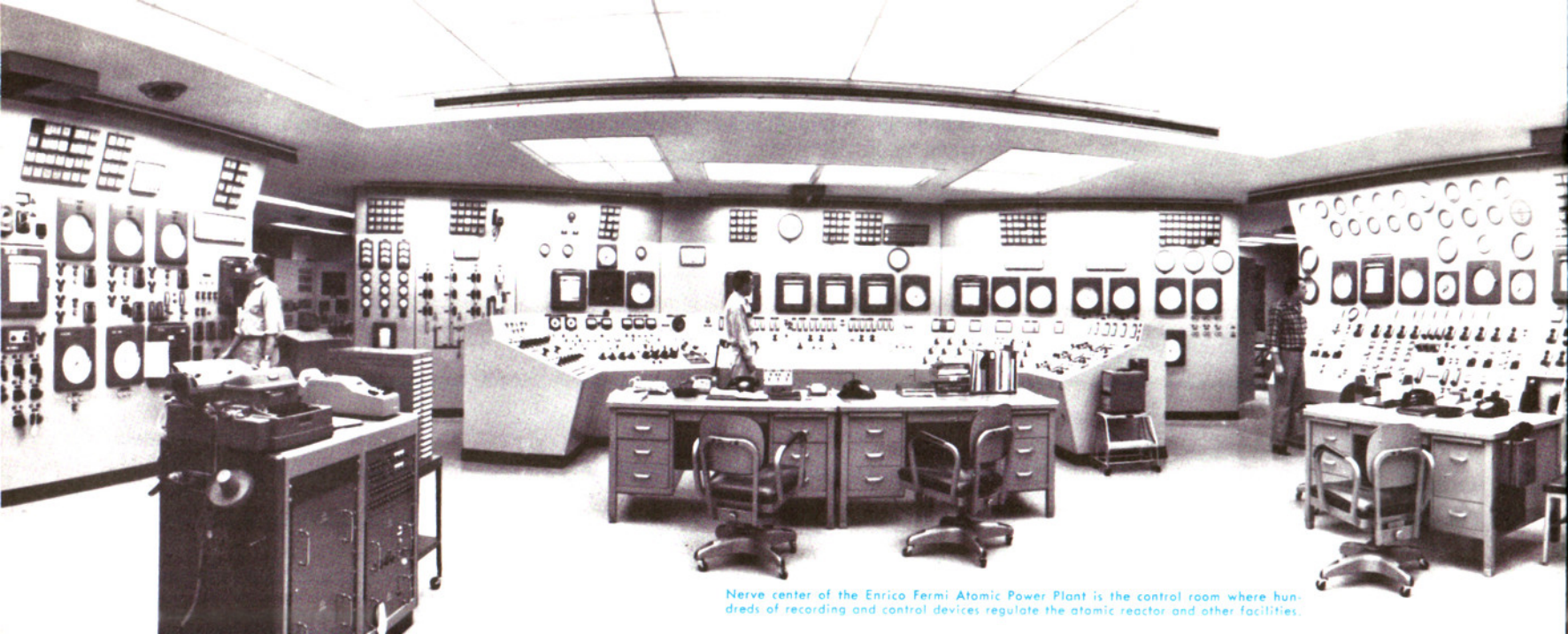
The U-235 atoms within the reactor core are forced to fission (split) and a chain reaction results, releasing intense heat energy both in the core and, to a lesser degree, in the "blanket" of fertile but non-fissionable material.

This tremendous heat is transported by a liquid metal, sodium, to a heat exchanger and thence transferred to a second liquid sodium system that is piped to the boiler. At the boiler the heat energy changes water into steam to drive the conventional turbines and generate electric power.

Meanwhile, through the fission and chain reaction, the non-fissionable fertile nuclear material "breeds" a new and fissionable fuel, plutonium. The breeder reactor thus both creates heat energy and produces more fissionable material than it consumes in the valuable by-product, plutonium.



Interior of reactor containment building during pre-operational testing. Mechanism and equipment in center is mounted on reactor vessel plug. It is enclosed by a steel dome.



Nerve center of the Enrico Fermi Atomic Power Plant is the control room where hundreds of recording and control devices regulate the atomic reactor and other facilities.

THE OBJECTIVES, HISTORY AND ORGANIZATION of the Breeder Reactor Project

The Enrico Fermi reactor is pioneering the use of atomic power by private industry under the "Atoms for Peace" program. It will demonstrate the potential "commercial" uses of this type of reactor and economically feasible, eventual application.

APDA grew out of proposals by Detroit Edison and Dow Chemical Company to study the use of nuclear heat in steam-electric power plants accepted by the AEC in 1950. In 1954, with more than 30 companies actively participating, it was decided to incorporate the organization as Atomic Power Development Associates, Inc.

The nuclear part of the Enrico Fermi Atomic Power Plant was financed, built and is owned and operated by the Power Reactor Development Company formed by 20 private-industry member companies. ATOMIC POWER DEVELOPMENT ASSOCIATES, INC., with 46 member companies, is responsible for design and development of the nuclear reactor to be used in the plant.

Walker L. Cisler of The Detroit Edison Company is President of both of the nonprofit corporations. Detroit Edison built and owns the electric power generating facilities.

Safety has been the keynote throughout the design of the reactor. Its relatively low pressure and temperatures, its intermediate sodium cycle and its gas-tight steel dome are only a few examples emphasizing how safety has been stressed.

A SUMMARY OF FACTS RELATING TO THE REACTOR

- ☐ The plant is named in honor of the late Dr. Enrico Fermi, the Italian-American scientist who, with his associates, was the first to initiate a sustained nuclear chain reaction.
- ☐ Like other nuclear reactors, it releases heat energy through controlled nuclear fission, to run a steam-electric turbine generator in the plant.
- ☐ The coolant used is a liquid metal, sodium.
- ☐ Unlike other reactors, it is a "breeder" type—so called because it produces more fissionable material than it consumes.
- ☐ It uses "pin-type" fuel elements of uranium alloy partially enriched in U-235. The new fuel produced through the chain reaction is fissionable plutonium.
- ☐ The plant has a capacity of 100,000 kilowatts and the reactor can provide electricity for a quarter of a million people.

THE EXHIBIT HALL contains exhibits and scale models of the plant, as well as slides and films. It is open to the public Tuesday through Saturday from 10:00 a.m. to 4:00 p.m.