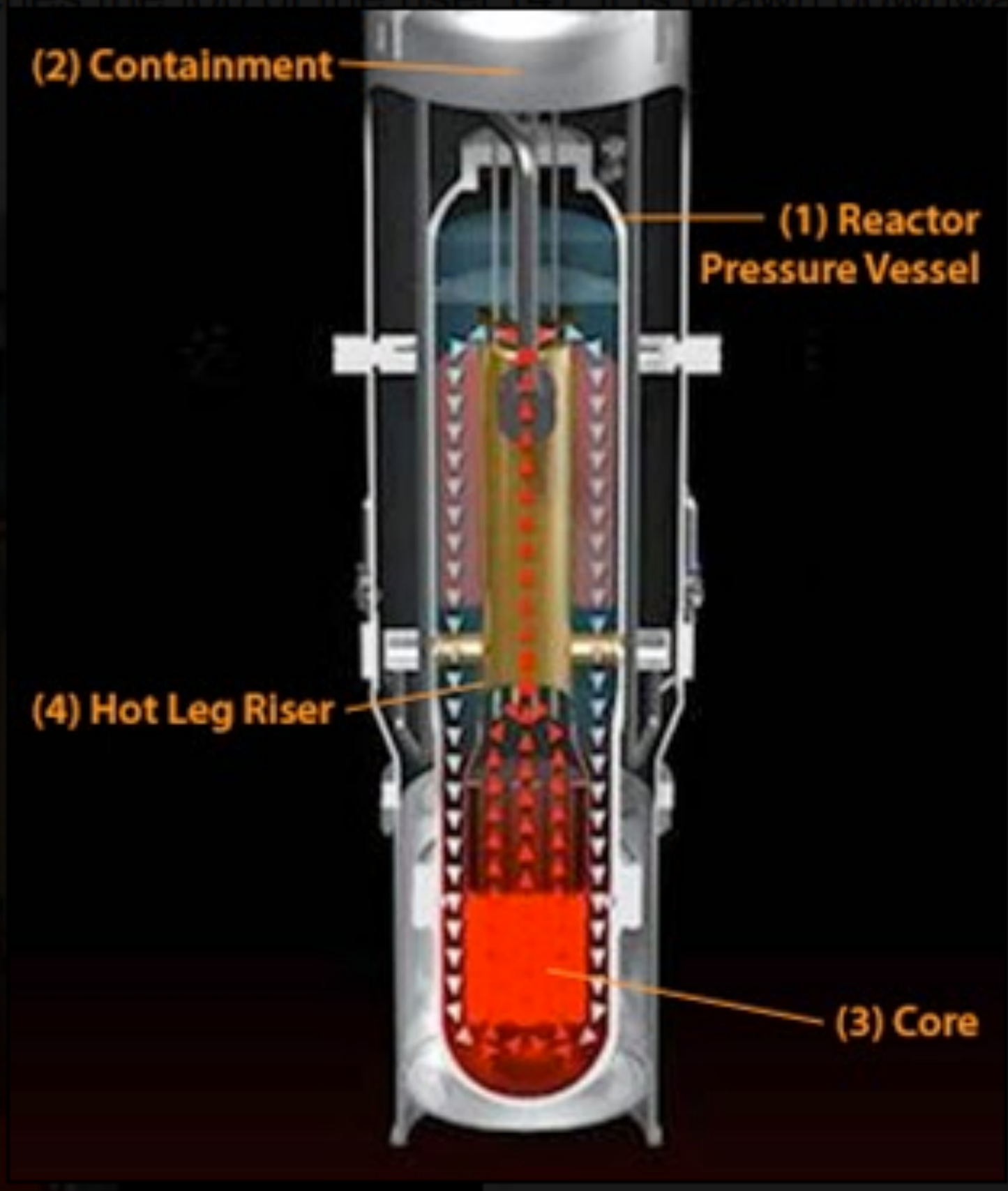
SMRs
MSRs
&
SMMSRs

Small (25 MWe up) reactors for near-term deployment – development well advanced

Name	Capacity	Type	Developer
VBER-300	300 MWe	PWR	OKBM, Russia
NuScale	50 MWe	PWR	NuScale Power + Fluor, USA
Westinghouse SMR	225 MWe	PWR	Westinghouse, USA*
mPower	180 MWe	PWR	Babcock & Wilcox + Bechtel, USA*
SMR-160	160 MWe	PWR	Holtec, USA
ACP100	100 MWe	PWR	CNNC & Guodian, China
SMART	100 MWe	PWR	KAERI, South Korea
PBMR	165 MWe	HTR	PBMR, South Africa; NPMC, USA*
Prism	311 MWe	FNR	GE-Hitachi, USA
BREST	300 MWe	FNR	RDIPE, Russia
SVBR-100	100 MWe	FNR	AKME-engineering, Russia

NuScale


(2) Containment
(1) Reactor Pressure Vessel
(4) Hot Leg Riser
(3) Core

Factory Manufacturing

NuScale Power Module includes Containment and Reactor Vessel

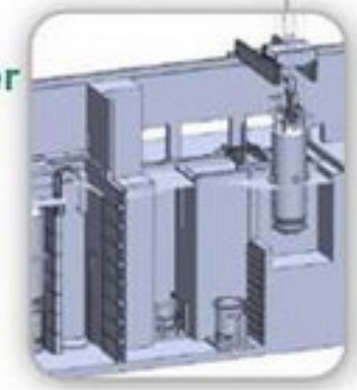
Shipped by Truck, Rail, or Barge

Skid-Mounted Steam Turbine/Generator

Control Room provides enhanced security and state-of-the-art controls

12 Module Reactor Building

Containment
Reactor Vessel
Steam Generator
Fuel



Each Module is refueled underwater while the remainder of the plant produces power

- Refueled once every 24 months
- Capable of 48-month fuel cycle
- 10 day refueling target

Each Module Installed in its own Isolated Bay

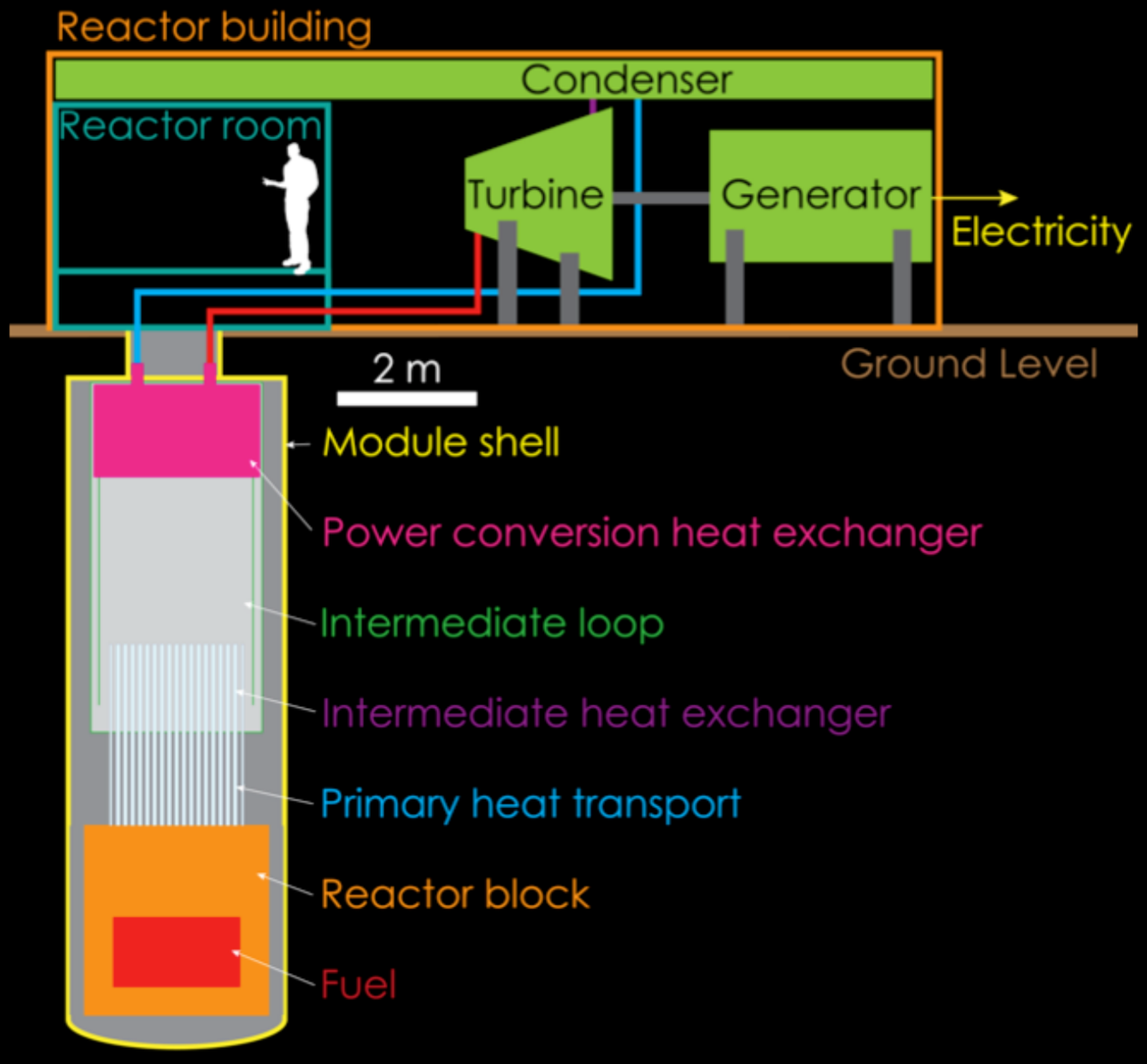
- Natural Circulation (No Reactor Coolant Pumps)
- 37 Standard 17X17 PWR Fuel (Half-Height) Fuel Assemblies
- Standard Magnetic Jack Control Rod Drives
- Internal Helical Coil Steam Generators and Pressurizer
- 50 MWe Gross Power

NuScale Plant Overview

Current Construction vs. Factory Built
and delivered by truck.

OKLO

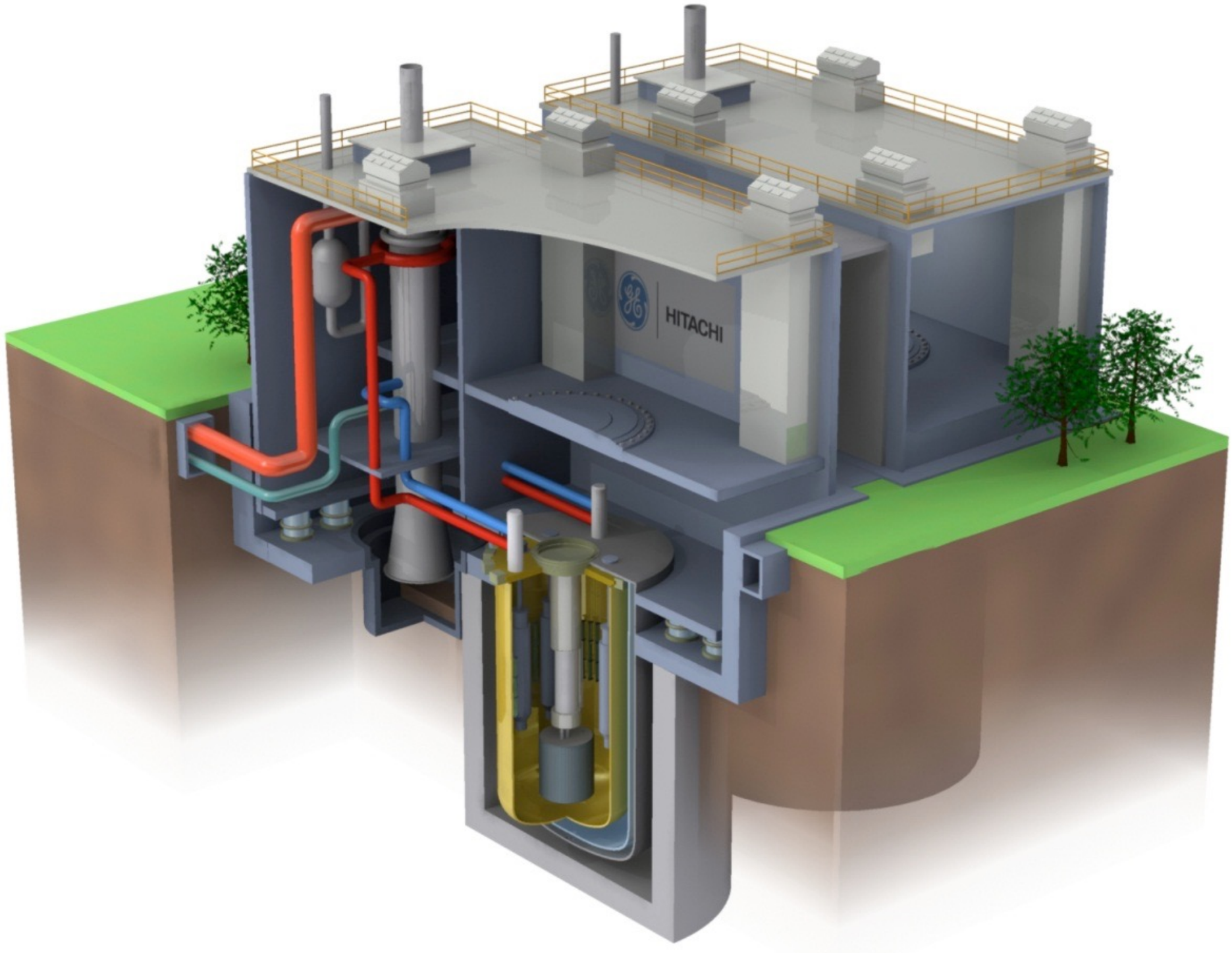
A Nuclear Battery



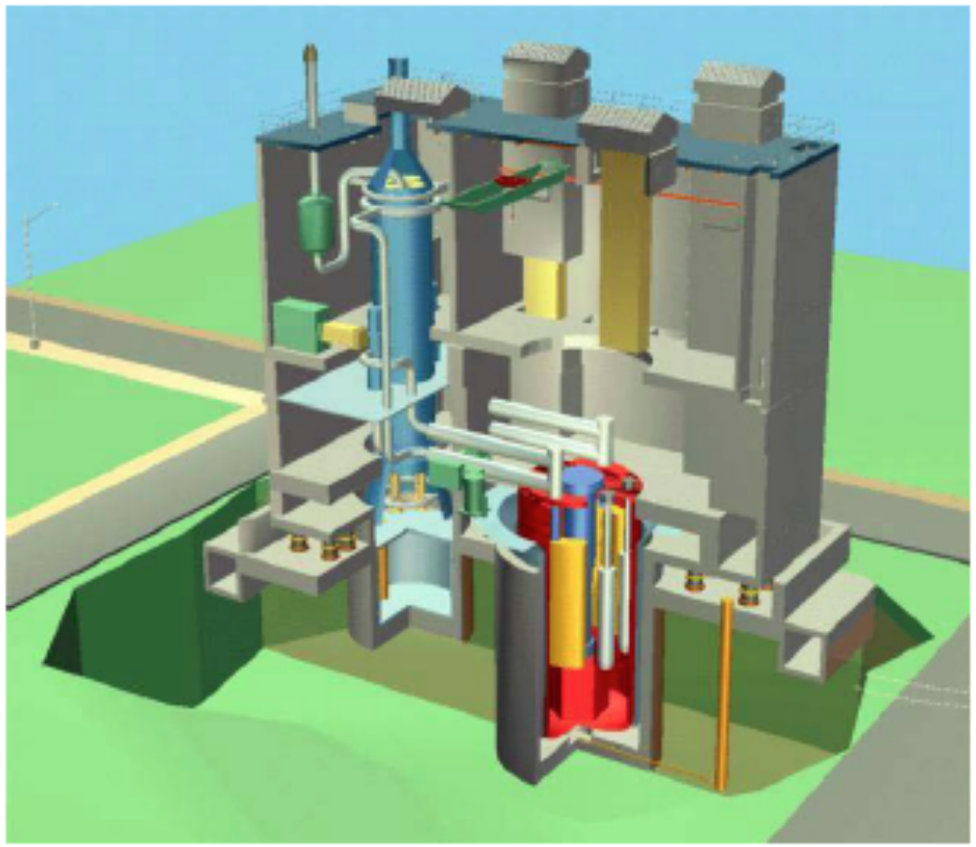
- 2-3 MW output
- Completely passive
- No moving parts in reactor
- Sub-atmospheric pressure
- 12 year fuel lifetime
- Behaves like a thermal battery


oklo
oklo
oklo
oklo

PRISM



PRISM

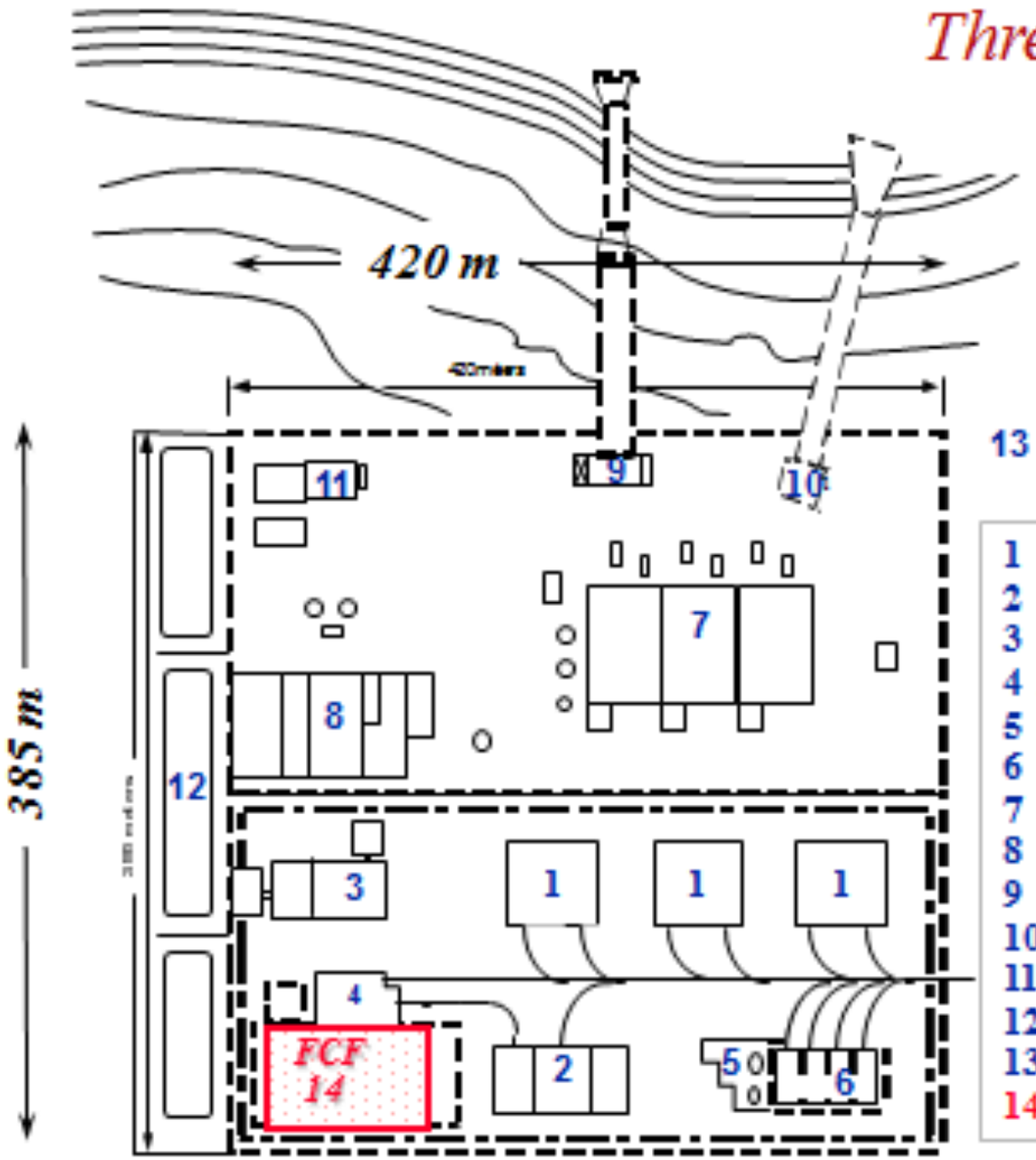


+ 840 MWth & 311 MWe
+ Na cooled fast reactor
+ Passive safety
+ Modular/scalable
+ Factory built
+ Flexible fuel cycle (broad input composition)
+ Metal or oxide fuel (metal pref.)
+ Extensive component testing

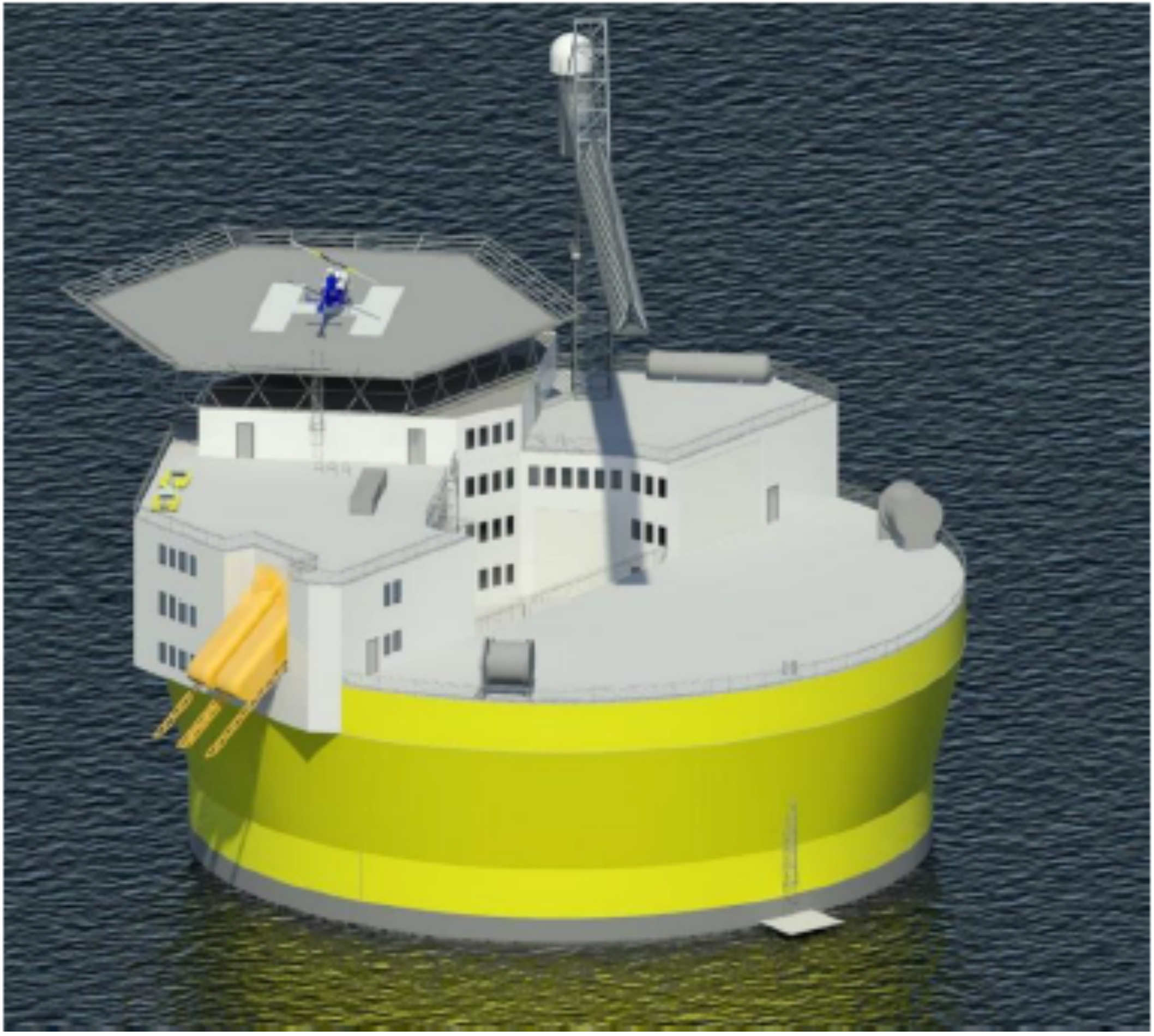
GE S-PRISM - Three Power Block Plot Plan

Three Power Block Plant

2,280 MWe (net)



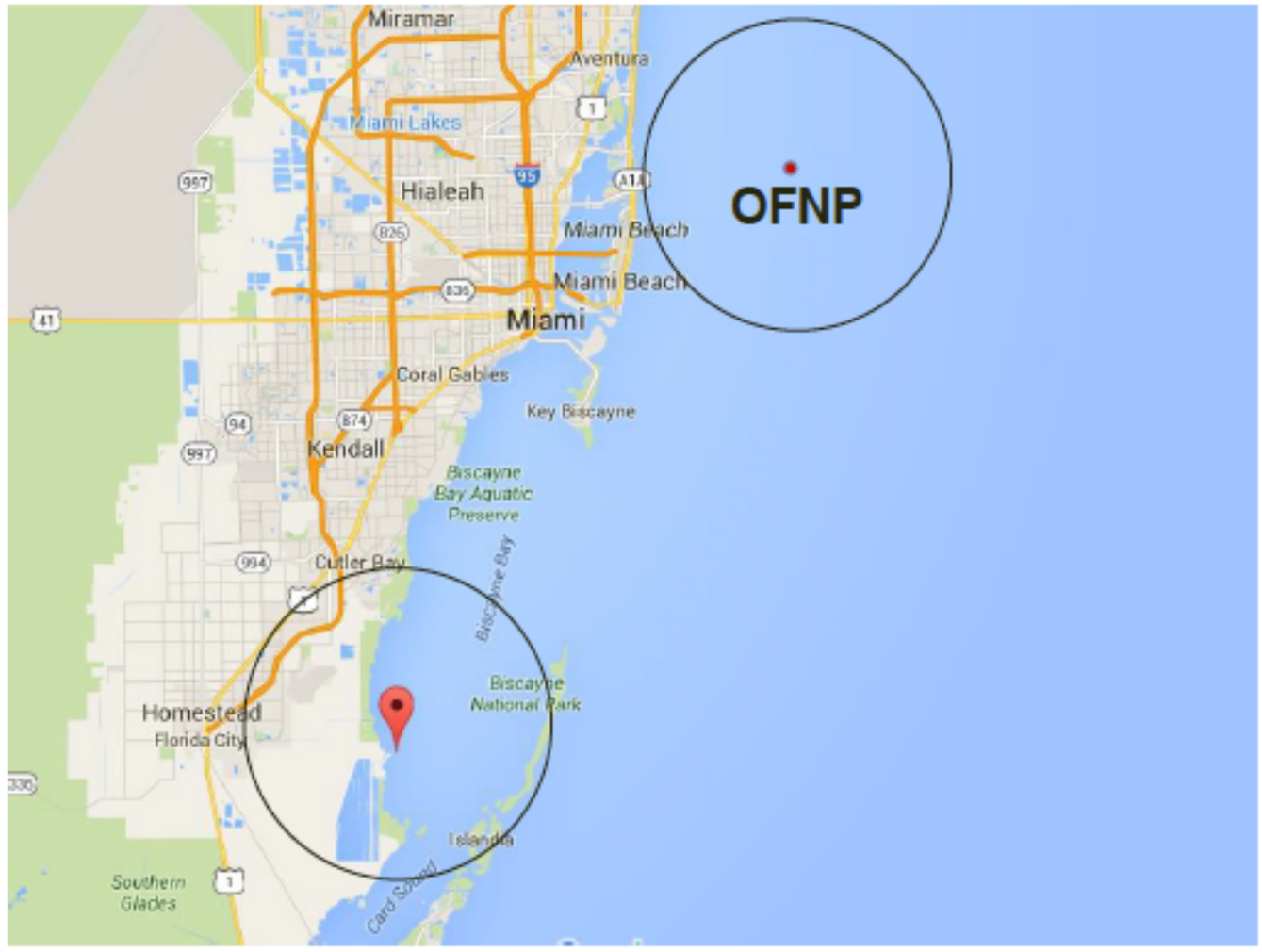
1 Reactor Building (2 NSSS/block)
2 Reactor Maintenance Facility
3 Control Facility
4 New and Spent Fuel Handling Facility
5 Assembly Facility
6 Cask Storage Facility
7 Turbine-Generator Facility
8 Maintenance Facility
9 Circulating Water Inlet Pump Station
10 Circulating Water Discharge
11 Waste Treatment
12 Parking Lot
13 Switch Yard
14 Optional Spent Fuel Facility



Plant Construction and Deployment

Moved to transport ship (dry tow, 10-12 knots)
or launched to sea (wet tow, 6 knots)

Designed for Superior Safety

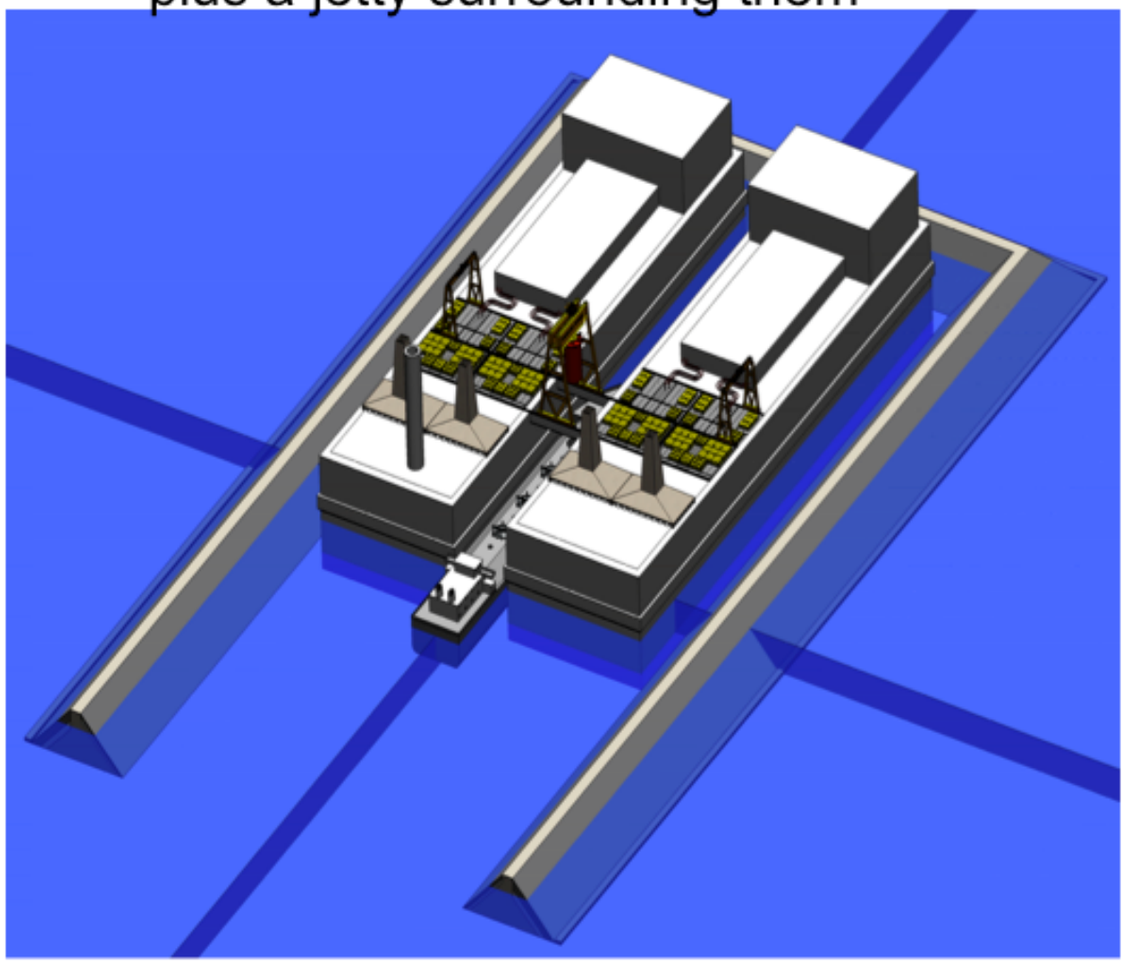


Plant	Population within 10-mi radius	Evacuation plan	Distance from major load center
Indian Point	~270,000	Yes	25 mi from NYC
OFNP NYC	0	No	<15 mi from NYC
Turkey Point	~160,000	Yes	21 mi from Miami
OFNP Miami	0	No	<15 mi from Miami

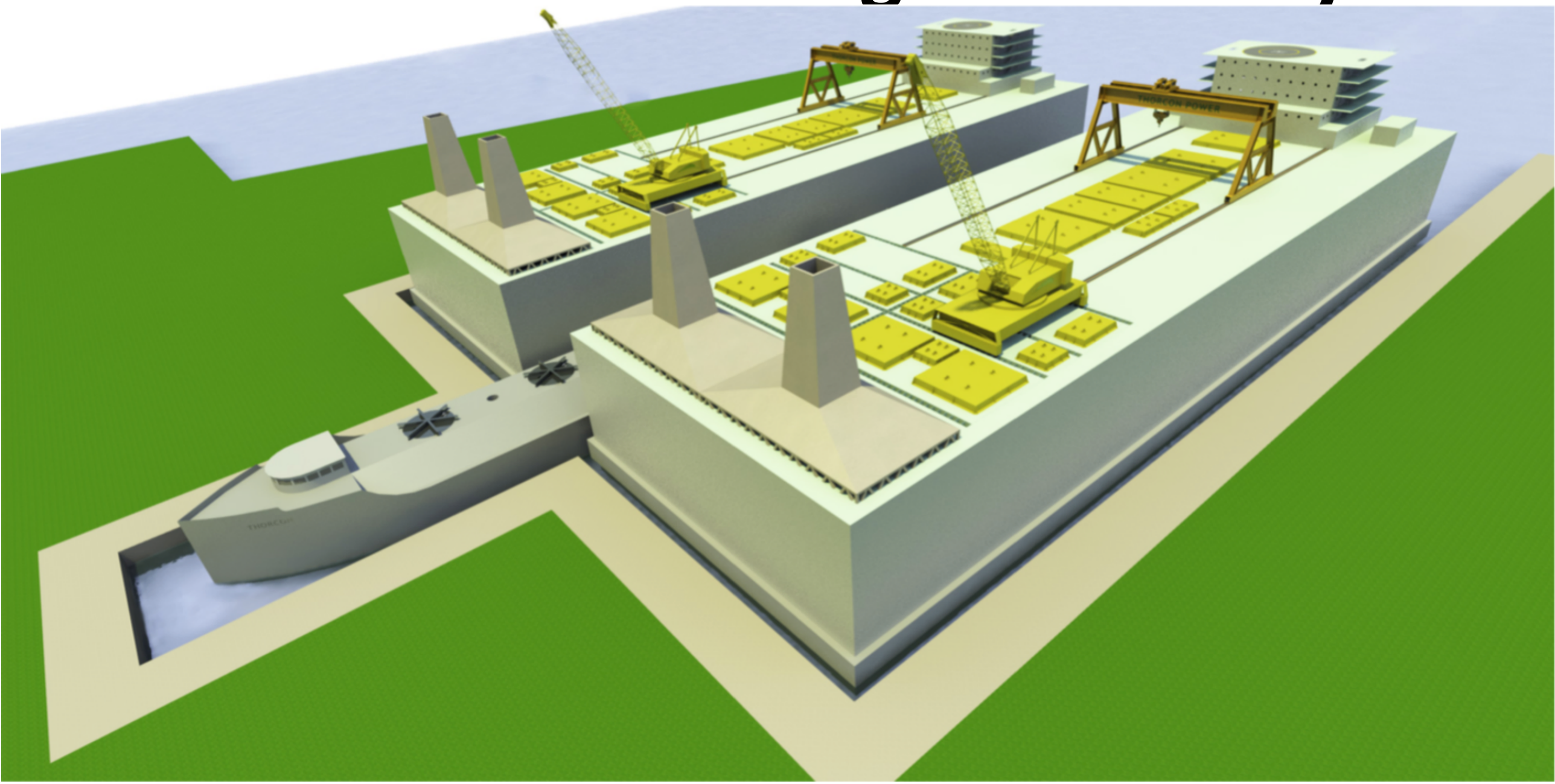
Build Nuclear Power Plants Like ULCC's

Ultra large crude carrier cost $89M in 2001
Largest operating oil tankers in the world.
Hellespont Alhambra, Tara, Fairfax, Metropolis
Architected and managed by Jack Devanney

ThorConIsle
Each barge is 500 MWe
60% the size of ULCCs
Graphic shows two 500 MWe barges
plus a jetty surrounding them



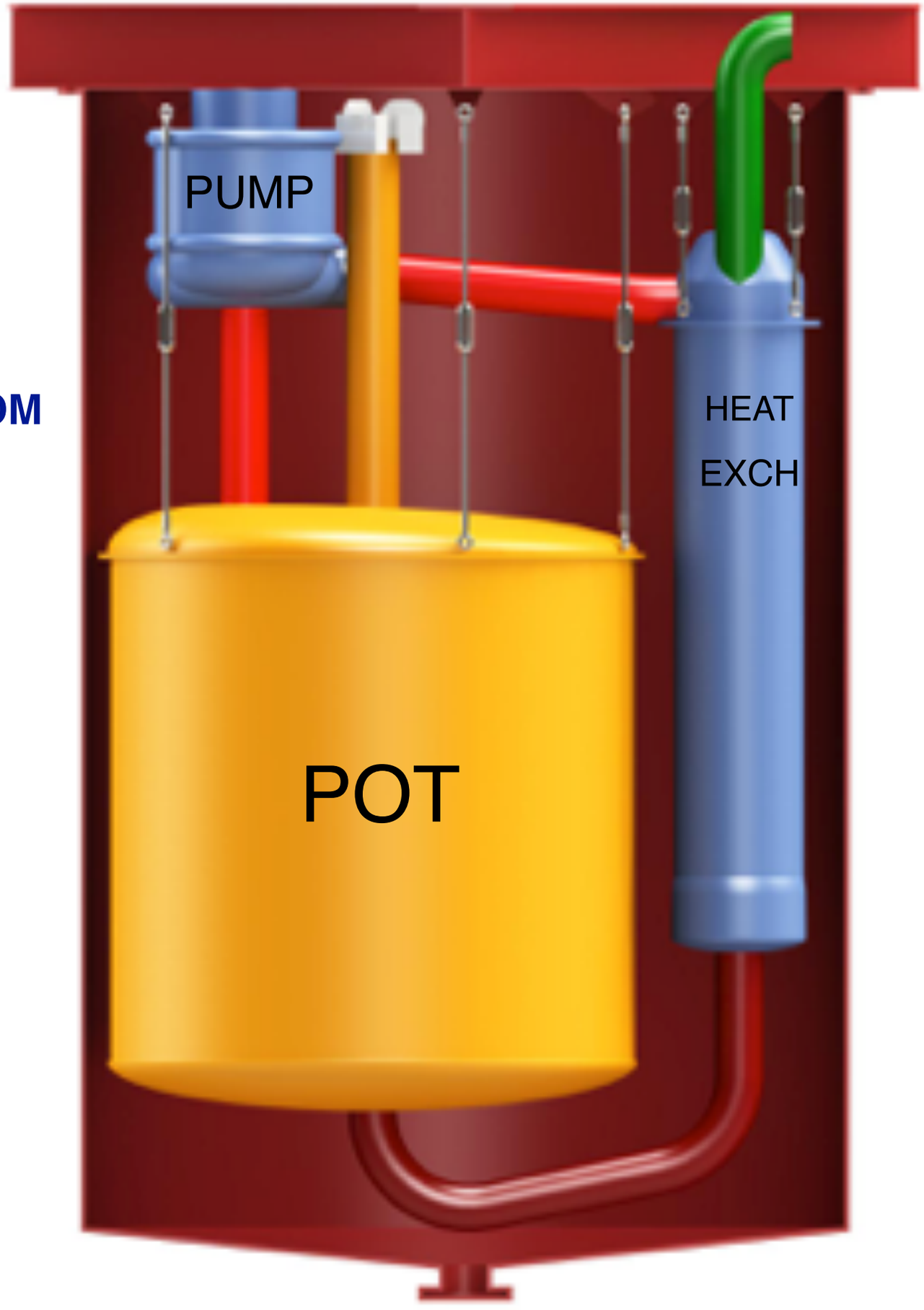
Two ThorConIsles being serviced by



BUILD EVERYTHING ON AN ASSEMBLY LINE

Reactor yard produces 150--500 ton blocks. About 120 blocks per 1GWe plant.
Blocks are pre-coated, pre-piped, pre-wired, pre-tested.
Focus quality control at the block and sub-block level.
Blocks dropped into place, and welded together at the shipyard berth.
100% labor at factory
Hyundai shipyard in Ulsan, South Korea pictured below is sufficient to manufacture 30 GWe Power Ships (or 100GWe land based ThorCon) per year.

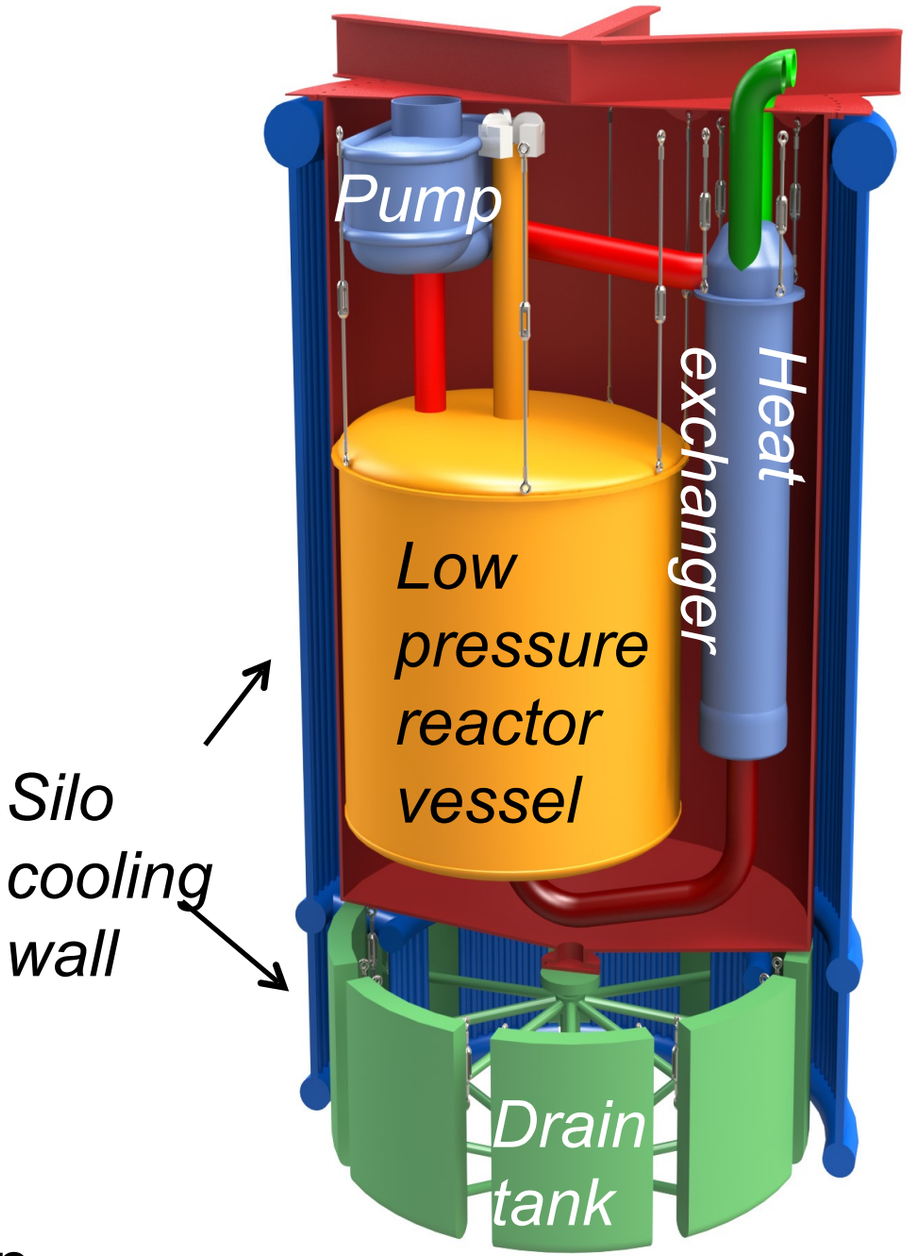
THORCONPOWER.COM

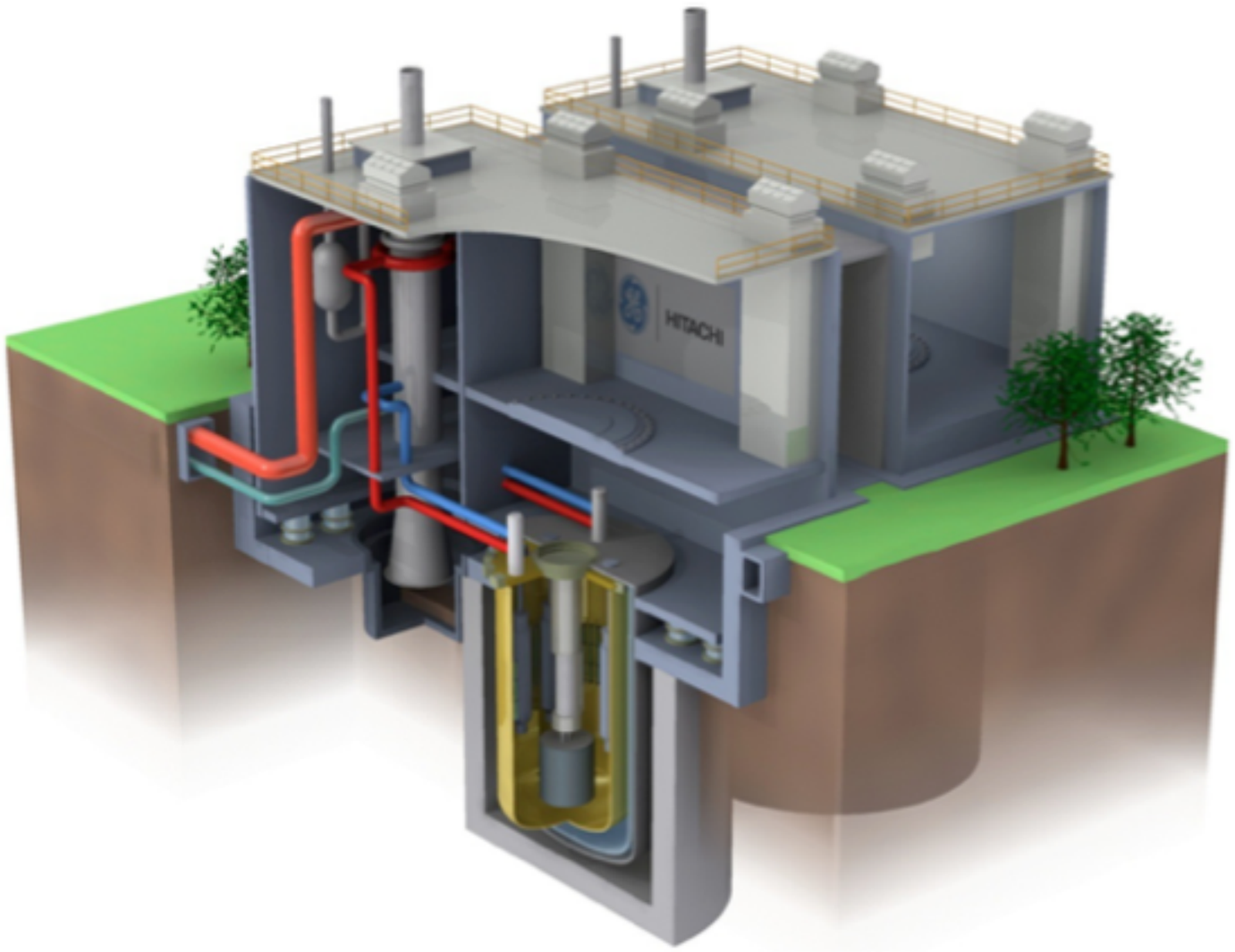


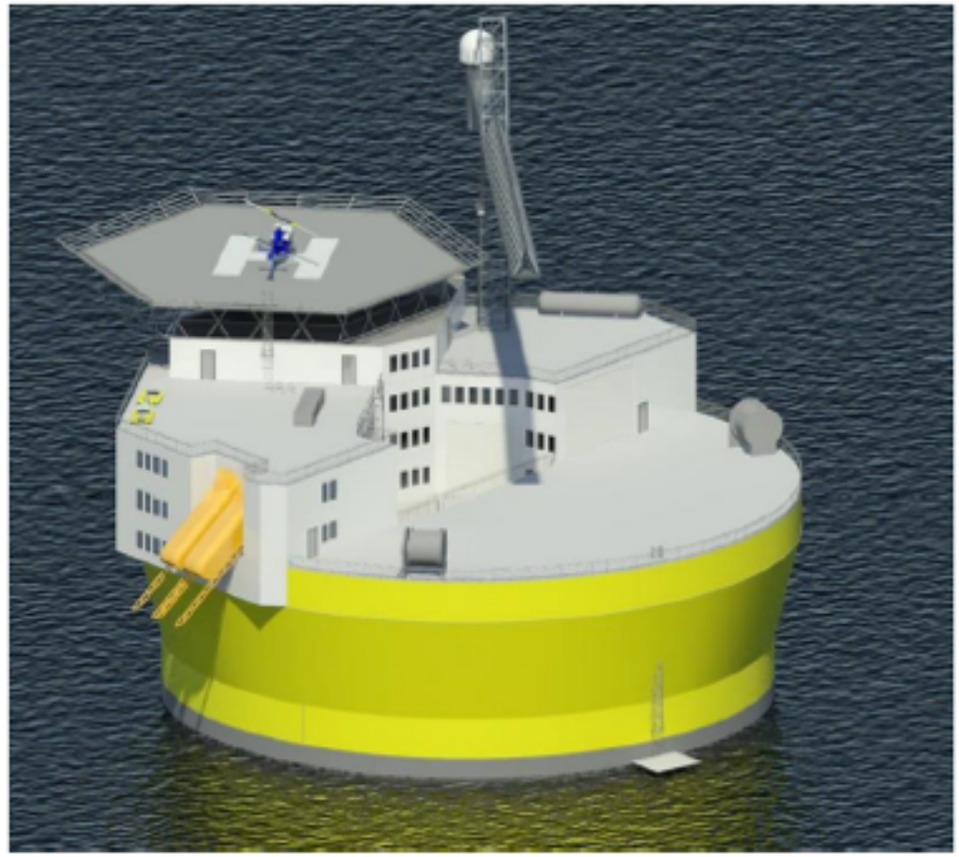
ORNL director Alvin Weinberg's interest in molten salt reactors led to a 1959 lab proposal for funding from the US Atomic Energy Commission to develop the MSRE. Construction began in 1962. The MSRE reactor core, shown during assembly, contained 69 cubic feet of graphite formed into 513 graphite core blocks. Passages between the blocks, called fuel channels, held molten salt fuel when the reactor was in operation.

Safety status: walk-away safe

- Safety is **intrinsic** from physics, not add-on safety systems; overheating stops chain reaction.
- Any break will **drain** reactor fuel to cold shutdown fuel salt drain tank.
- Decay heat is removed by silo cooling wall continuous **passive** water circulation, even in power blackout.
- Radioactive fuel salt at **low**, garden-hose pressure can’t disperse in catastrophe.
- Fluoride salt chemically **locks up** hazardous fission products iodine-131, cesium-137, strontium-90.







PRISM + Thorcon + Recycling

A Perfect Synergy

Operate at atmospheric pressure

Designed for mass production

Reliable baseload power 24/7

Zero emissions

Proliferation resistant

Speedy & massive deployment