FPL Energy
Seabrook Station

Operational Reactor Safety

22.091/22.903

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Seabrook Station Training Dept.

Lecture 16
Seabrook Station
General Description

Seabrook Station at a Glance …

- Seabrook is a 3648-megawatt (thermal) Westinghouse pressurized-water reactor (original licensed thermal power limit was 3411 MWth).
- Seabrook's turbine-generator was built by General Electric.
- The water used to condense steam in the plant is carried from the ocean to the plant via two three-mile-long underground tunnels.
- Seabrook was designed in the 1970s and construction was completed in October 1986. The plant began commercial operation in August 1990.

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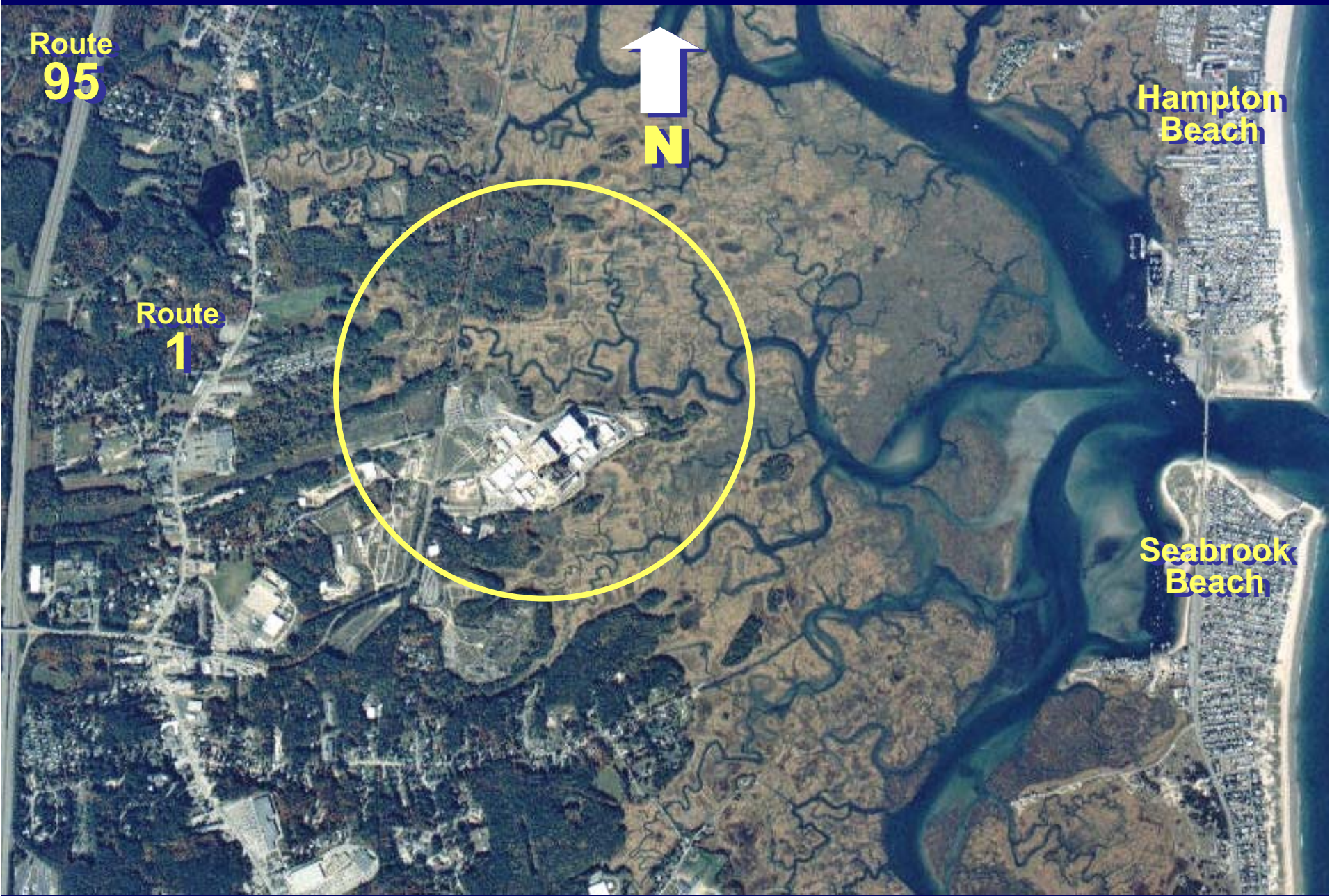
Seabrook Station


Route
95
N
Hampton
Beach
Route
1
Seabrook
Beach

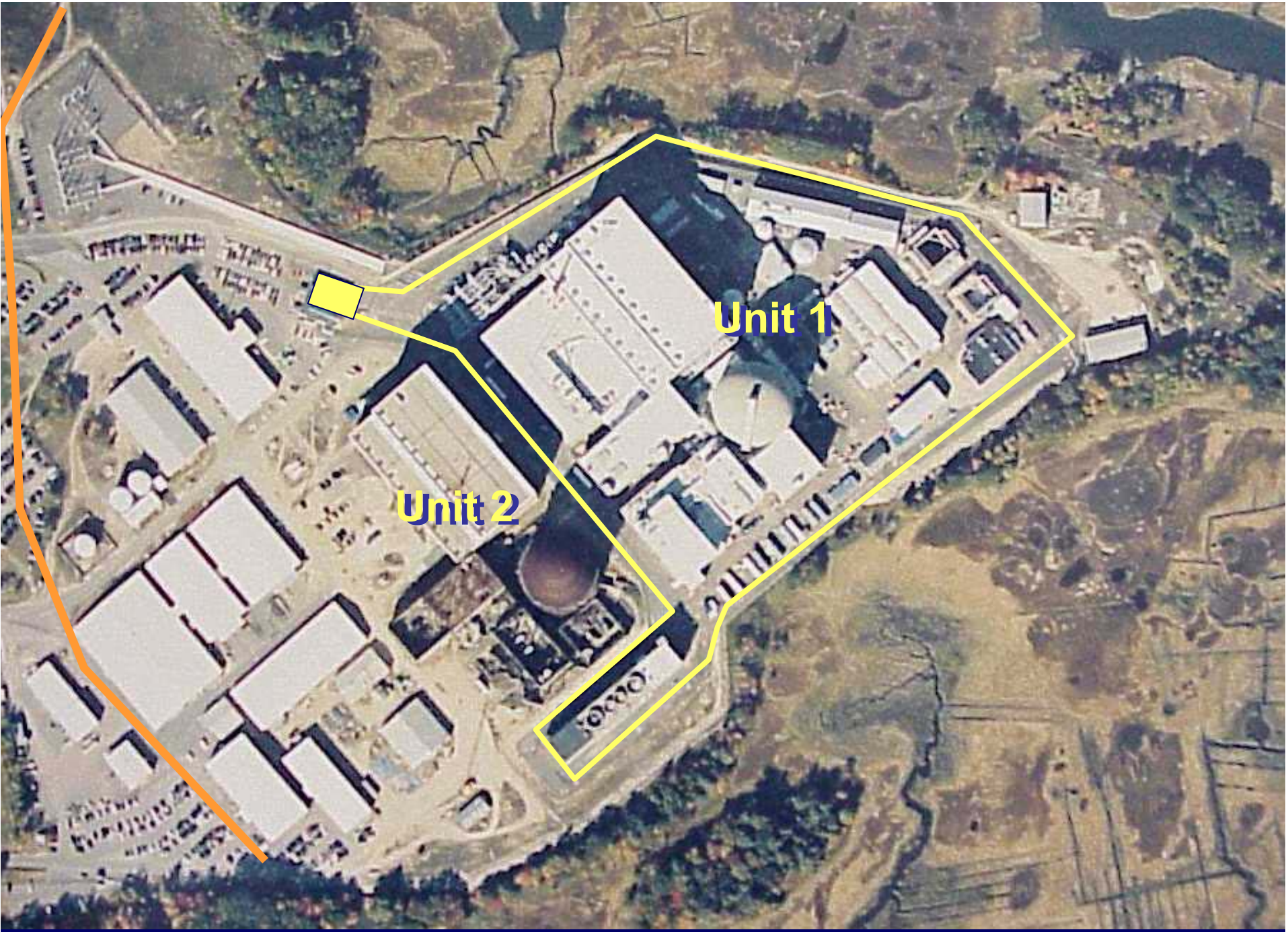
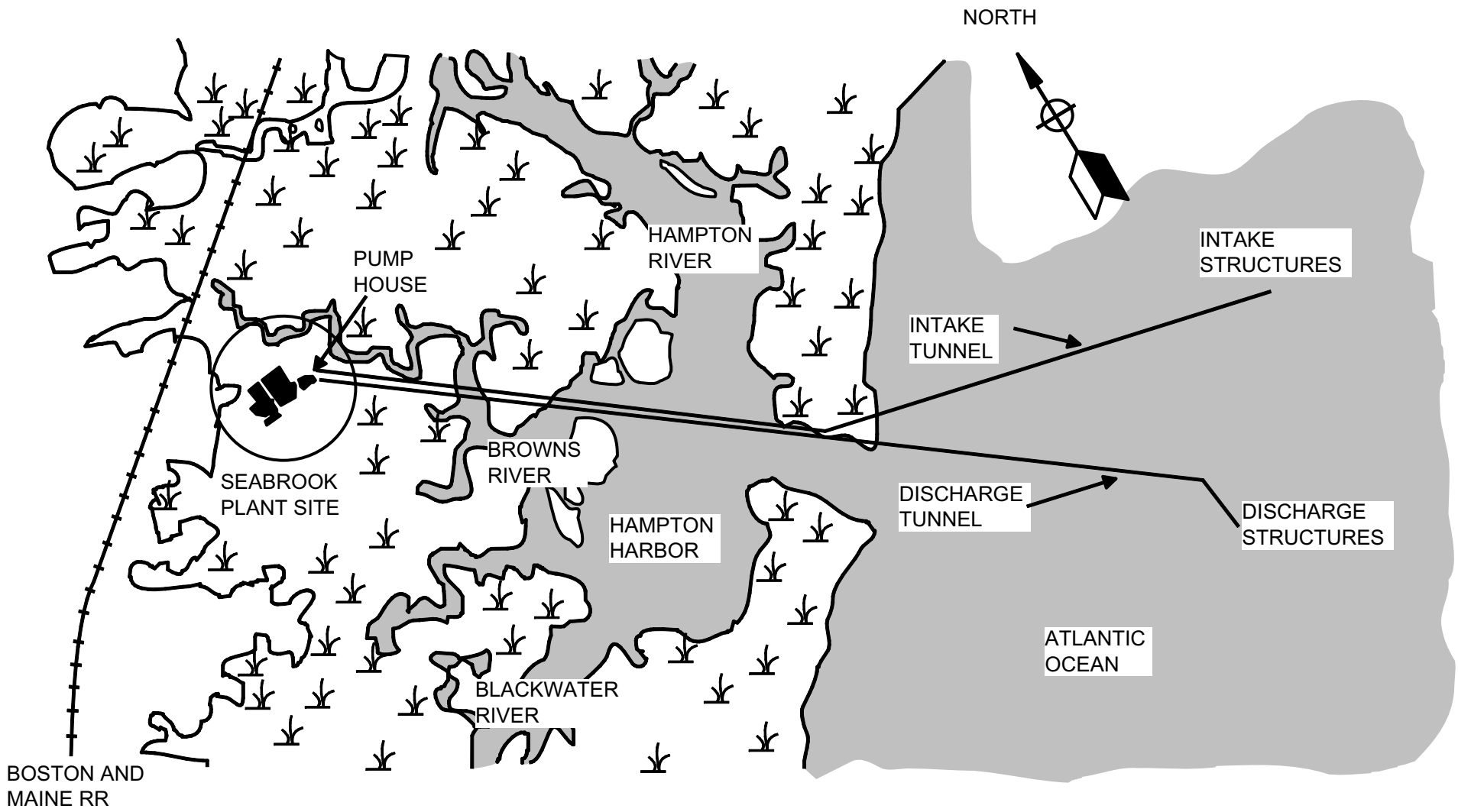
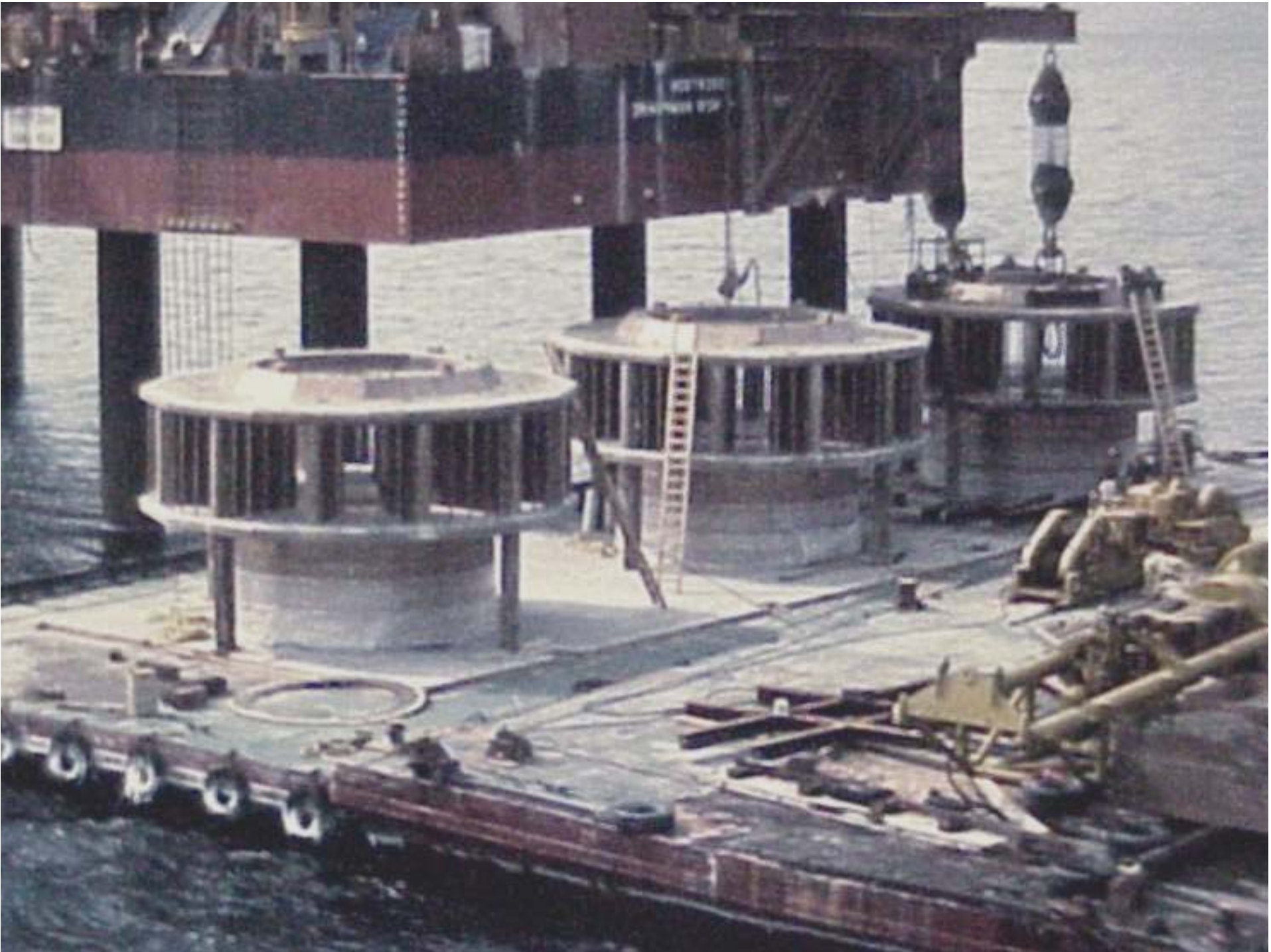
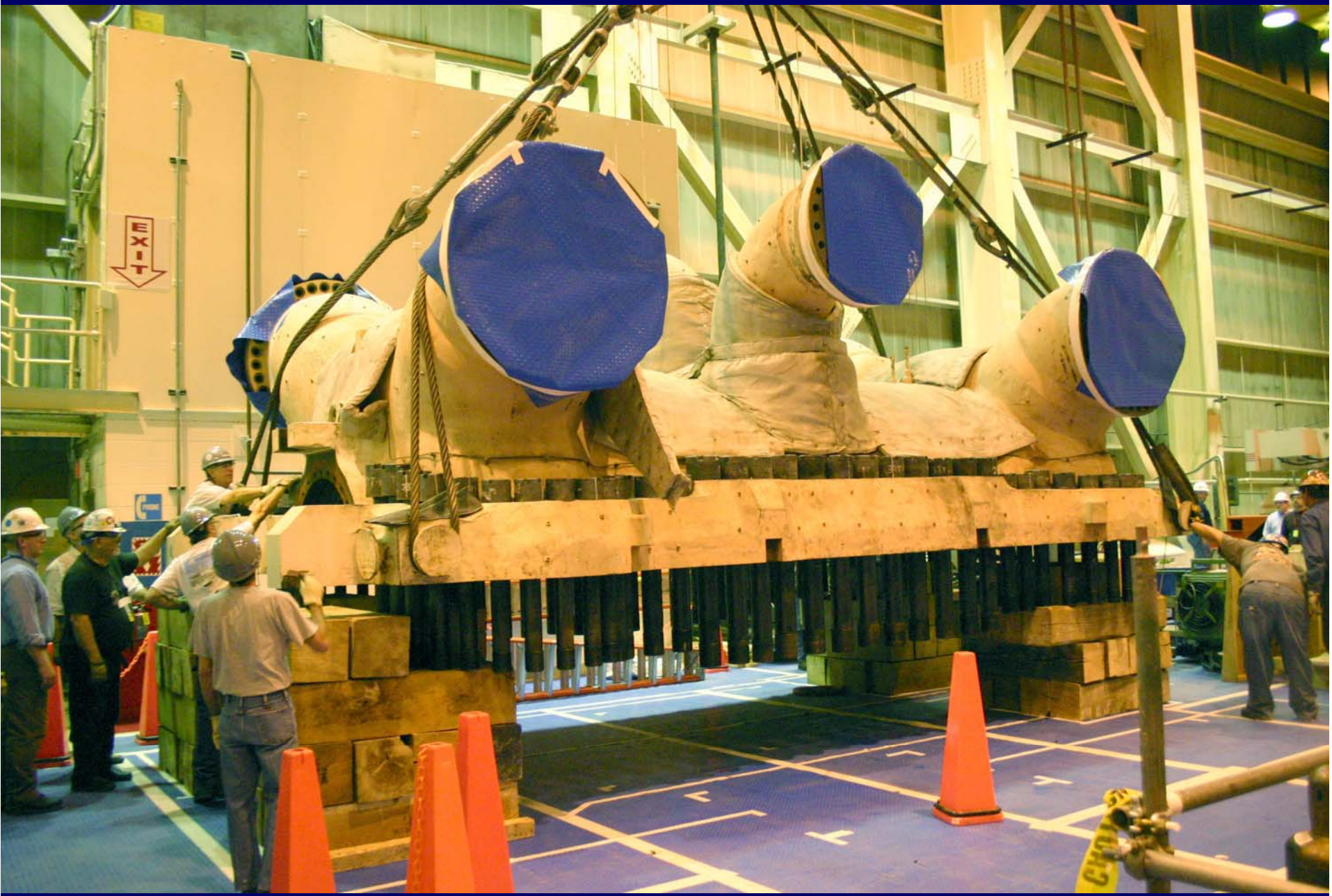

Unit 1
Unit 2

Figure CW - 3.11
Circulating Water Tunnel Layout

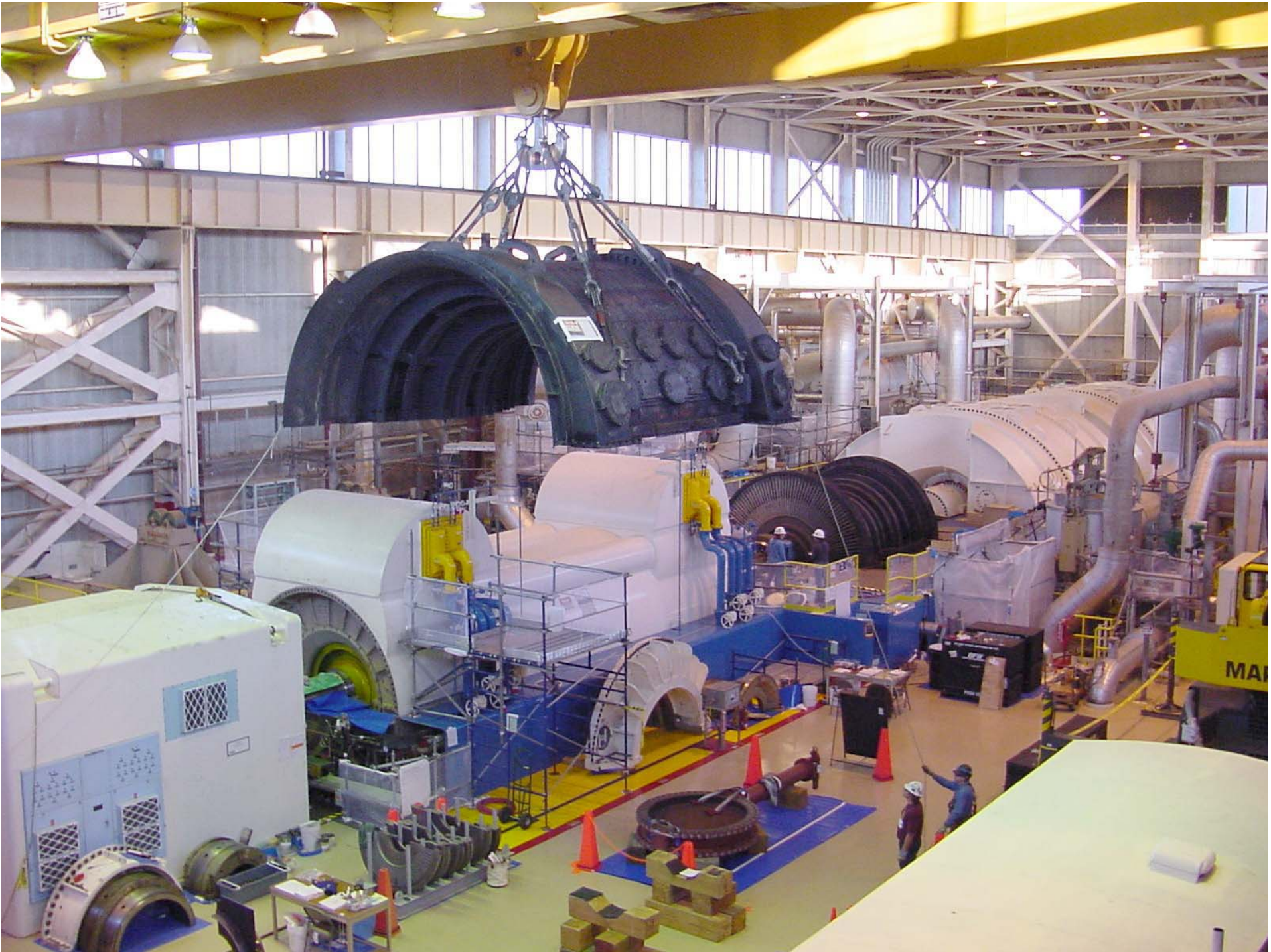


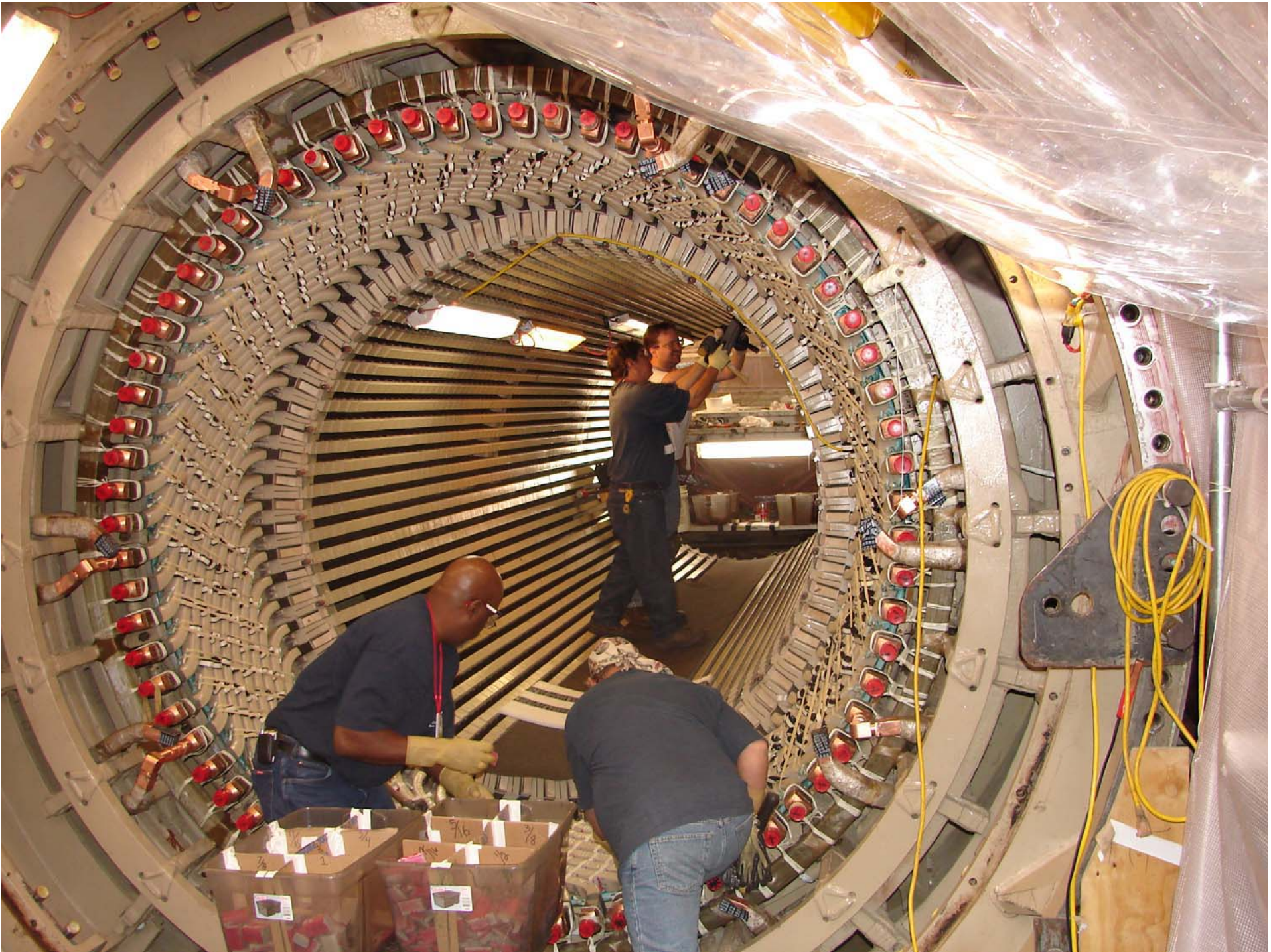


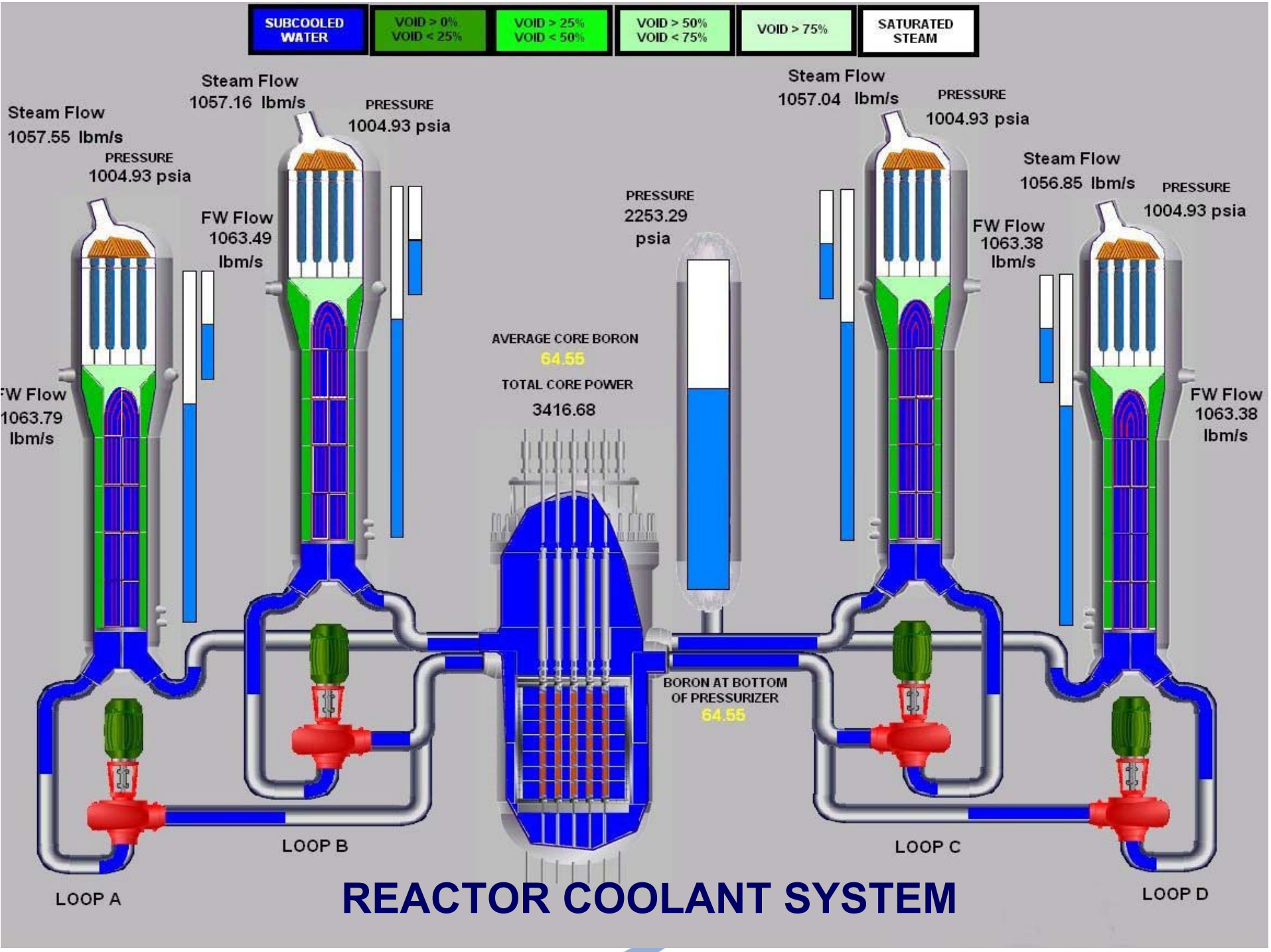

TILTON

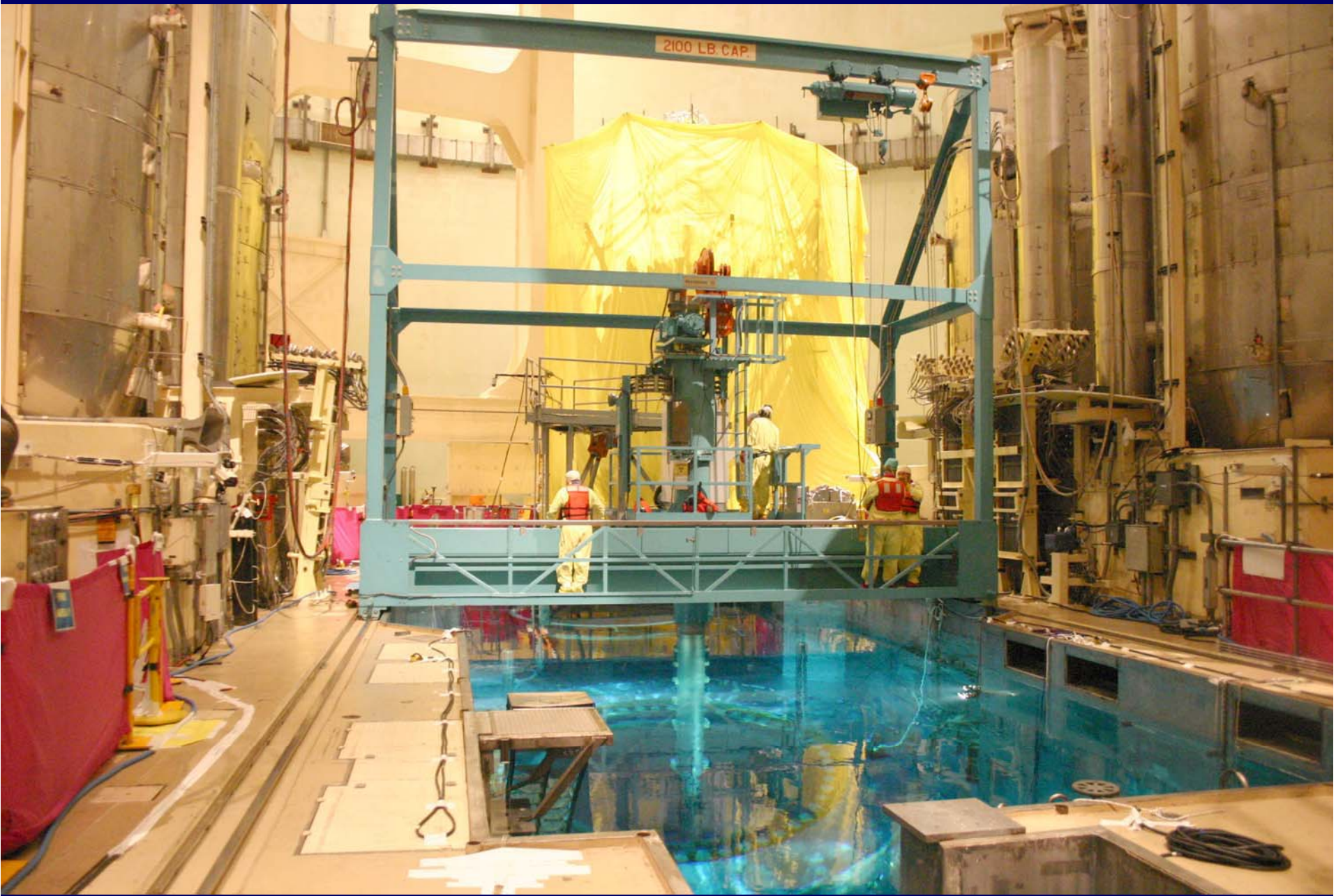

EXIT

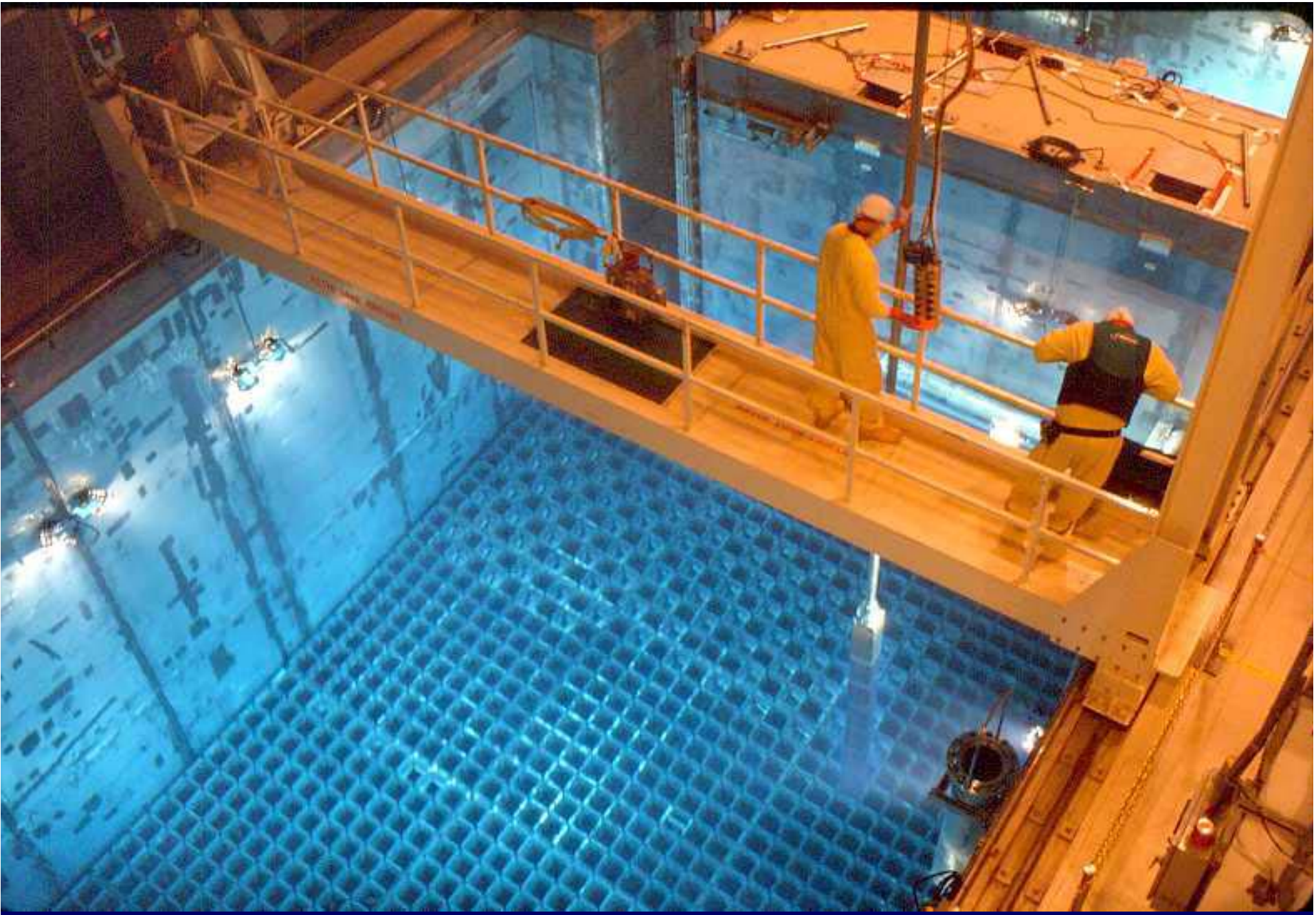

MARINO



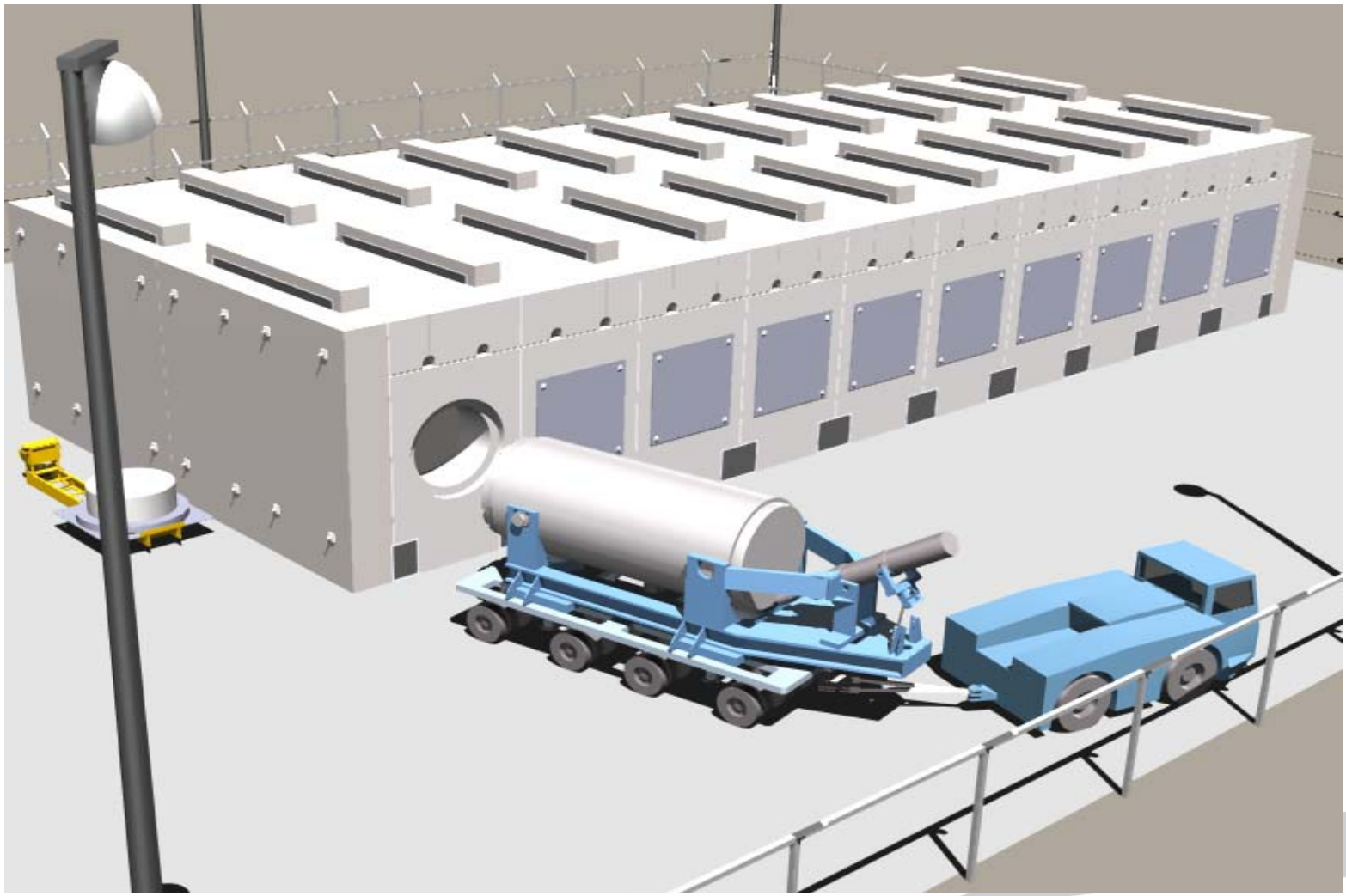



SUBCOOLED WATER
VOID > 0% VOID < 25%
VOID > 25% VOID < 50%
VOID > 50% VOID < 75%
VOID > 75%
SATURATED STEAM
Steam Flow 1057.55 lbm/s
PRESSURE 1004.93 psia
FW Flow 1063.79 lbm/s
Steam Flow 1057.16 lbm/s
PRESSURE 1004.93 psia
FW Flow 1063.49 lbm/s
PRESSURE 2253.29 psia
AVERAGE CORE BORON 64.55
TOTAL CORE POWER 3416.68
BORON AT BOTTOM OF PRESSURIZER 64.55
Steam Flow 1057.04 lbm/s
PRESSURE 1004.93 psia
FW Flow 1063.38 lbm/s
Steam Flow 1056.85 lbm/s
PRESSURE 1004.93 psia
FW Flow 1063.38 lbm/s
LOOP A
LOOP B
LOOP C
LOOP D
REACTOR COOLANT SYSTEM


2100 LB CAP.



Dry Fuel Storage Facility



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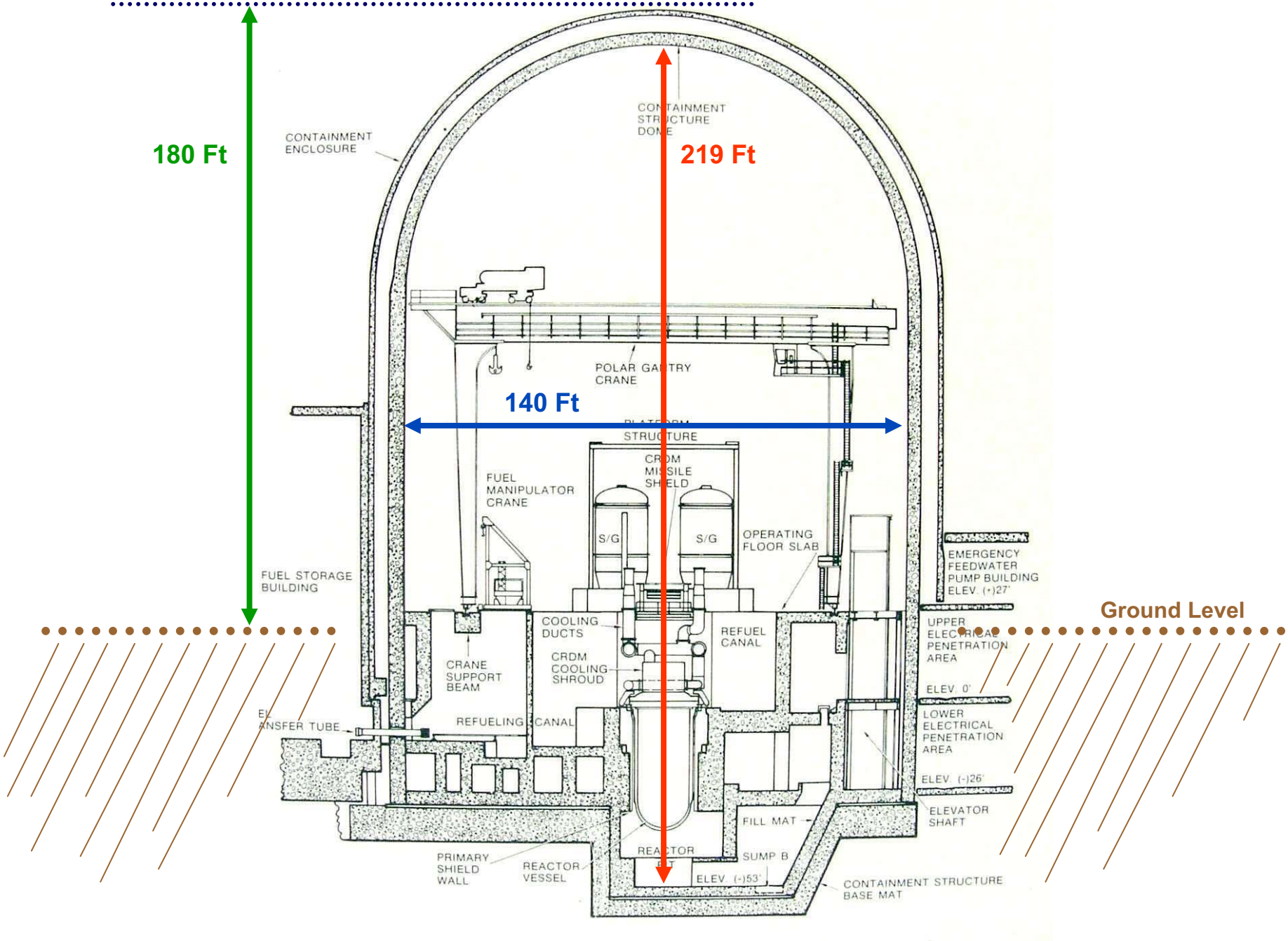
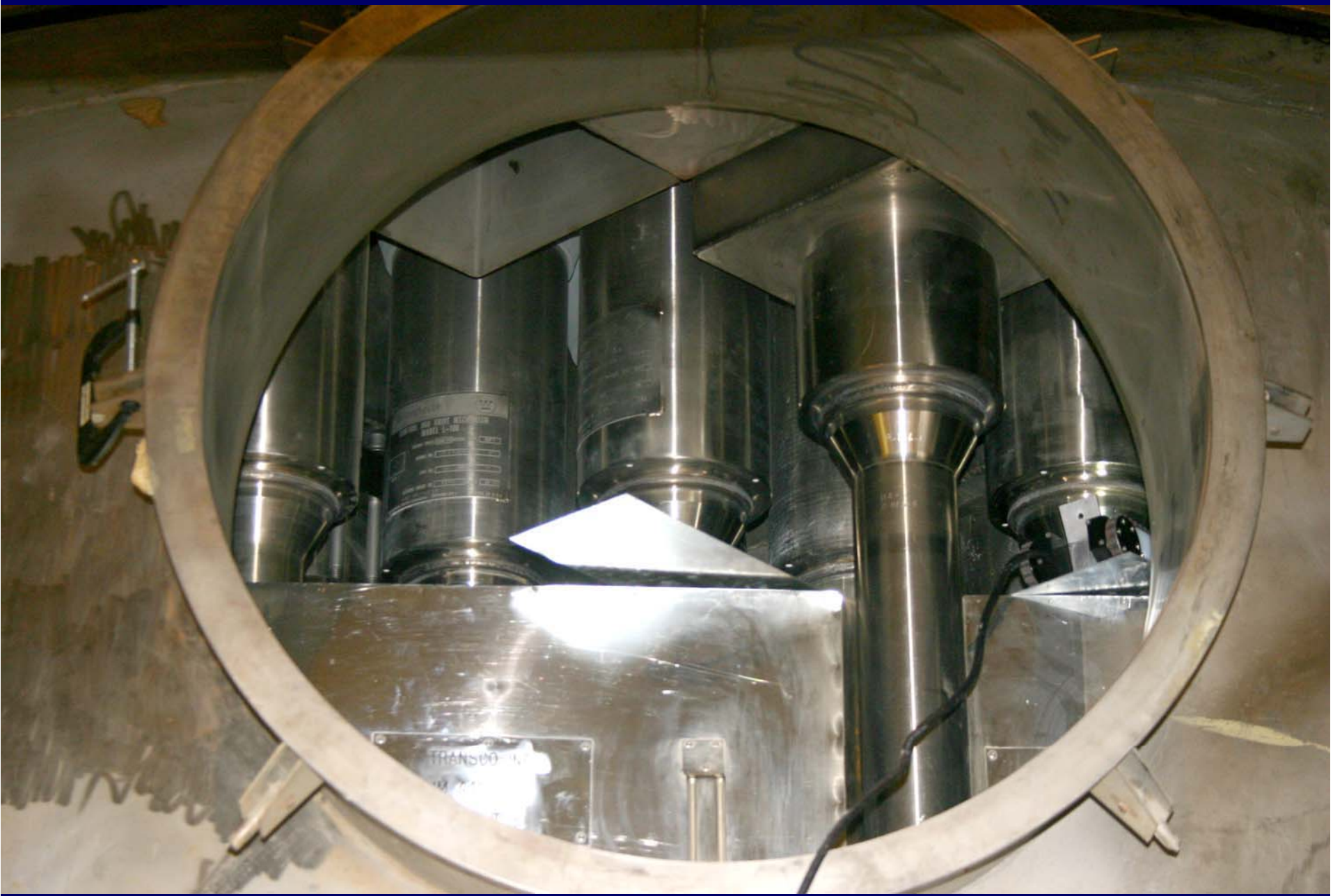
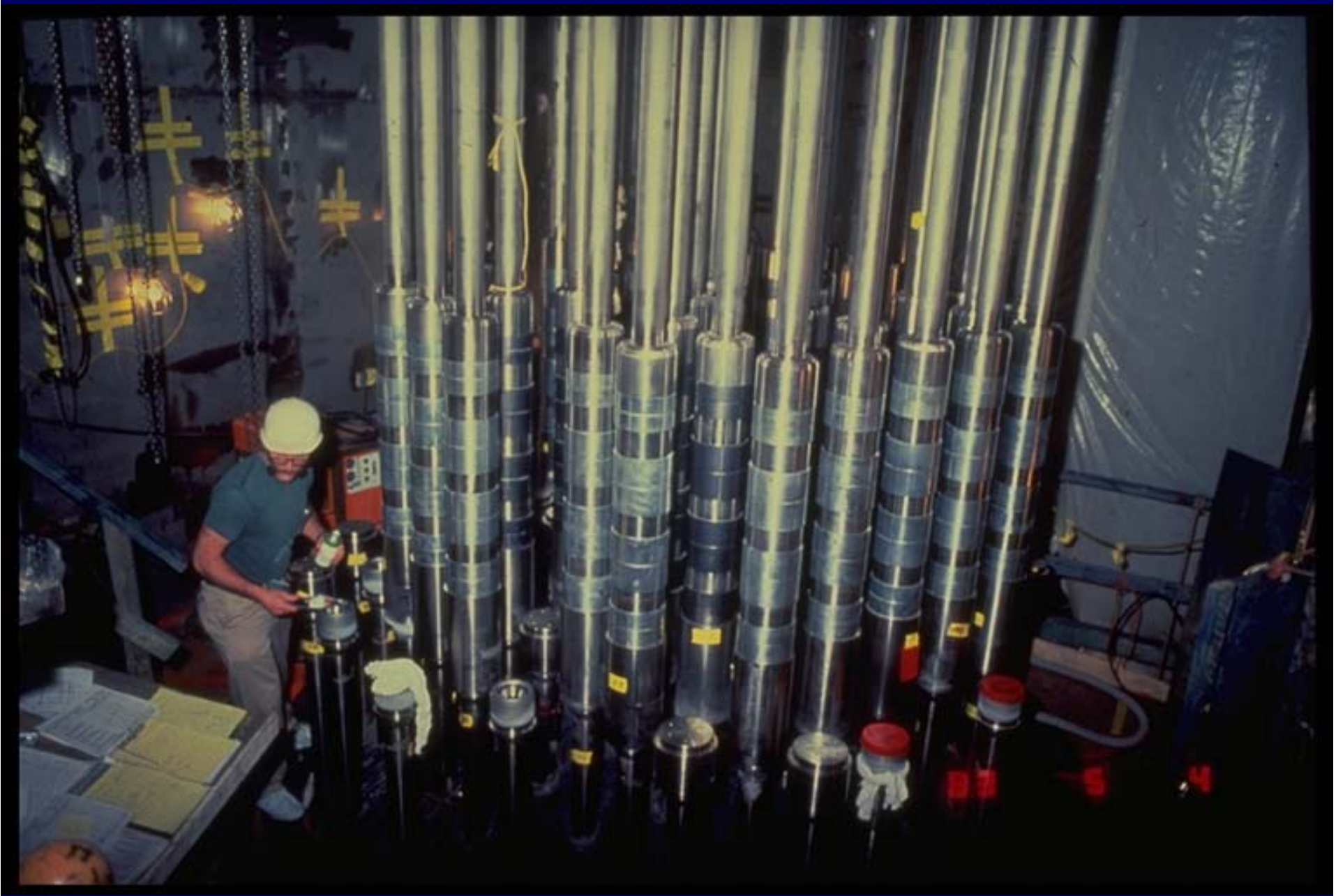
STOP


180 Ft
219 Ft
140 Ft
CONTAINMENT ENCLOSURE
CONTAINMENT STRUCTURE DOME
POLAR GANTRY CRANE
STRUCTURE
CRDM MISSILE SHIELD
FUEL MANIPULATOR CRANE
S/G
S/G
OPERATING FLOOR SLAB
EMERGENCY FEEDWATER PUMP BUILDING ELEV. (+)27'
FUEL STORAGE BUILDING
Ground Level
COOLING DUCTS
REFUEL CANAL
UPPER ELECTRICAL PENETRATION AREA
CRANE SUPPORT BEAM
CRDM COOLING SHROUD
ELEV. 0'
TRANSFER TUBE
REFUELING CANAL
LOWER ELECTRICAL PENETRATION AREA
ELEV. (-)26'
ELEVATOR SHAFT
FILL MAT
REACTOR
SUMP B
PRIMARY SHIELD WALL
REACTOR VESSEL
ELEV. (-)53'
CONTAINMENT STRUCTURE BASE MAT

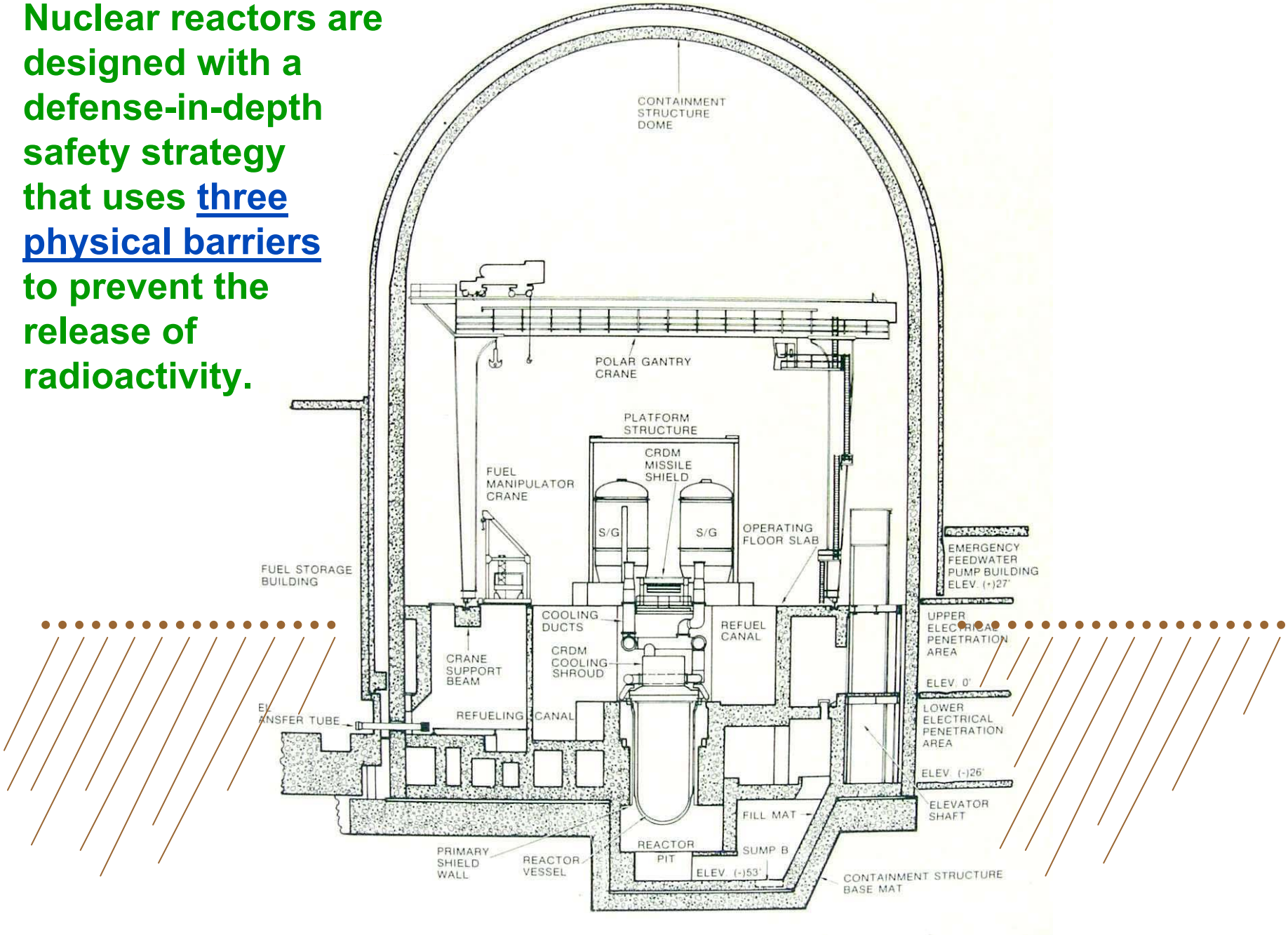

FME
AREA 1
FME
AREA 1


CAUTION CAUTION

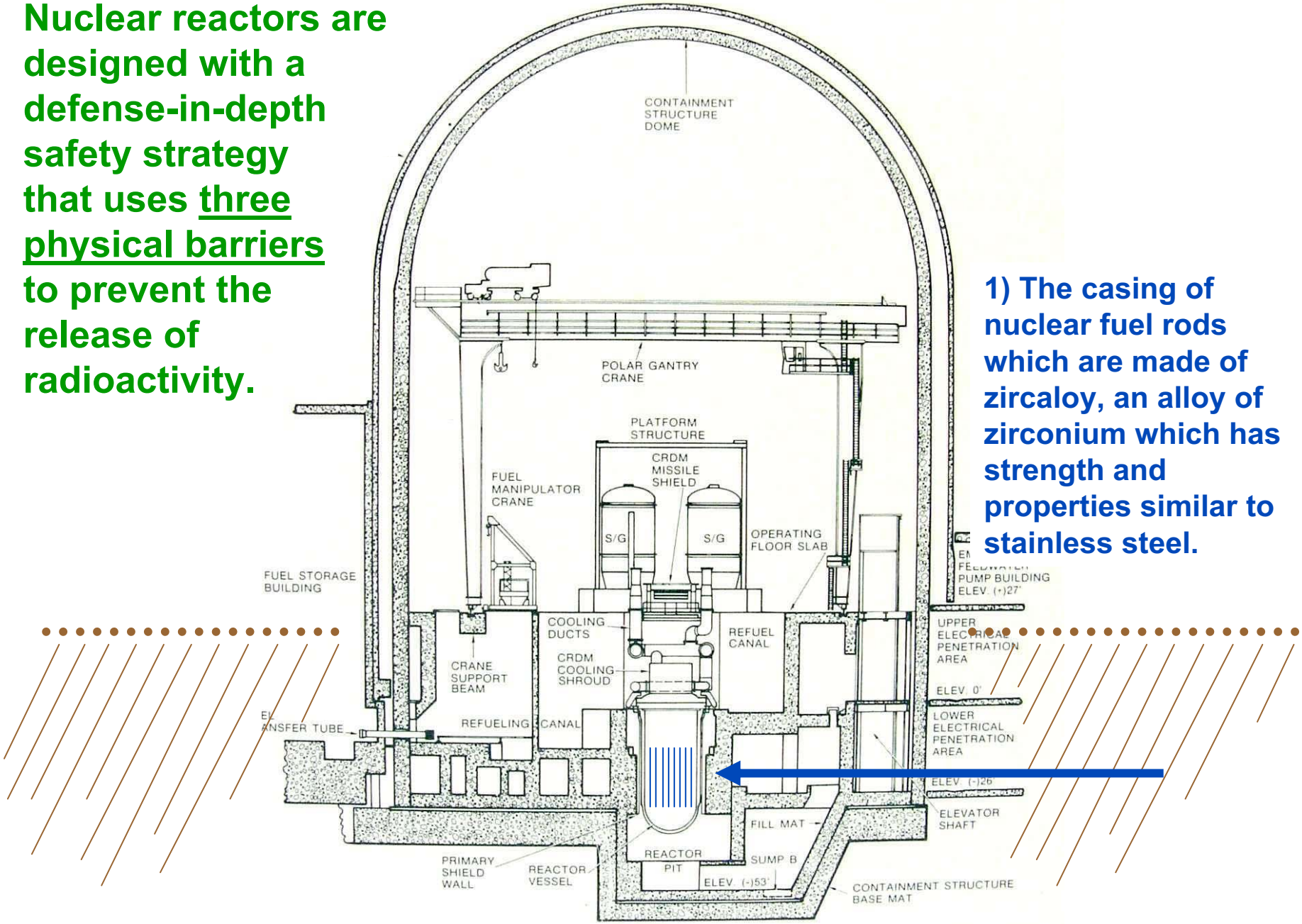




Nuclear reactors are designed with a defense-in-depth safety strategy that uses three physical barriers to prevent the release of radioactivity.



Nuclear reactors are designed with a defense-in-depth safety strategy that uses <u>three physical barriers</u> to prevent the release of radioactivity.



1) The casing of nuclear fuel rods which are made of zircaloy, an alloy of zirconium which has strength and properties similar to stainless steel.

New Fuel Canisters on flatbed

New Fuel being removed from transportation canister

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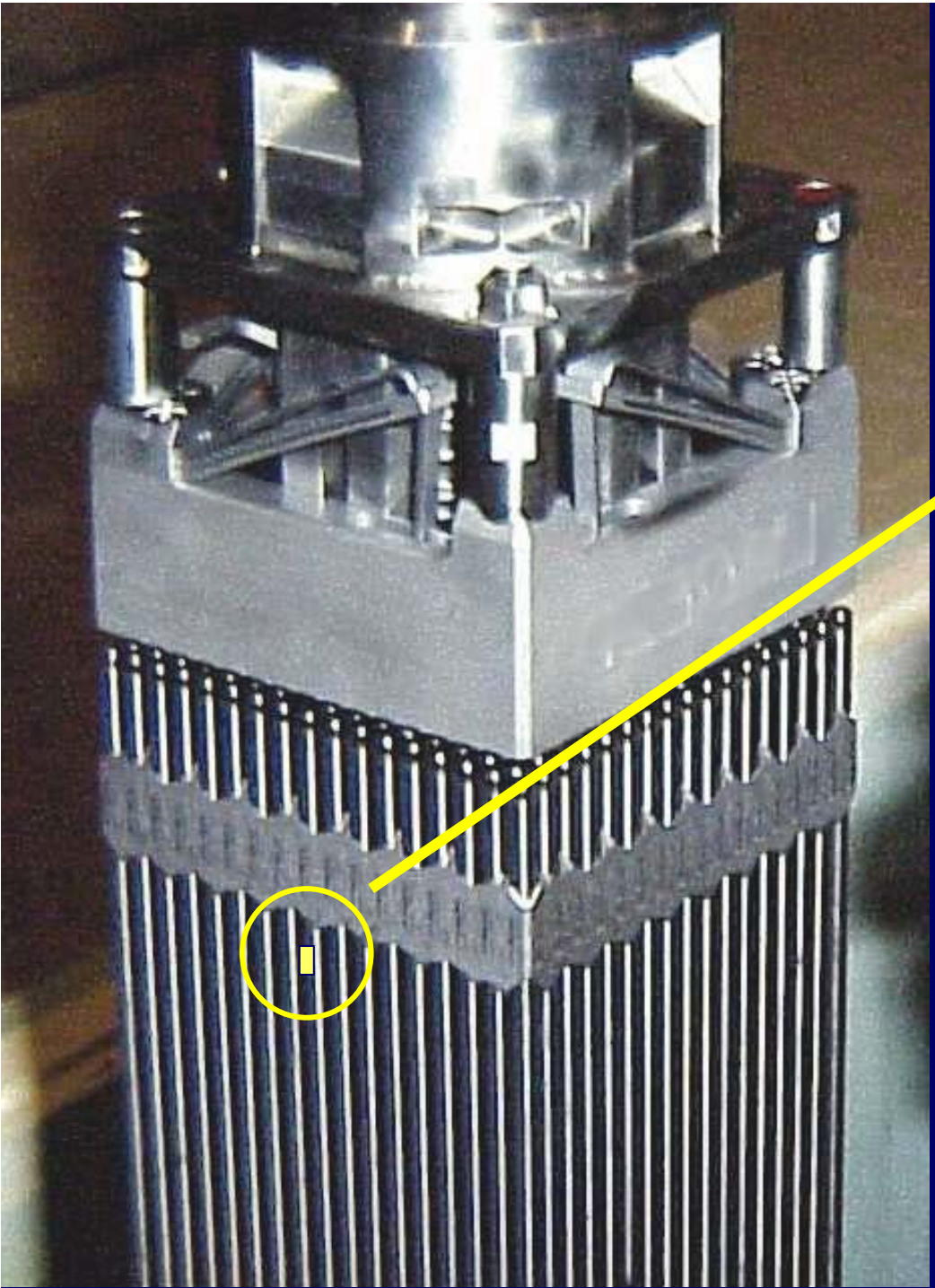

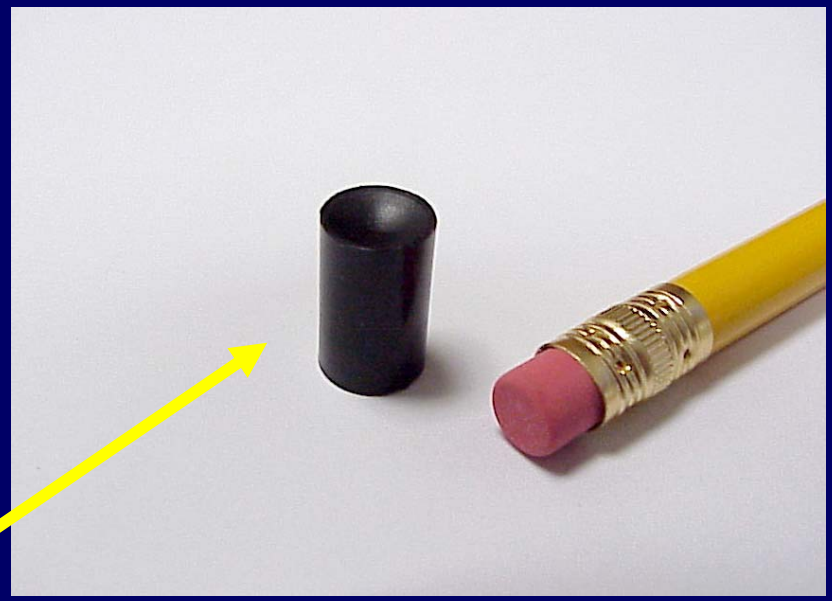

The energy from one uranium fuel pellet equals about:

- **2,000 pounds of coal, or**
- **175 gallons of oil or gasoline.**

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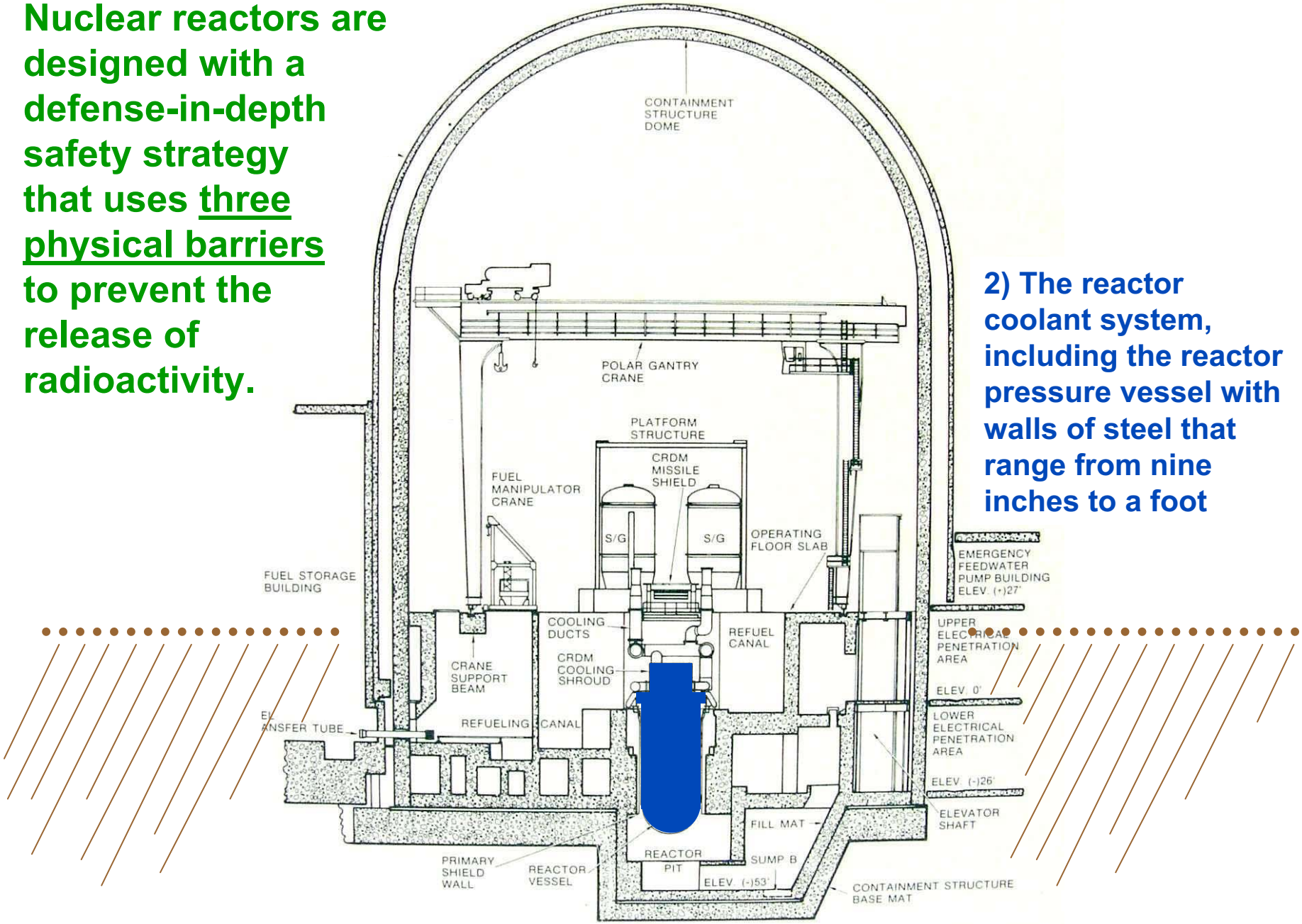

2) The reactor coolant system, including the reactor pressure vessel with walls of steel that range from nine inches to a foot

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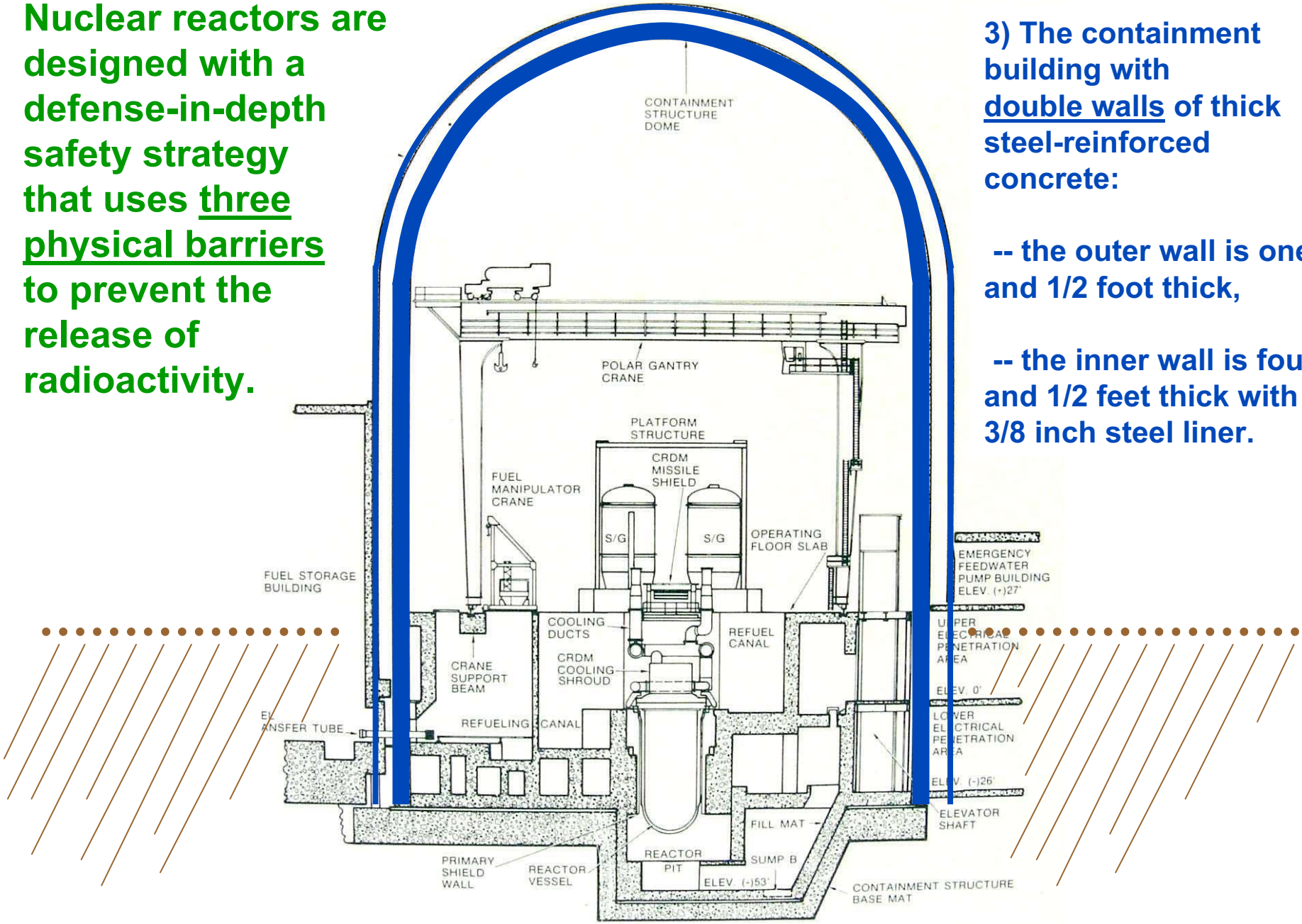
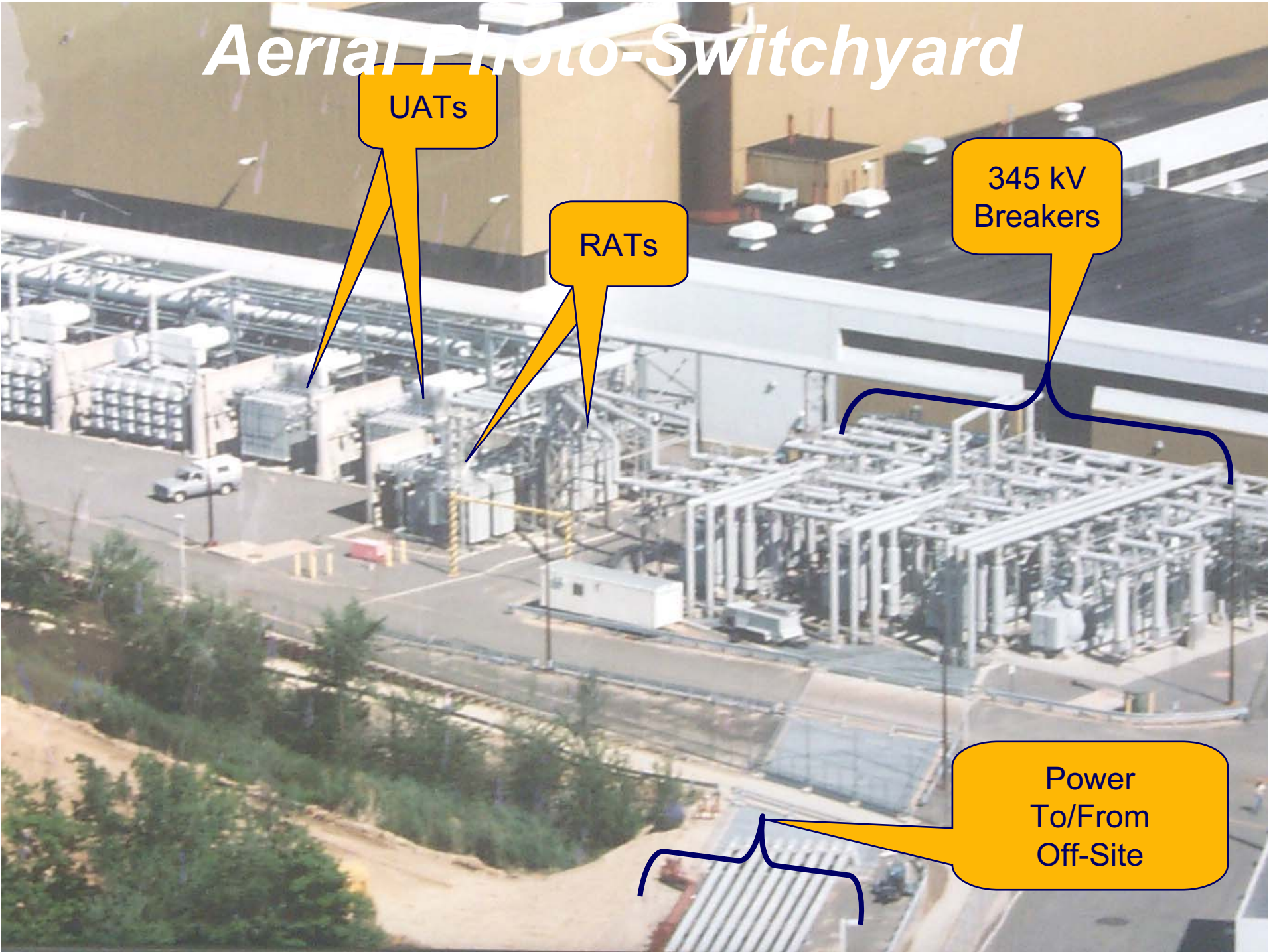


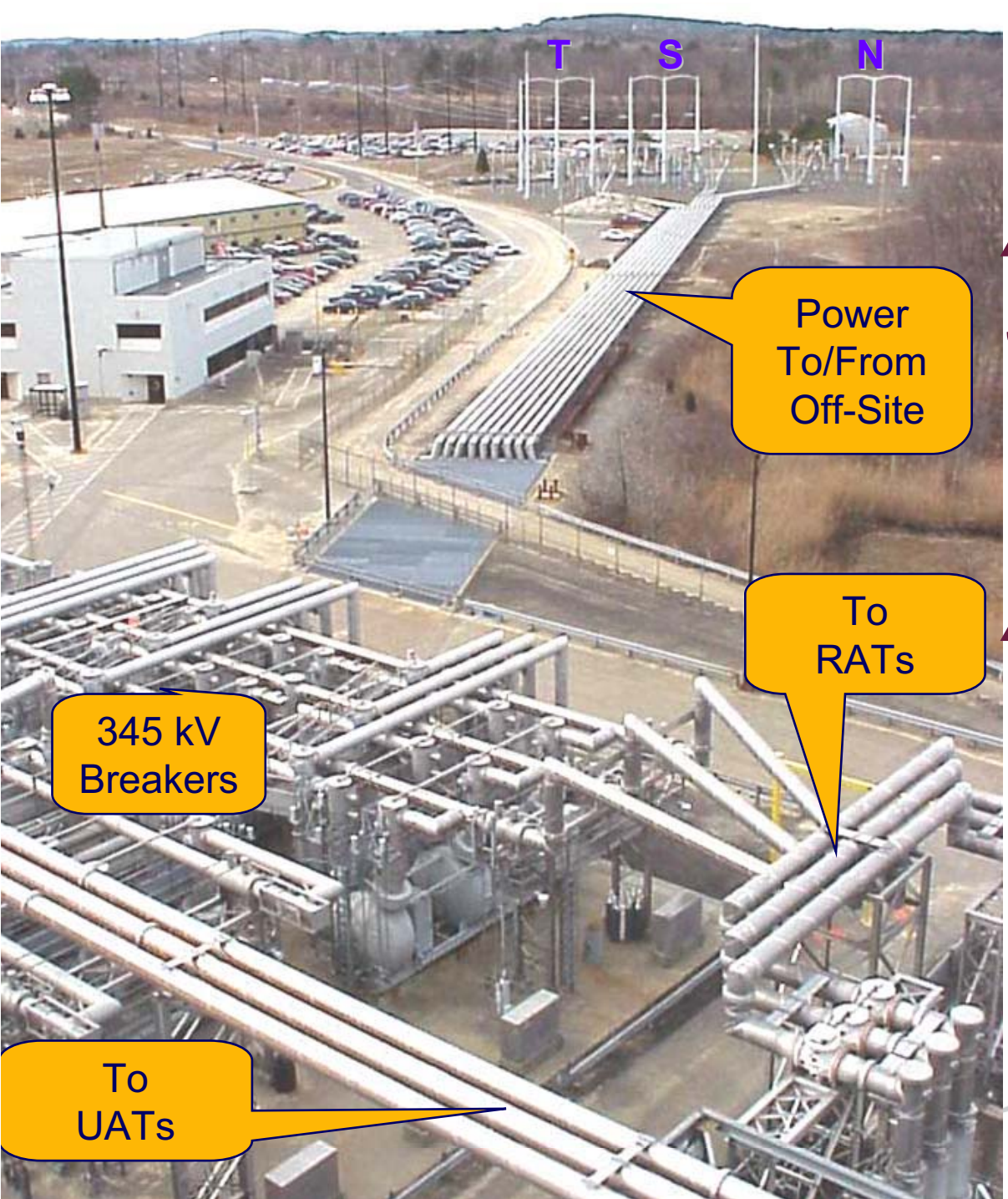
3) The containment building with <u>double walls</u> of thick steel-reinforced concrete:

-- the outer wall is one and 1/2 foot thick,

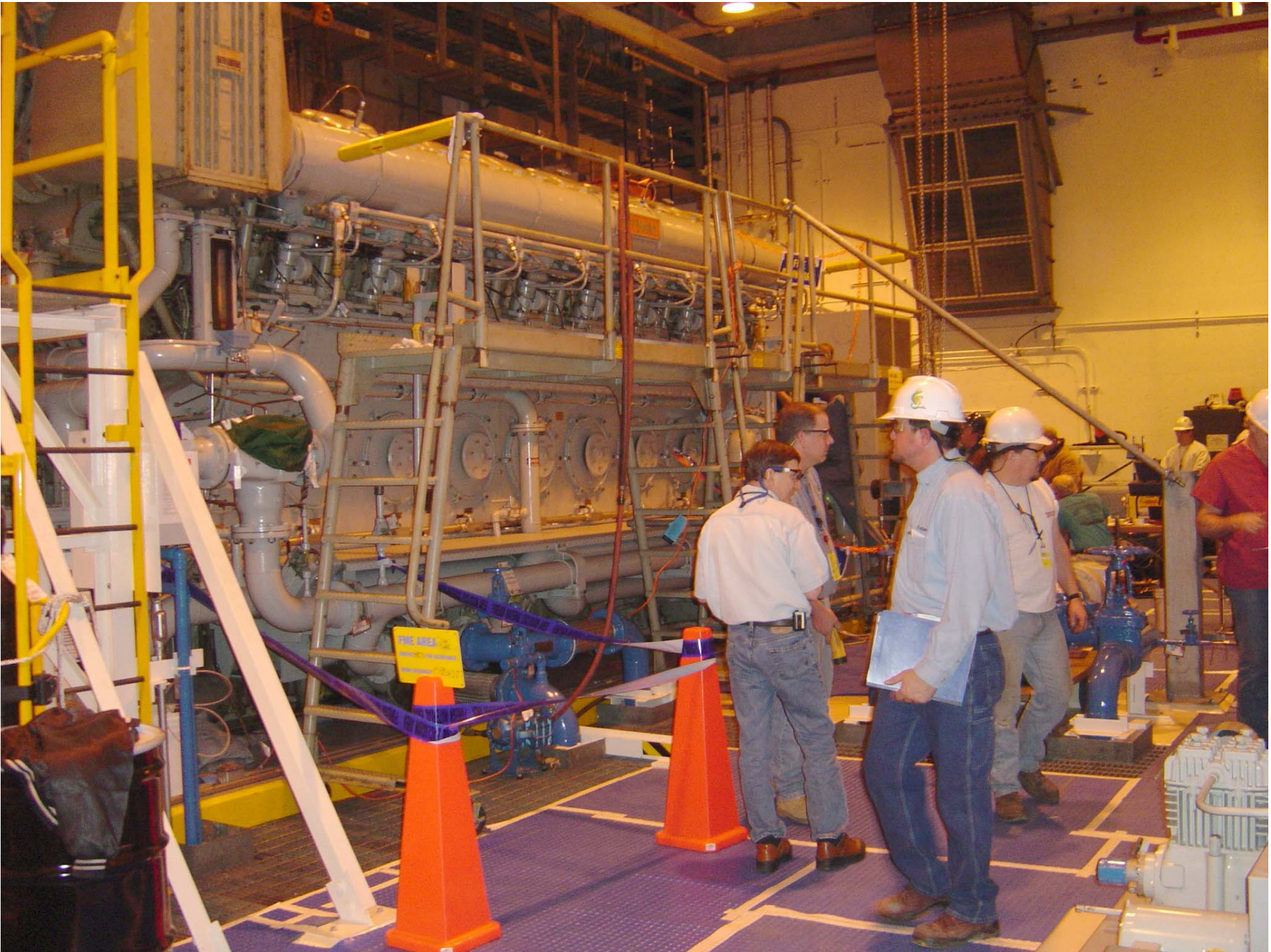
-- the inner wall is four and 1/2 feet thick with a 3/8 inch steel liner.

Aerial Photo-Switchyard





Aerial Photo- Switchyard to Termination Area



Action in the Control Room

Operators in the Control Room Simulator

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