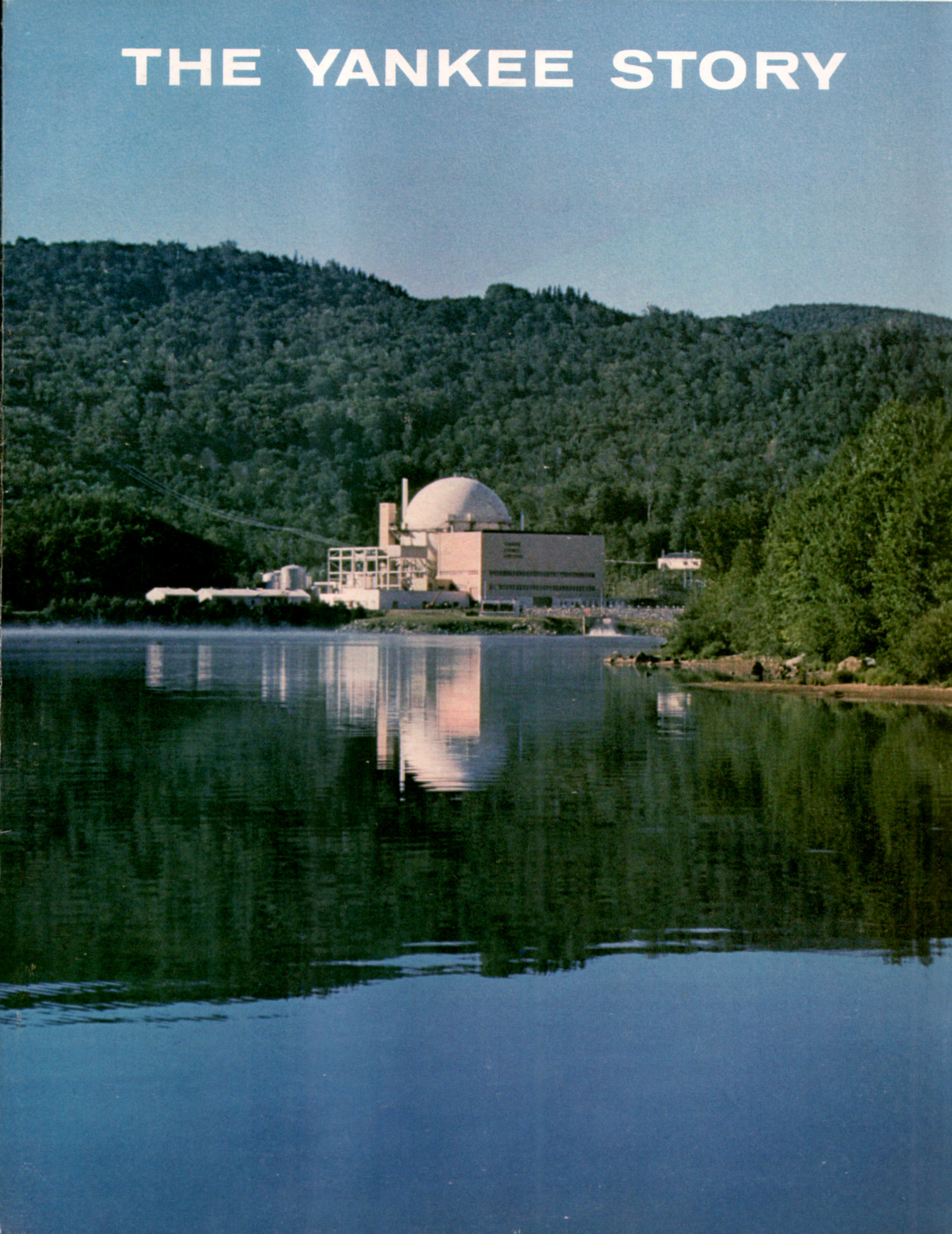
THE YANKEE STORY



After over seven years of successful operation, the Yankee Atomic Electric plant has lived up to all expectations as the New England forerunner of an entirely new source of energy and power.

Now in 1968, six additional nuclear plants are either under construction or planned for this area. These plants will go into service between 1967 and 1973, and will provide a total capability of around 4,000,000 kilowatts — nearly a 50 per cent increase over New England's present electrical generating capacity.

This is the 6th edition of The Yankee Story with over 150,000 copies printed since 1960.

The Yankee Philosophy

These basic reasons for building and operating the Yankee plant have been expressed by President William Webster during his many talks on Yankee:

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"One of the prime reasons was that it was expected of us. Electric utilities recognize that it is their obligation to their customers and stockholders to seek out and to provide the most efficient and economical service. As long as there was a possibility that we might be able to bring competitive power to New England through the atom, it was properly expected that we attempt it."

☆ ☆ ☆

"We felt that here was a job for private enterprise and industry, not the government. Call this the old Yankee pioneering spirit, if you will."

☆ ☆ ☆

"We realized that we had much to learn and that there would be no substitute for first-hand experience in an atomic power plant. There seemed little to gain by waiting. Here was an opportunity to build a cadre of personnel who would know the atomic power field and could grow with it in the future."

☆ ☆ ☆

"In the event of a break-through in technology, in competitive power costs, or in the value of plutonium or radio-isotopic by-products, the owner of a full-scale plant in actual operation would be in the best position to benefit."

☆ ☆ ☆

"We knew that the presence of a full-scale plant in New England could focus attention on the atomic field in this region and could attract allied industries which might grow and gain business as the atomic power industry expanded over the rest of the nation."

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The Yankee Story

YANKEE

In 1954, President Dwight D. Eisenhower signed the amended Atomic Energy Act which for the first time permitted ownership of atomic facilities by a private company. The following day representatives from a group of New England utilities met and agreed to form a company whose purpose was to build and operate a full-sized plant to utilize atomic energy for the generation of electricity. They recognized that an entirely new and plentiful source of energy was to be found within the atom and that this new method of generating electricity would first become economic in areas such as New England. Here the power from the rivers has already been effectively harnessed, and here coal and oil must be imported from considerable distances.

From the beginning it was accepted that a joint effort would provide the best approach. A cooperative venture would give each utility the opportunity for experience with an atomic power plant, and at the same time reduce the investments of the individual companies.

The new company was immediately faced with a number of major decisions. Which of the many possible reactor types would it choose? How big should it be? Where should they locate it? Who should design it — who construct it? Should assistance be requested from the Atomic Energy Commission?

On the type of reactor, Yankee wanted to go forward as soon as possible with the construction and actual operation of a dependable and economically-feasible plant. Thus a pressurized water reactor was selected, similar in principle to the submarine reactors and to the Shippingport reactor then being built for the AEC and the Duquesne Light Company near Pittsburgh. The design developed for Yankee takes full account of the experience gained in these previous reactors and, at the same time, attempts to move in the direction of a more nearly commercialized plant.

As the planning for Yankee progressed, it became evident that greater output would lead to reduced unit cost for the power produced. Through experience and refinement of reactor operation, Yankee's rating has grown in four stages from an original 60–75,000 kilowatts to its present 185,000 kilowatt level.

THE HARTFORD ELECTRIC LIGHT COMPANY

EASTERN UTILITIES ASSOCIATES

NEW ENGLAND GAS AND ELECTRIC ASSOCIATION NEGEA

Western Mass. Electric Co.

PUBLIC SERVICE Company of New Hampshire

The location of the plant in Rowe, Massachusetts, was influenced by its geographical location, the availability of cooling water from the Deerfield River, existing power transmission facilities, adequate land at a reasonable price, railroad transportation and a favorable public attitude.

Having settled on the type of reactor, it was easy to choose the organizations to perform plant design. Westinghouse Electric Corporation had been intimately connected with all of the previous pressurized water reactors and Stone & Webster Engineering Corporation had assisted in the design of the Shippingport plant. These two companies were given joint responsibility for the engineering design of Yankee, while Stone & Webster carried out plant construction.

In June of 1956, Yankee signed the first contract of the AEC under its Power Demonstration Reactor Program. This contract provided that the government would assist Yankee by underwriting up to $5,000,000 of the cost of research and development and by waiving interest charges on the nuclear fuel for a period of five years. The research and development work has been carried out by Westinghouse under a subcontract with Yankee.

The Yankee Atomic Electric Company was formed and incorporated as a Massachusetts electric company and the sponsoring companies arranged the entire financing of the plant. Common stock in the new company was purchased by each of the ten utilities roughly in proportion to their size. This provided about 35 per cent of Yankee's capital needs. An additional 35 per cent came from the sale of Yankee 5 per cent bonds to ten insurance companies and the remaining 30 per cent from unsecured 4¾ per cent notes taken by 28 banks. The total cost of the plant and fuel was approximately 43.7 million dollars. The stockholding companies are both owners and customers. All electricity generated at Yankee is purchased by the sponsoring utilities in the same ratio as their stockholdings.

The number of companies involved and the many regulatory requirements necessitated highly impressive and complicated financing. Leading the way in overcoming this difficulty were The Equitable Life Assurance Society of the United States, The First Boston Corporation, and The First National Bank of Boston.

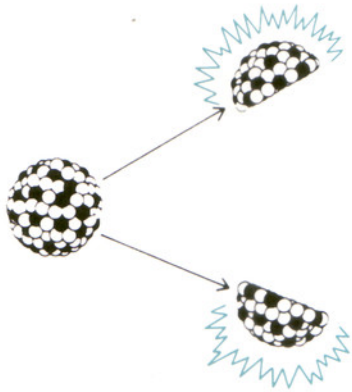
CENTRAL VERMONT Public Service CORPORATION

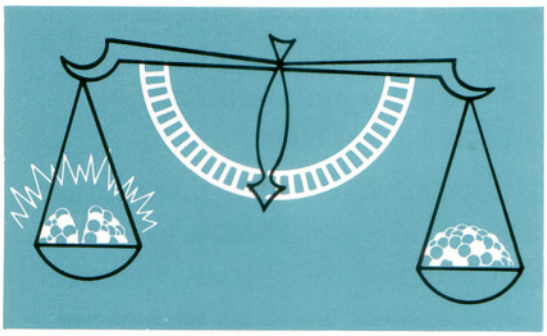
CENTRAL MAINE POWER

CL&P
THE CONNECTICUT LIGHT AND POWER COMPANY
A SHAREHOLDER OWNED PUBLIC UTILITY

BOSTON EDISON COMPANY

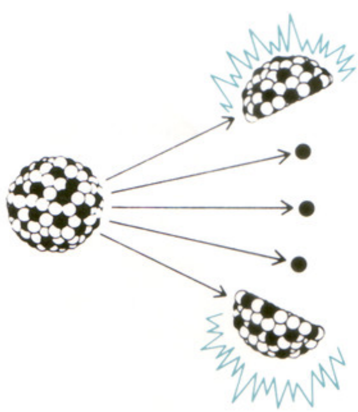
New England Electric System



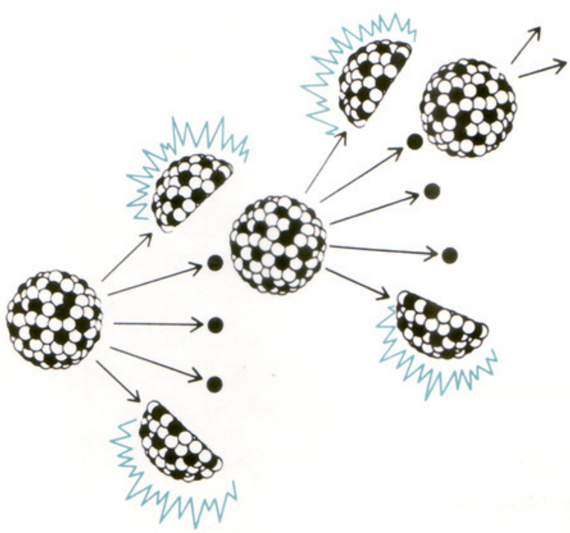


How The Reactor Works

The nuclear heat within the Yankee reactor is developed when atoms of uranium are split apart — that is, fissioned. Each fissioned atom splits into two fragments, each of which becomes an atom in its own right. The significant thing is the fact that these two new atoms together weigh slightly less than the original uranium atom. This difference in weight — or mass — becomes energy in the form of heat. This is the phenomenon predicted 60 years ago by Albert Einstein but only recently put to practical and peaceful use.



Each individual fission gives out only an exceedingly minute quantity of heat; but, since there are many million trillions of fissions taking place within the reactor every second, the total amount of heat developed is large. Small as the energy from each fission is, the amount of weight actually lost is tremendously smaller. In a typical reactor only a few pounds of material will actually be consumed each year, but many millions of kilowatthours of electrical generation will be the result.

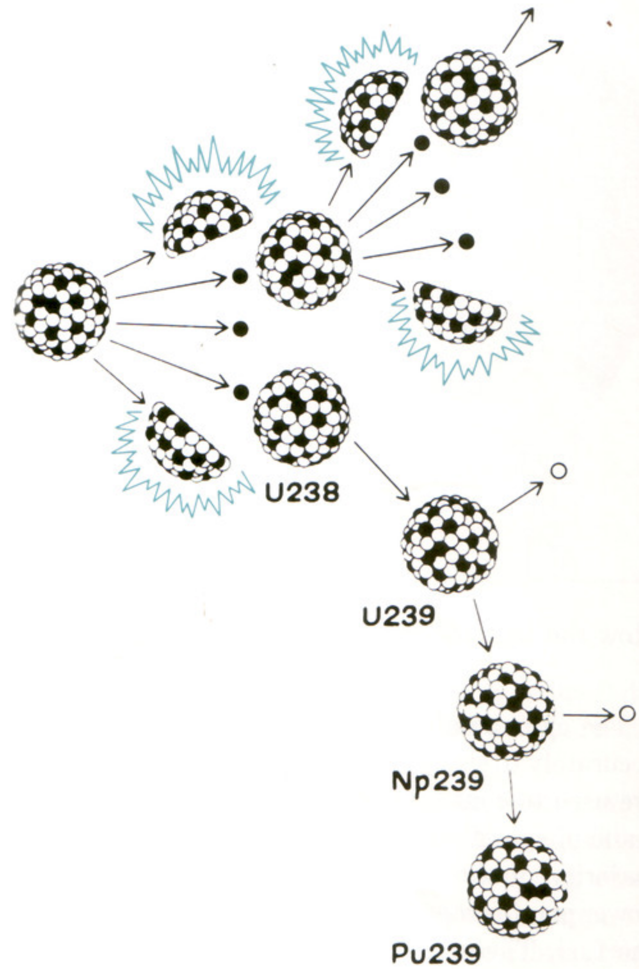


Another important aspect of the fission process is that each atom as it splits releases two or three free neutrons. Neutrons are one of the basic building blocks of nature. All material — whether animal, vegetable or mineral — is made up of neutrons in combination with other particles called protons and electrons.

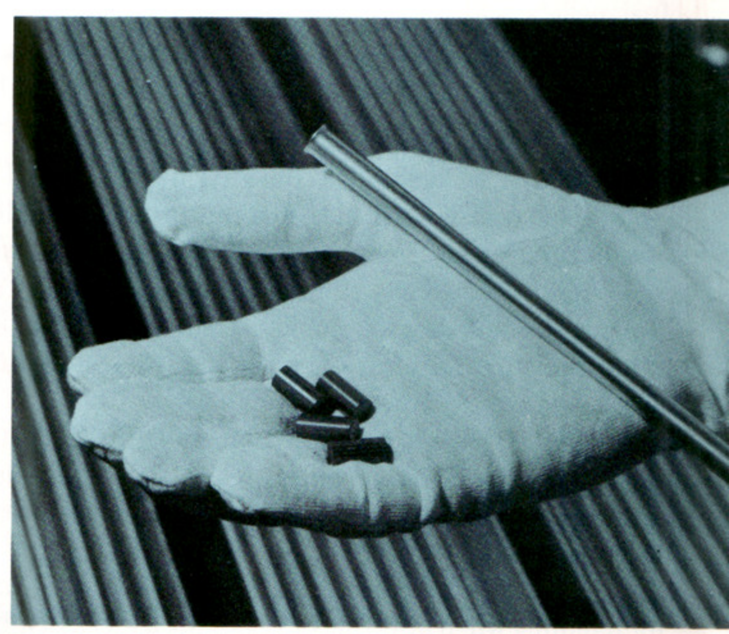
The neutrons released during the fission of one uranium atom move through the reactor core until they meet another atom of uranium, whereupon another fission is triggered. The process is thereby made continuous; each generation of fissions releasing enough neutrons to give rise to a new generation. This sequence continues as long as the reactor is in operation and is referred to as a chain reaction.

Uranium atoms exist in several different forms, called isotopes, one of which is much more readily fissioned than the others. This fissionable isotope makes up less than one per cent of the uranium existing naturally. In order to provide enough of this fissionable uranium, known as uranium-235, in most reactors the proportion must be increased. In the Yankee reactor the uranium is enriched so that the uranium-235 content in fresh fuel is about five per cent.

The chain reaction is maintained if only one of the two or three neutrons given off during each fission finds another atom of uranium and causes another fission. The other neutrons are absorbed by atoms of the other materials in the reactor or in the shielding. Some of these neutrons strike atoms of the type of uranium which is normally not fissionable and another very important process takes place. The atoms of uranium-238 are transmuted into even heavier atoms of an element which does not exist naturally anywhere in the world. This new material — the alchemists' goal, at last — is called plutonium. Its most important characteristic is that it too is a fissionable material like uranium.

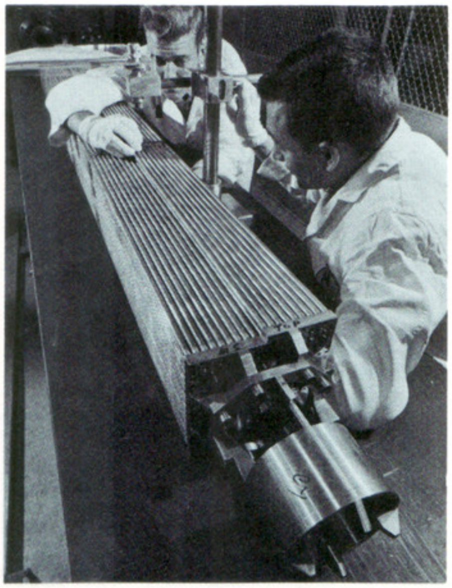


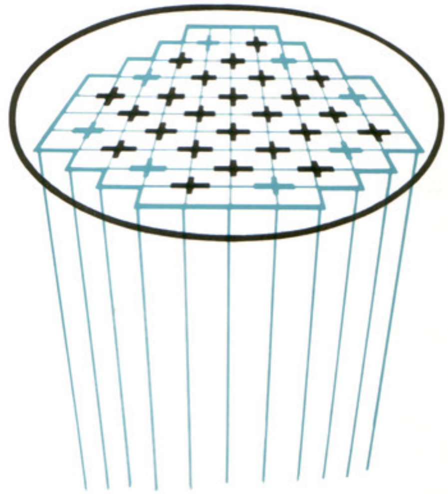
Some 14 per cent of the power generated at Yankee comes from fissions taking place in plutonium atoms that have been formed in the fuel during operation. When the fuel is removed, it contains additional plutonium which is eventually processed to provide fuel for other reactors. The amount of extra plutonium formed in this reactor will equal in weight about half the amount of the uranium-235 consumed.



The fuel in the Yankee reactor is in the form of small pellets of an oxide of uranium called UO_2. This material was chosen because it is the form of uranium least affected by conditions within the reactor. It is not appreciably damaged by the fission process, nor by reactor temperatures, and is also practically unaffected by exposure to hot water. Since reactor fuel is expensive, the longer it can remain in the reactor producing heat, the better.

The pellets of UO_2 are formed individually under tremendous pressure in automatic hydraulic presses and are heated to almost 3,000° F. The heating process further reduces their volume and produces a dense hard material almost like porcelain. The core of the Yankee reactor contains over 3,400,000 of these pellets.





How the Reactor Works (continued)

The cylindrical surface of the pellets is ground very accurately to size so as to fit closely into the tubes which are used to contain them in the reactor. This tubing is made of special high-strength stainless steel. The great majority of the radioactivity generated in an atomic power plant is represented by the fission products within the fuel. These stainless steel tubes serve as the first of several barriers which prevent the escape of this radioactivity, as well as to support and position the fuel pellets within the reactor. There are more than 23,000 of these fuel tubes, each nearly eight feet long — making a total of almost 37 miles of tubing within the reactor core.

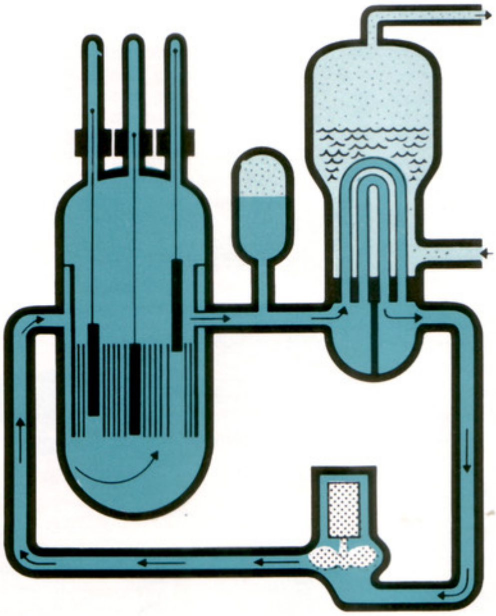
Each tube is filled with 150 fuel pellets, sealed at both ends, and brazed into bundles or subassemblies. Small tubular spacers, called ferrules, separate each tube from its neighbor. Nine of these subassemblies are assembled into larger bundles containing over 300 tubes and are held together by welded steel straps. These groups of nine subassemblies are called fuel assemblies. The reactor core is made up of 76 such units, arranged so as to approximate a cylinder eight feet high and six feet in diameter. At both ends of each fuel assembly, fixtures are provided to support the assembly within the reactor. These fixtures also are used for handling when inserting or removing a fuel assembly.

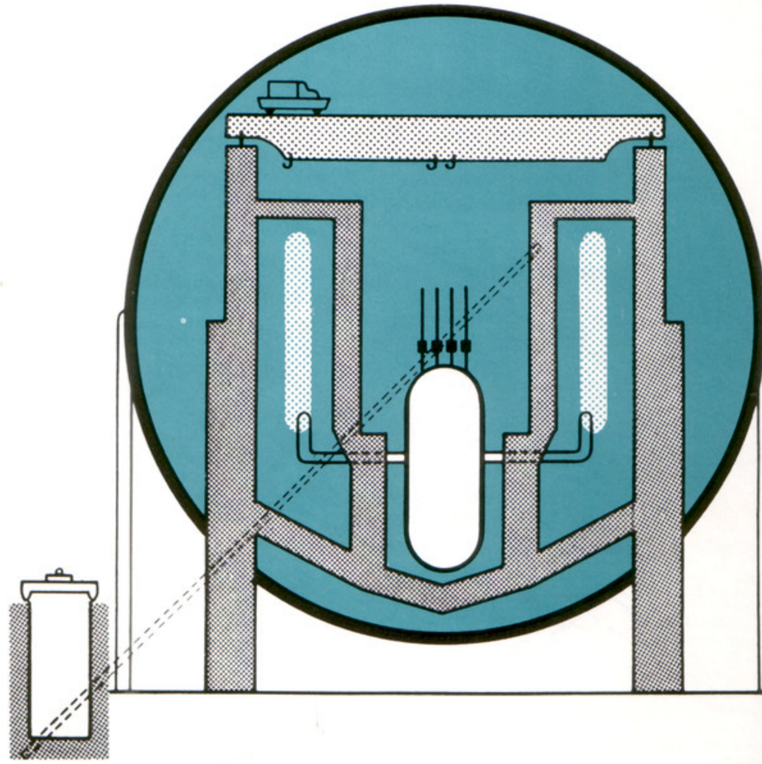
During reactor operation, water is circulated upward through the reactor core. Since every fuel tube is slightly separated from those next to it, the water flows freely around and past each of them. The water serves two essential purposes: the first being to slow down the neutrons which are moving through the core, and the second, to remove and carry away the heat being generated within the fuel.

The neutrons given off as an atom fissions move too rapidly to be efficient in triggering additional fissions. The light hydrogen atoms in ordinary water provide a cushioning effect which quickly slows the neutrons to a speed at which the probability of additional fissioning is much greater. Without this slowing-down effect, or moderation, the chain reaction could not be maintained.

The heat, which is developed when atoms within the fuel fission, is conducted to the surface of the pellets, through the stainless steel tube, and carried away by the water circulating through the core. This water is pressurized to 2,000 pounds per square inch in order to prevent the formation of steam within the reactor — hence the name, pressurized water reactor.

One of the advantages of the pressurized water reactor is its strong inherent tendency to be self-regulating. If the temperature of the core rises, the water becomes less dense and therefore less effective as a moderator. This has the effect of reducing the number of fissions taking place and therefore the amount of





heat being developed. In the simplest terms, then, it is impossible for this type of reactor to run away.

Also an essential part of the reactor core are the 24 control rods. These are cross-shaped so as to slide through spaces left between the square fuel assemblies for this purpose. The control rods are made of either hafnium or of an alloy of silver, indium and cadmium, both of which are highly effective as neutron absorbers. By withdrawing the control rods from the core, fewer neutrons are absorbed, more are available to cause fissioning and the reactor power increases. When the control rods are inserted more neutrons are absorbed until finally the chain reaction dies out and the reactor is shut down. Normally, the control rods are moved in and out slowly, but at any indication of trouble they are automatically released and fall into the core by gravity — an operation technically known as a scram.

In this reactor, an additional means of control is provided by adding boric acid solution to the water in the reactor. Since the boron in the boric acid is a neutron absorber, increasing or decreasing the concentration of boric acid has an exactly similar effect on the reactor to inserting or withdrawing control rods.

The reactor core is contained within a cylindrical steel pressure vessel, whose walls are eight inches thick. This reactor vessel is 31½ feet high and over 10 feet in diameter. Within the vessel are the necessary internals to direct the flowing main coolant and to support the reactor core and control rods. Mounted on the reactor head are the 24 control rod drives.

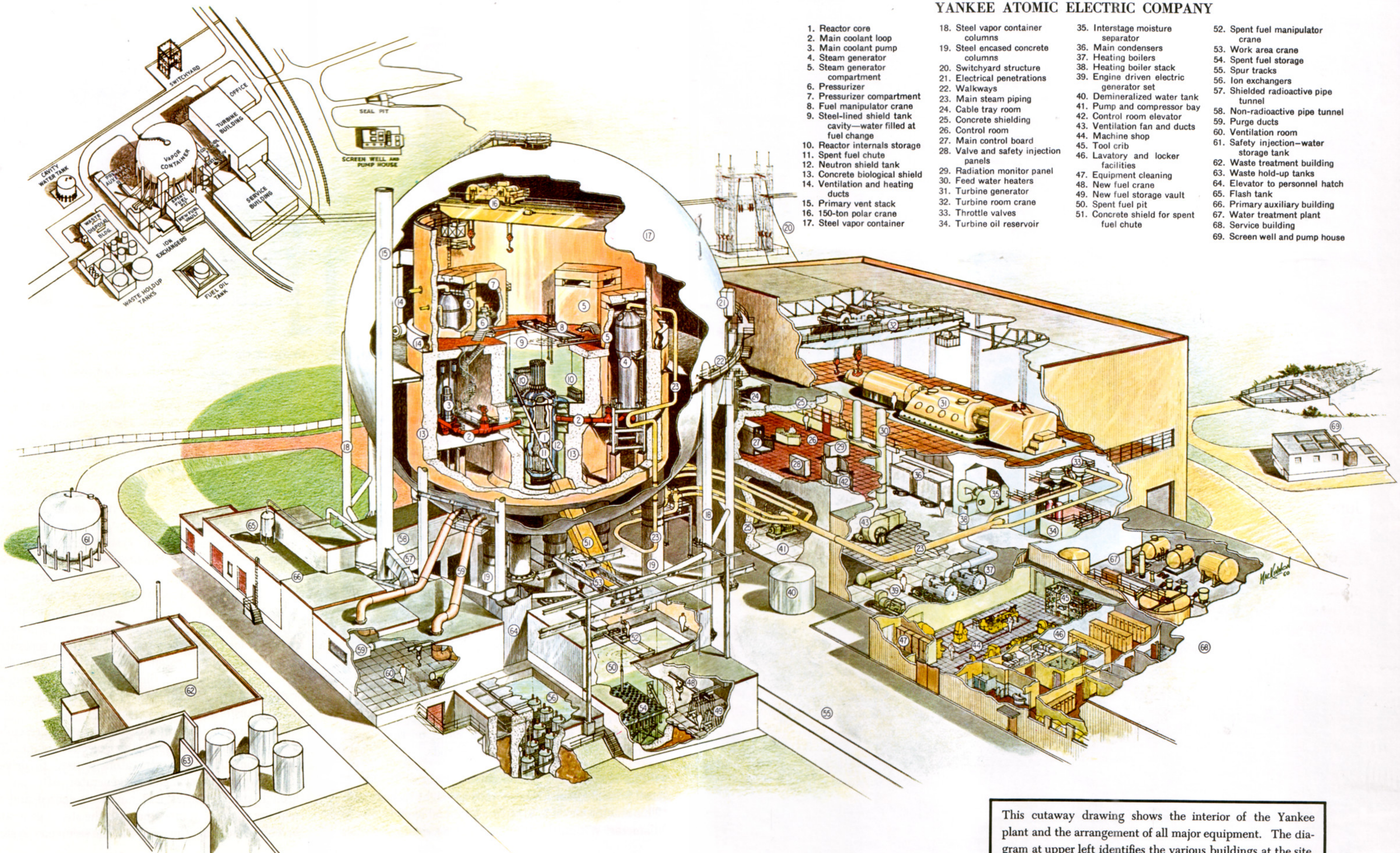
After passing through the core, the heated water travels through the primary system, which consists of four separate loops in parallel. Each loop is a closed system made up of a steam generator, a pump, two shutoff valves, a check valve and connecting piping. The primary system water circulates continuously through these loops, removing heat generated in the reactor, carrying it to the steam generators where it is transferred to the secondary system, and then returns to the reactor to repeat the process. The pump in each loop circulates over 23,000 gallons every minute which means that each drop of water in the primary system makes more than four round trips during that time.

In the steam generators, the primary system water travels inside of stainless steel tubes which separate it from the secondary system water on the outside of the tubes. The heat passing through these tubes from the primary water boils the cooler, lower-pressure secondary water, transforming it into steam.

From this point on, the basic Yankee plant resembles closely any conventional steam-electric plant. The steam from the steam generators is used to drive a turbine which turns an electric generator. After passing through the turbine, the steam is condensed and the resulting water is pumped back to the steam generator, thereby completing the circuit in the secondary system.

YANKEE ATOMIC ELECTRIC COMPANY

1. Reactor core
2. Main coolant loop
3. Main coolant pump
4. Steam generator
5. Steam generator compartment
6. Pressurizer
7. Pressurizer compartment
8. Fuel manipulator crane
9. Steel-lined shield tank cavity—water filled at fuel change
10. Reactor internals storage
11. Spent fuel chute
12. Neutron shield tank
13. Concrete biological shield
14. Ventilation and heating ducts
15. Primary vent stack
16. 150-ton polar crane
17. Steel vapor container
18. Steel vapor container columns
19. Steel encased concrete columns
20. Switchyard structure
21. Electrical penetrations
22. Walkways
23. Main steam piping
24. Cable tray room
25. Concrete shielding
26. Control room
27. Main control board
28. Valve and safety injection panels
29. Radiation monitor panel
30. Feed water heaters
31. Turbine generator
32. Turbine room crane
33. Throttle valves
34. Turbine oil reservoir
35. Interstage moisture separator
36. Main condensers
37. Heating boilers
38. Heating boiler stack
39. Engine driven electric generator set
40. Demineralized water tank
41. Pump and compressor bay
42. Control room elevator
43. Ventilation fan and ducts
44. Machine shop
45. Tool crib
46. Lavatory and locker facilities
47. Equipment cleaning
48. New fuel crane
49. New fuel storage vault
50. Spent fuel pit
51. Concrete shield for spent fuel chute
52. Spent fuel manipulator crane
53. Work area crane
54. Spent fuel storage
55. Spur tracks
56. Ion exchangers
57. Shielded radioactive pipe tunnel
58. Non-radioactive pipe tunnel
59. Purge ducts
60. Ventilation room
61. Safety injection—water storage tank
62. Waste treatment building
63. Waste hold-up tanks
64. Elevator to personnel hatch
65. Flash tank
66. Primary auxiliary building
67. Water treatment plant
68. Service building
69. Screen well and pump house



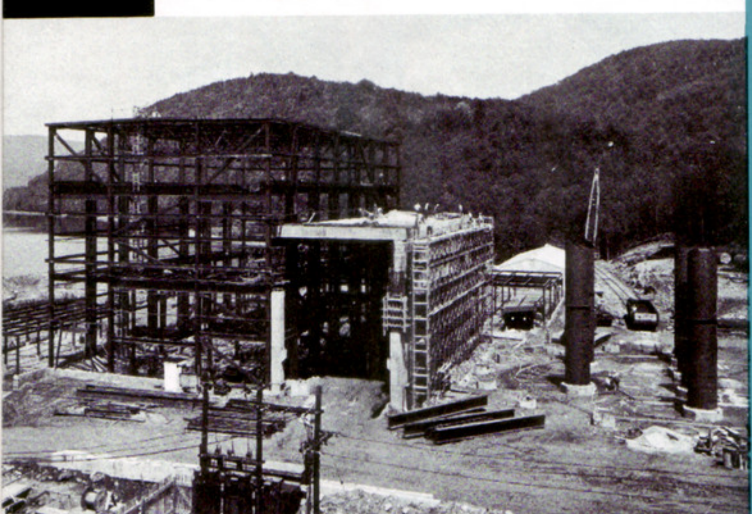
This cutaway drawing shows the interior of the Yankee plant and the arrangement of all major equipment. The diagram at upper left identifies the various buildings at the site.

Construction Progress

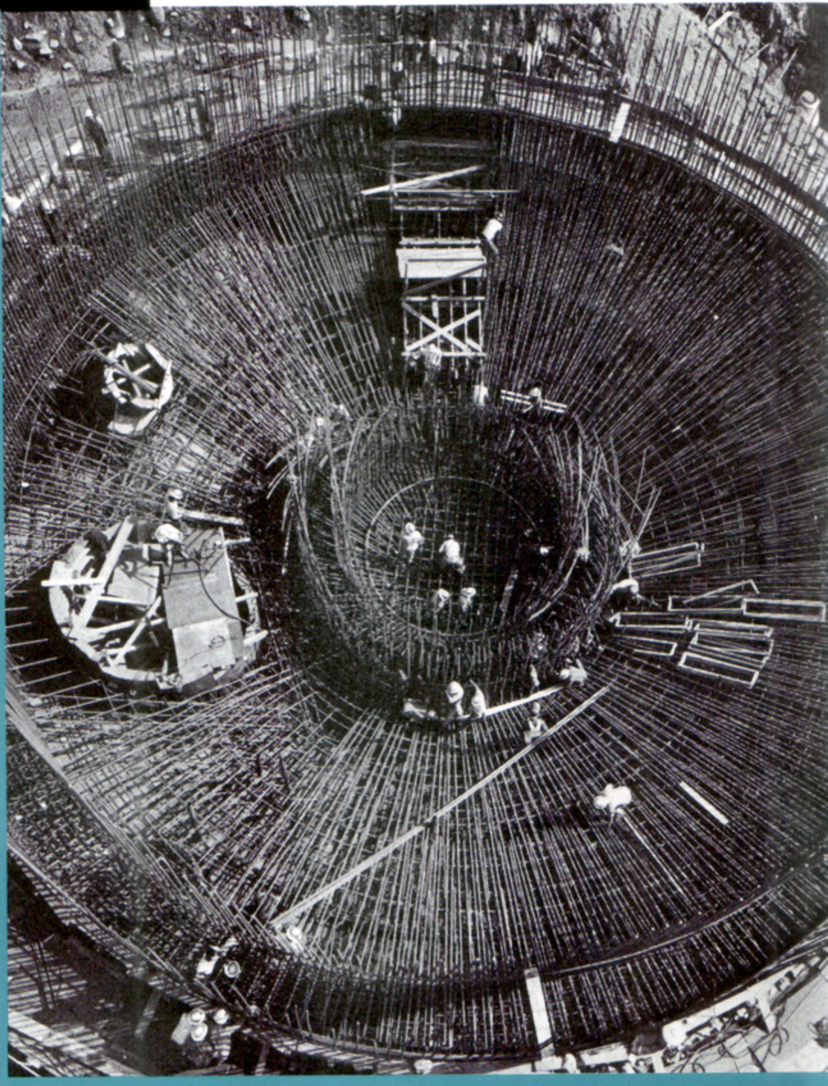
1 March 1958—Construction forces move in

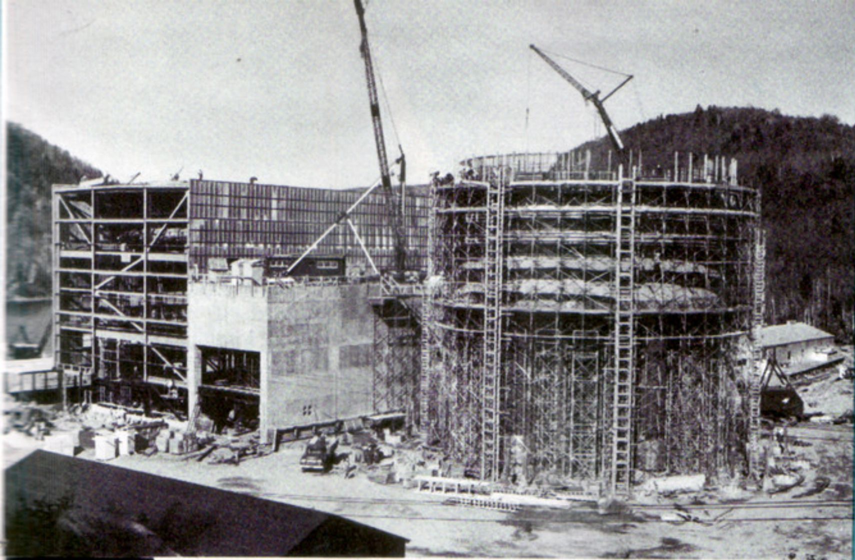
2 June 1958—Concrete foundations

3 July 1958—Turbine building, structural steel and columns for reactor structure



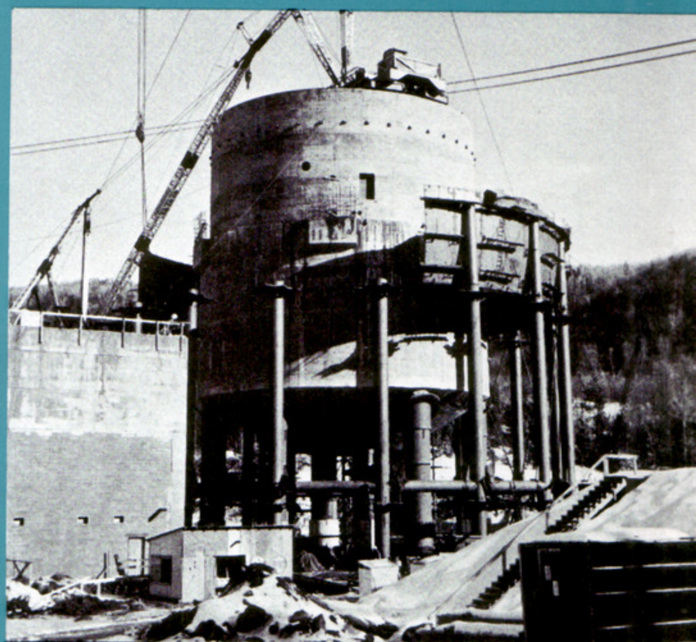
4 September 1958—Reinforcing steel for reactor structure





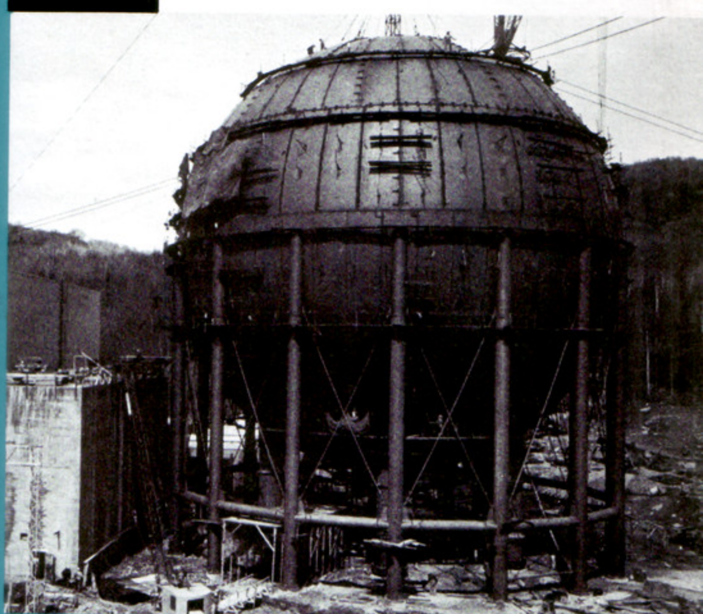
5 October 1958—Temporary scaffolding for reactor structure

6 December 1958—Concrete reactor structure

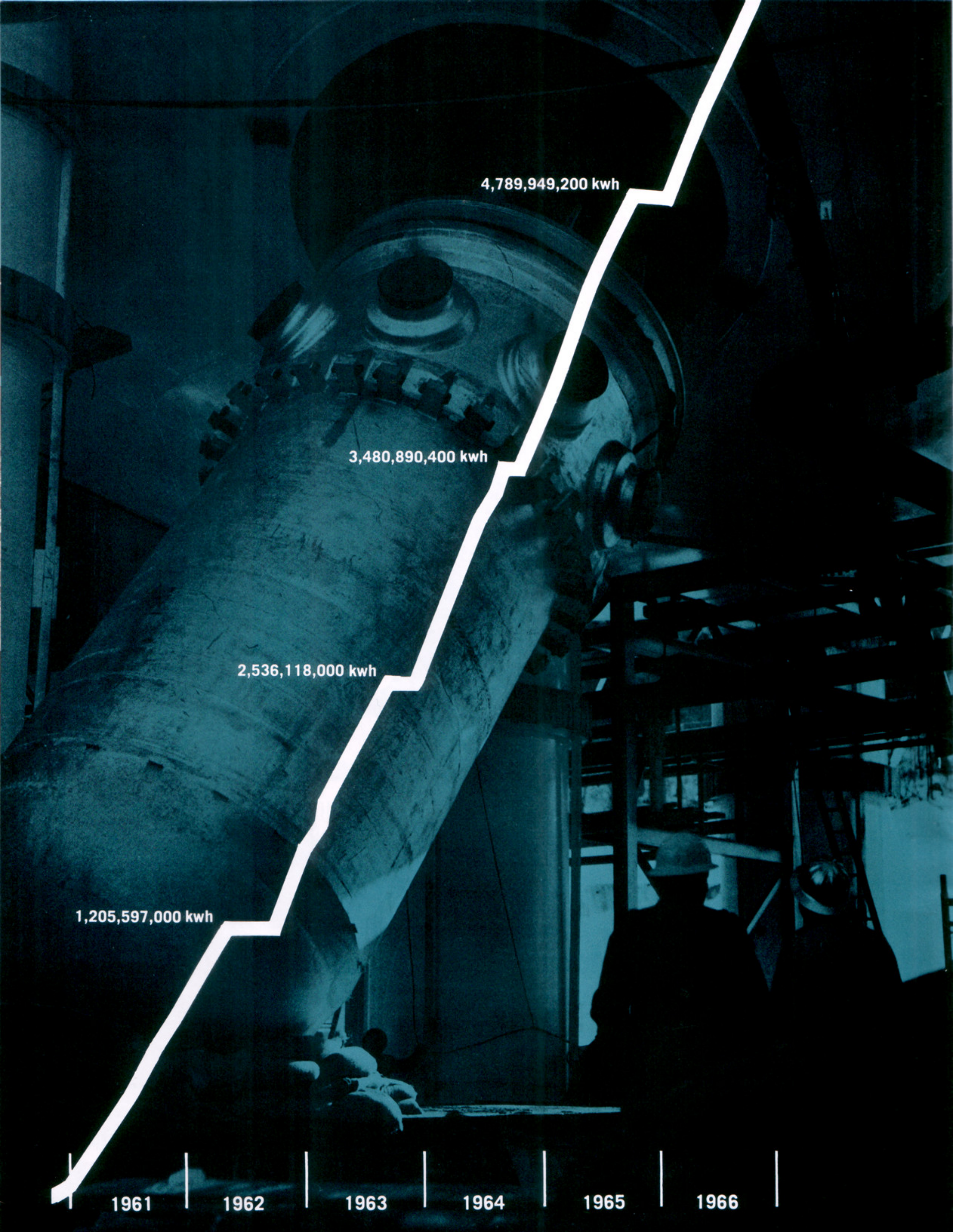


7 January 1959—First plates for steel sphere

8 May 1959—Completion of steel sphere



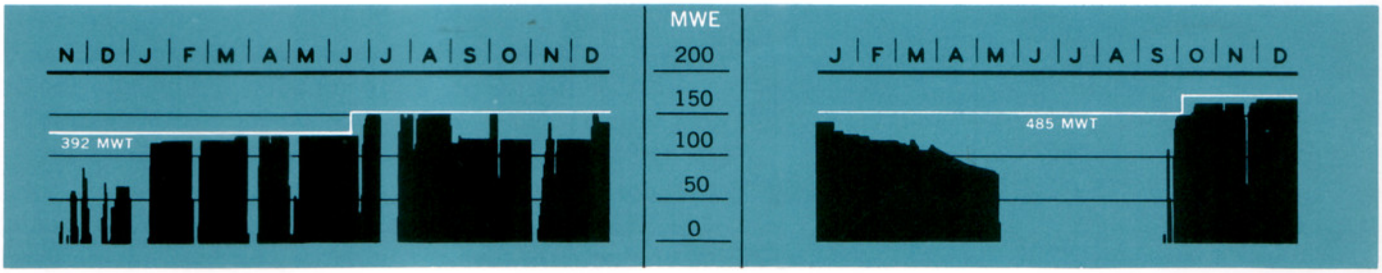
9 June 1960—Construction completed


4,789,949,200 kwh
3,480,890,400 kwh
2,536,118,000 kwh
1,205,597,000 kwh
1961
1962
1963
1964
1965
1966

5 Years of Operation

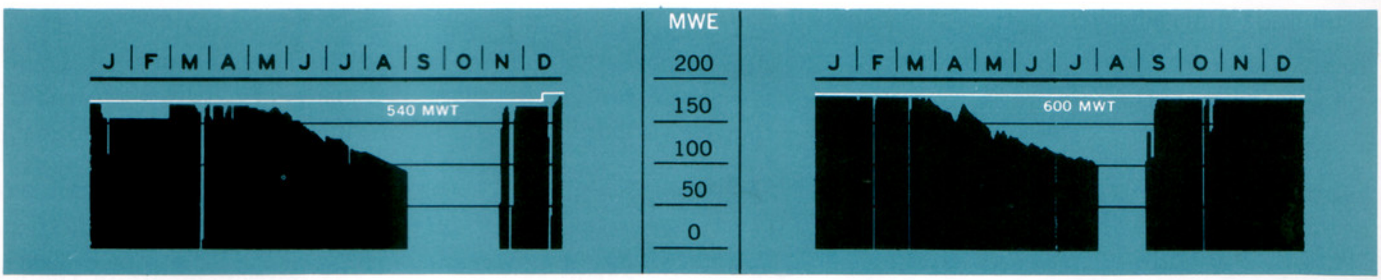
1960-61 — Following initial power generation on November 10, 1960 the remainder of that year was taken up with a series of tests at a variety of power levels. In January of 1961 a design modification on the turbine generator allowed the plant to reach full licensed power of 125 MW for the first time. Additional physics tests were performed at intervals throughout the year, as well as corrections to minor design defects and general debugging throughout the plant — primarily on conventional equipment such as valves.

1962 — During the early part of the year the useful life of Core I was substantially extended by allowing reactor power to decrease as the reactivity of the core gradually burned out. This same technique has been used on all subsequent cores. The length of the shutdown for the first refueling was extended because of the necessity of redesigning and replacing certain core components which had not performed satisfactorily.



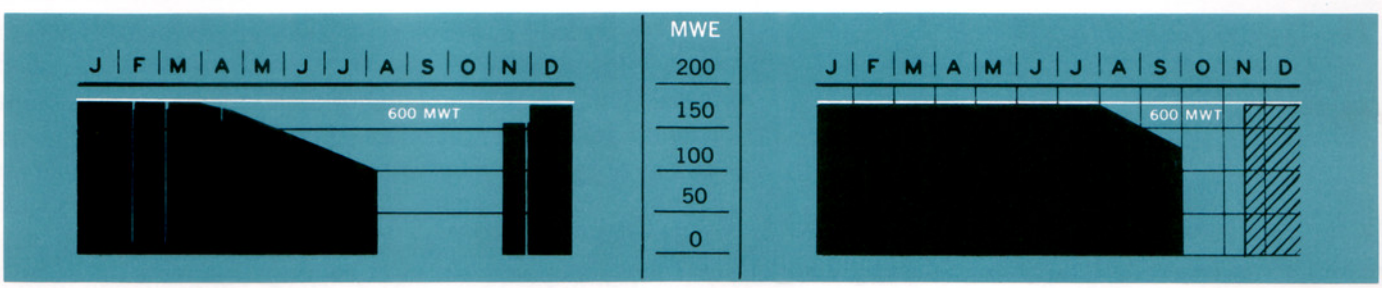
1963 — By this time plant operation was becoming more and more routine. Prior to shutdown for refueling the plant had been on the line at full capability continuously for 147 days. Core III was the first core based on an improved fuel cycle involving the use of more highly enriched new fuel and the replacement of only the most burned up fuel from the previous core. The result is a gradual increase in the energy generated by each unit of fuel.

1964 — This was a year indicative of the full potential of the Yankee plant. By this time plant capability had been gradually raised to take full advantage of the conservative plant design and operation was essentially continuous except for a routine 5 week refueling.

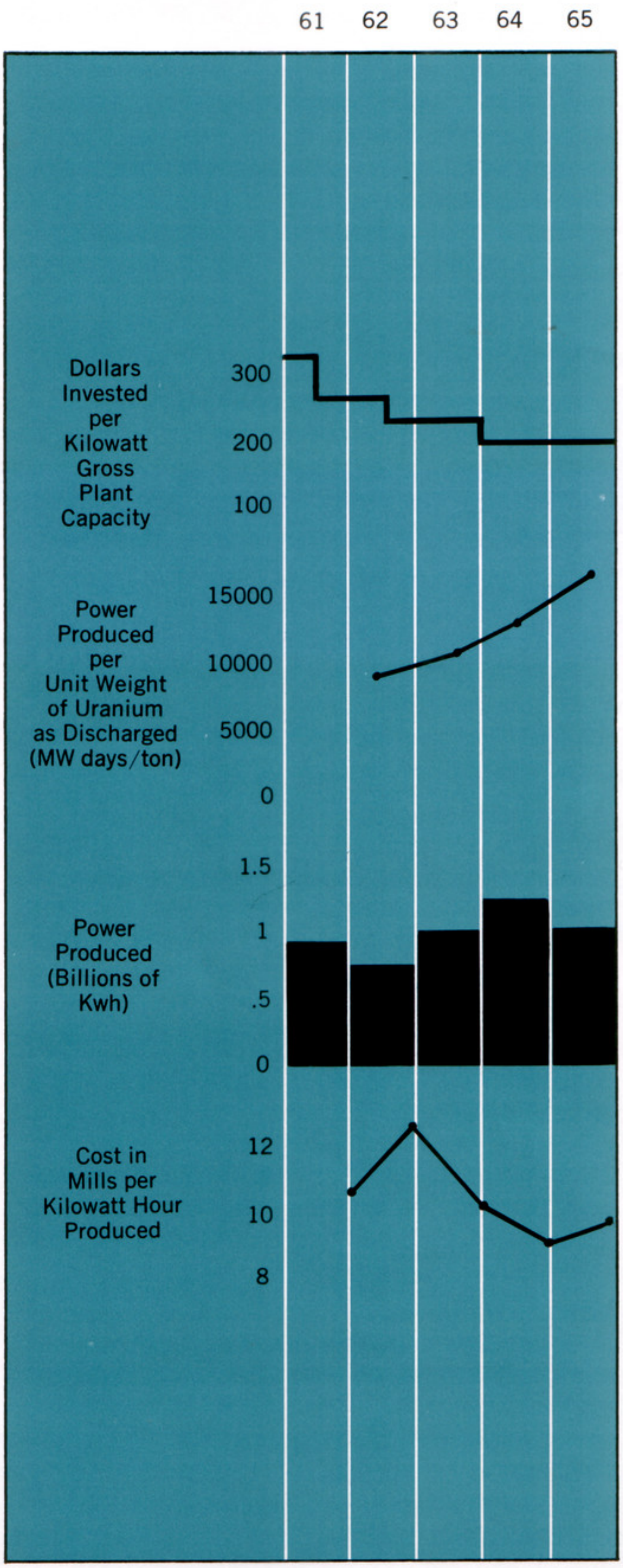


1965 — Since this was the fifth year of plant operation, the plant was shutdown for a longer period of time to perform extensive inspections and to make a variety of modifications and needed repairs. Core V represents another incremental increase in uranium enrichment in the continuing program for reducing fuel costs.

1966 — During 1966 Yankee passed 5 billion net KWHR of generation on March 27 and 6 billion gross KWHR in August. A short refueling period is anticipated in late 1966. Plans call for generation throughout the entire year of 1967 and until the end of February 1968, a period of approximately 15 months, with 11 months at full power, at an estimated generation cost around 7 mills.



Economics



Since the Yankee plant was the first full-sized nuclear plant of its size and type to be constructed anywhere in the world it was not intended or expected to produce electricity at a cost competitive with conventional fuel fired generating plants. Rather it was intended to provide actual operating experience and a firm reference for the detailed evaluation of this completely new and unique source of energy and its utilization in everyday service. On this basis Yankee has more than lived up to expectations during the first five years of operation.

Plant construction was completed well within the original estimates at a cost of $39,400,000 exclusive of fabrication of the first core, working capital, and organization and administrative expenses which brought the grand total to $43,700,000. The gradual rise of power level capability has reduced the investment in the plant per unit of capacity.

One of the advantages which nuclear power plants have compared to conventional plants is the ability to take advantage of improved technology as it develops. This has been dramatically demonstrated at Yankee through an improvement in fuel utilization which has nearly doubled in the first five years.

The combination of increased plant capability and of more continuous plant use has resulted in a general trend upward in total power produced by the plant. (1961 had an exceptionally high production since there was no refueling operation that year.)

Primarily as a result of the improvements in the areas already mentioned, the overall cost of each kilowatthour produced at Yankee has shown a general trend downward with time. (1961 again is an exception because of the high electrical production that year combined with a substantial reduction in the credit received for plutonium in subsequent years.)

The present power cost level of approximately 9.0 mills per kilowatthour is very appreciably lower than pre-operational estimates which indicated costs at this point in time in the 12–14 mill range. It is also particularly encouraging to note that a conventional plant of the same size, built at the same time, would have power costs of about 8.0 mills, only slightly lower than Yankee's present costs and within the range of possible additional improvements in the future.

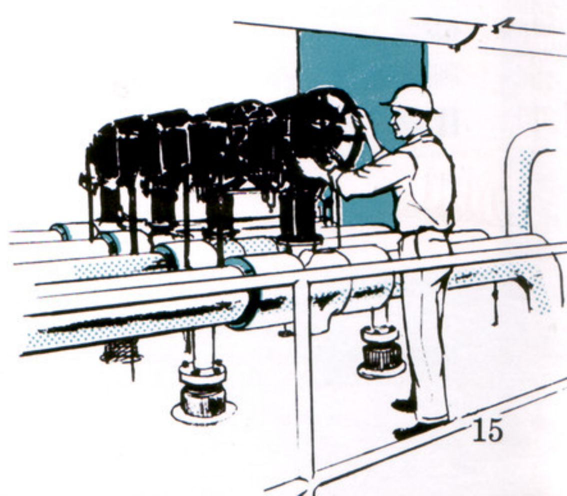
People

Yankee's operating organization consists of approximately 66 full-time employees. In building for the future, these people were carefully selected and trained, starting even before there was a formal Yankee organization. Beginning in 1952, men with extensive utility operating experience were sent on loan to various reactor projects throughout the country. The first submarine prototype reactor, the first boiling water reactor experiments, the first breeder reactor, and the Enrico Fermi power reactor being built near Detroit, all had Yankee people participating in their design or operation.

Yankee added to its staff men who had extensive experience at government installations such as the reactors at Savannah River, South Carolina; West Milton, New York; and Fort Belvoir, Virginia. Most of the remaining people at the Yankee plant worked previously in generating plants of the sponsoring New England utilities. Throughout the design of the Yankee plant, the engineers and scientists who were to be in charge of its operation worked with Westinghouse and Stone & Webster, and participated directly in each phase. Supplementary services were obtained from recognized consultants in special fields, plus the talents of the New England Power Service Company in engineering, legal, financial, public relations, insurance, drafting and other areas. Sponsor companies also provided engineers on a loan basis for design and early operation.

In September of 1959, Yankee began its own training program for operating personnel at the site in Rowe. Basic scientific and engineering courses were covered, as well as intensive instruction in the details of the plant and its operation. The instructors were those members of the plant organization specializing in the particular subject, but on many occasions, experts from other organizations added their technical knowledge.

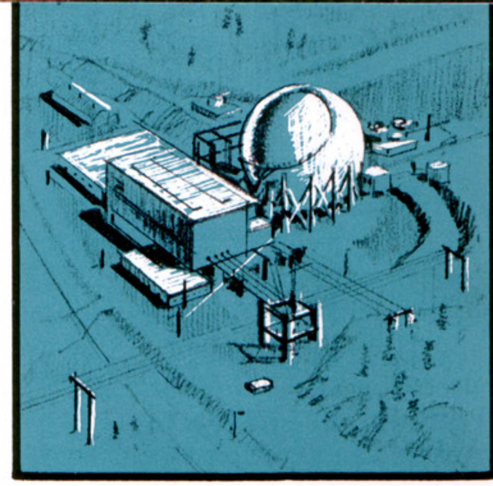
As the plant neared completion, the emphasis in the training program shifted from the classroom to the plant itself. This knowledge was augmented and put to practical use as the individual pieces of equipment were checked out and accepted from the construction forces by teams of Yankee operating personnel. Plant familiarization was accelerated by the preparation of detailed operating instructions and check-off lists for every portion of the plant under all conditions.



Each operator responsible for the operation of the plant must not only be licensed by the State of Massachusetts as an operating engineer, but must also pass both a written and oral examination to qualify for the required Atomic Energy Commission operator's license.

Well trained Yankee engineering and operating personnel are now available for other nuclear plants presently being planned, designed, and constructed for Yankee sponsoring companies. Fourteen men recently transferred to Connecticut Yankee with others assigned to Vermont Yankee and Maine Yankee. Thus, one of the basic reasons for the formation of Yankee is being accomplished.

Note should be made of the outstanding Safety Record of the plant with only one disabling injury (a twisted knee) in nearly six years.



In Perspective

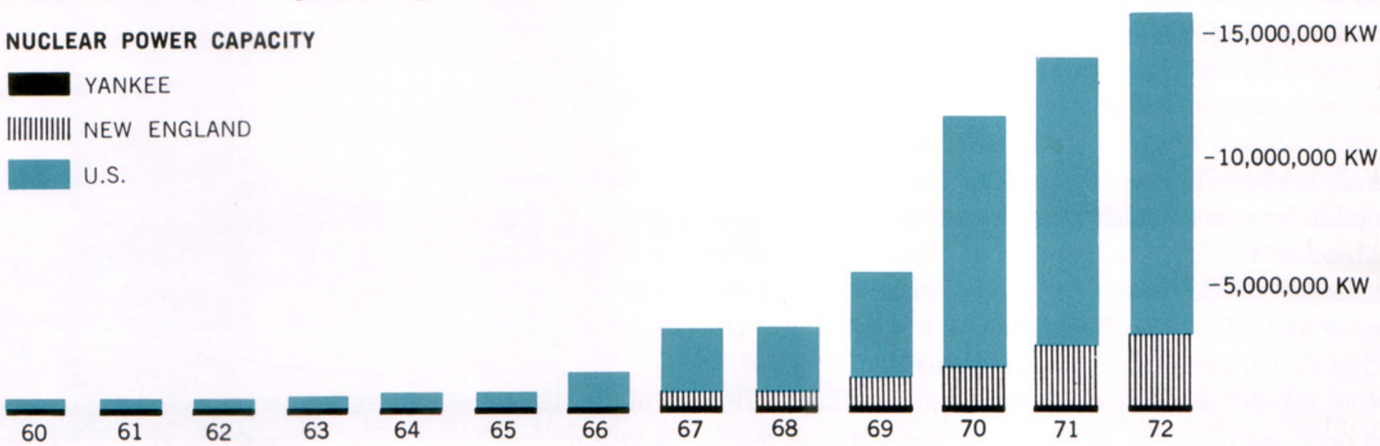
One of the most important early phases of the Yankee project was the conscious effort to choose a reactor type which was well enough developed to give promise of reliability and at the same time with sufficient potential to become economically attractive. The pressurized water reactor was chosen based on experience gained in the nuclear navy which has employed this reactor type almost exclusively and on experience at the experimental Shippingport plant. Although at the time and until quite recently there has been a wide variety of reactor types to choose from, it is now becoming clear that the water reactors — either pressurized or boiling — are going to be the predominant types in normal utility service for a good many years to come. As it has turned out, Yankee and a boiling water plant at Dresden, Illinois owned by Commonwealth Edison Company have produced nearly identical amounts of power and have together produced about two thirds of the electrical output so far from all the nuclear plants in the United States.

The performance of these two plants has been so satisfactory that it has become clear that water reactors of a large size and based on the lessons learned at Yankee, at Dresden, and elsewhere can be economically competitive in areas of the country where ordinary fuel costs are high. Since New England is far removed from coal or oil producing areas transportation of conventional fuels very nearly doubles their costs to utilities in this region.

In 1963, the New England utilities which had financed the Yankee project agreed to form another company called Connecticut Yankee Atomic Power Company, which includes additionally United Illuminating Company. The plant is now in operation.

Vermont Yankee Nuclear Power Company, which includes additionally Green Mountain Power Corporation, has under construction a 540 megawatt nuclear plant to be built at Vernon, Vermont with operation scheduled for 1971. Maine Yankee Atomic Power Company, with Bangor-Hydro Electric Company and Maine Public Service Company joining other Yankee sponsors, has started work on an 830 megawatt nuclear plant for operation in 1972 in Wiscasset, Maine.

Four other nuclear projects have also been announced for New England. The Millstone plant, a 600 MW boiling water plant is under construction by a group of Connecticut and Massachusetts utilities for operation in 1969 and to be followed by a second unit of 830,000 MW; another 630 MW boiling water plant is underway by Boston Edison Company for operation in 1971; and New England Electric System has plans for an 800 megawatt unit about 1973.



OFFICERS AND DIRECTORS

Yankee Atomic Electric Company

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Vice-President	Charles F. Avila	Boston, Massachusetts
Vice-President	Howard J. Cadwell	West Springfield, Massachusetts
Vice-President	Roger J. Coe	Boston, Massachusetts
Vice-President	Charles H. Keenan	Boston, Massachusetts
Vice-President	Sherman R. Knapp	Hartford, Connecticut
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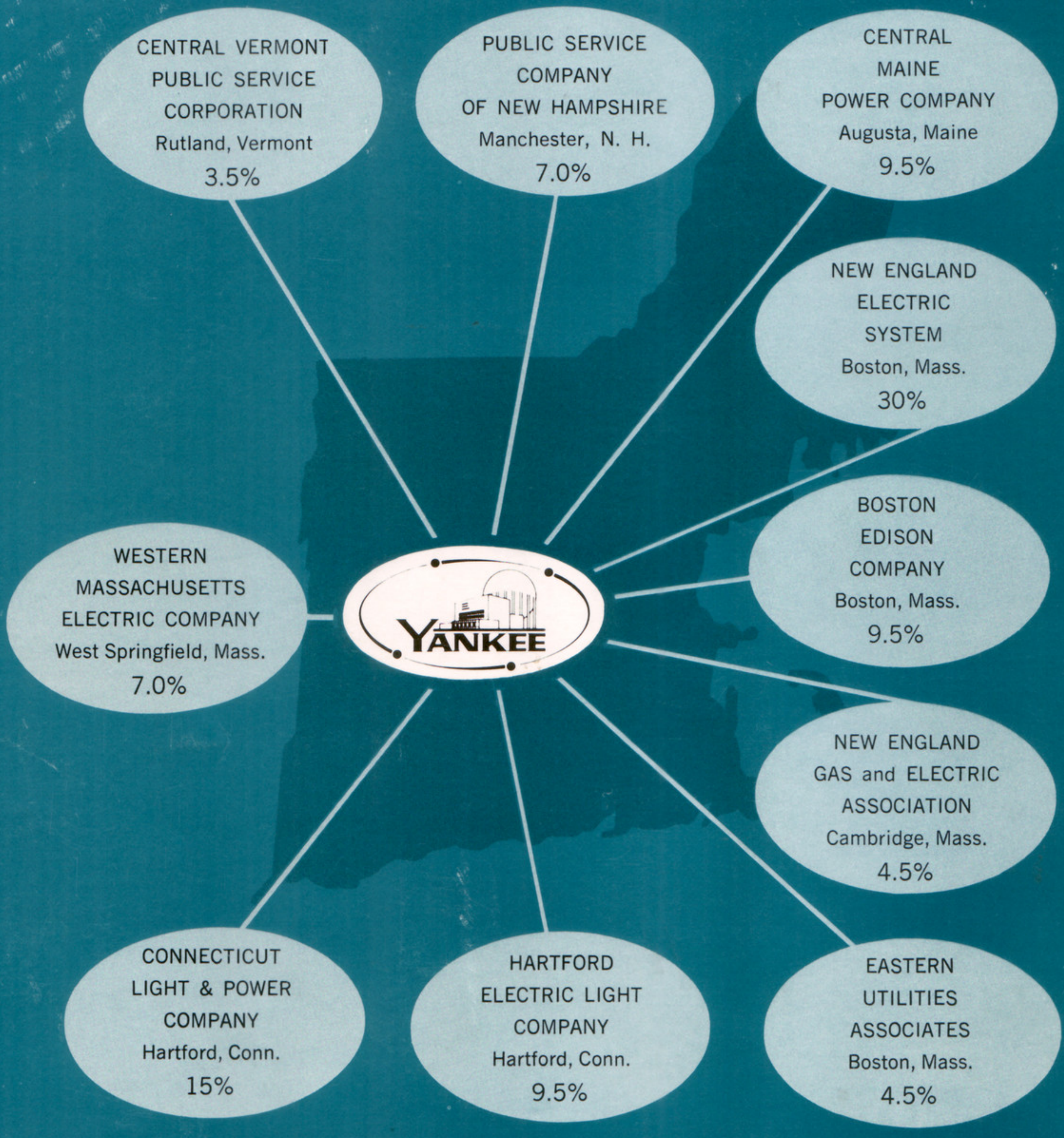
Avery R. Schiller	*Public Service Co. of New Hampshire* *Manchester, New Hampshire*
Olcott D. Smith	*Aetna Life Insurance Company* *Hartford, Connecticut*
William Webster	*New England Electric System* *Boston, Massachusetts*

THE EDISON AWARD

The Company was cited for "the completion of the plant well ahead of schedule, and at a capital cost 23 per cent below the estimate, for producing its first billion kilowatthours at a fuel cost of 2.8 mills per kilowatthour, compared to a fossil-fuel cost of 4.2 mills in the territory served; financing the construction with the private funds of ten cooperating electric companies serving the region; having the nuclear steam generator available for load 96 per cent of the time during the first core and at a 70 per cent load factor; developing a staff of well-trained personnel who did the fuel loading."

During the formative years of the Yankee project notable contributions were made by former directors Austin D. Barney of The Hartford Electric Light Co., Charles A. Coolidge of Ropes & Gray, I. L. Moore of New England Electric System; former officers Harry Hanson and Leeds A. Wheeler of New England Electric System, H. M. Johnson of Yankee Atomic; and former directors now deceased, Floyd D. Campbell of New England Gas & Electric Associates; Thomas G. Dignan, Boston Edison Company; William F. Wyman, Central Maine Power Company and Ralph D. Booth, Jackson & Moreland, Inc.



SPONSOR COMPANIES AND PERCENTAGES OF YANKEE OWNED

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