

ORIGINALDecision No. 54594

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

In the Matter of the application of)
 PACIFIC GAS AND ELECTRIC COMPANY, a)
 corporation, for an order issuing to)
 applicant a certificate declaring)
 that public convenience and necessity)
 require the construction, operation)
 and maintenance by applicant of the)
 nuclear steam-electric generating and)
 transmission project as herein set)
 forth.)

Application No. 38522

F. T. Searls and John C. Morrissey, for applicant.
Dion R. Holm and Paul L. Beck, for City and County
 of San Francisco; Fred J. Groat, for Harvey O.
 Banks, Director of Water Resources, State of
 California; Edward J. Terhaar, for U. S. Bureau
 of Reclamation; Bert Buzzini and J. J. Deuel,
 for California Farm Bureau Federation; Bruce
Renwick, Harry W. Sturges, Jr., and Rollin E.
Woodbury, for Southern California Edison Company,
 interested parties.
John J. Doran and John F. Donovan, for the
 Commission staff.

O P I N I O NApplicant's Request

Pacific Gas and Electric Company, a California corporation, operating public utility electric and gas systems and relatively minor water and steam-heat systems in northern and central California, on October 19, 1956, filed the above-entitled application requesting a certificate declaring that the present and future public convenience and necessity require and will require the construction, operation and maintenance of a nuclear steam-electric generating and transmission project to be located in Alameda County, and granting and conferring all necessary permission and authority to construct, operate and use the nuclear steam-electric plant as described in the application.

Proposed Nuclear Plant

Applicant alleges that the General Electric Company is carrying on a research program for the development of power generation by atomic energy and, in connection therewith, is constructing an engineering and development center on a 1,600-acre site near Pleasanton in Alameda County, California, approximately 40 miles southeast of San Francisco. As a part thereof, it is providing a nuclear fueled, boiling water type reactor. On May 4, 1956, the Atomic Energy Commission issued Construction Permit No. CPPR-3 to the General Electric Company to construct this nuclear reactor under Section 104 of the Atomic Energy Act of 1954.

Applicant proposes to construct, install and own one 5,000-kw turbine generator and related auxiliary equipment required to operate on saturated steam supplied at 1,000 psi pressure from the reactor and reduced to 450 psi near the turbine throttle. In connection therewith applicant proposes to construct, install and operate approximately 2,000 feet of 12-kv circuit line which will connect with its 60-kv transmission network east of the area involved through a 60/12-kv substation. This substation also will be used to deliver electric service to the engineering and development center.

Applicant states that the steam-electric generating plant and 12-kv line will be located on property leased from the General Electric Company. This generating plant and line will be operated and maintained by the applicant and the steam will be purchased by the applicant from General Electric for operation of the steam turbine.

The specific name applied to this plant is the Vallecitos Atomic Power Plant. Exhibit No. 1 is a general plan of the plant and Exhibit No. 2 is a sketch of the Vallecitos Atomic Power Plant. Exhibit No. 3 shows a simplified flow diagram.

Public Hearing

After due notice, public hearing was held on this application before Commissioner Ray E. Untereiner and Examiner Manley W. Edwards on January 7, 1957, at San Francisco. At the hearing applicant presented seven exhibits and testimony by four witnesses in support of its application. Cross-examination of applicant's witnesses was conducted by several interested parties and the Commission staff representative. No one entered any objection to the granting of applicant's request; however, the representative of the City of San Francisco was concerned as to the effect of this plant upon nearby Vallecitos Creek which forms part of the water supply for the City of San Francisco. The California Farm Bureau Federation's counsel and representative urged the Commission to give favorable consideration to the application and stated that the national policy of the Farm Bureau is that atomic power should be developed by private agencies rather than federal agencies.

Atomic Power Project Contract

The methods, means and terms for producing electric energy are to be governed by a 10 year contract between the applicant and the General Electric Company dated November 30, 1956. A copy of the contract is included in this record as Exhibit No. 4. Under this contract General Electric agrees to construct the boiling water reactor and to furnish steam to the applicant and the applicant agrees to furnish and operate a turbine generator and such other equipment as may be necessary for the generation of electricity from such steam. The contract states that in addition to the production of electricity, this project is intended to enable both General Electric and the applicant to obtain experience in the design, construction, and operation of atomic power plants.

General Electric will provide a site adjacent to the boiling water reactor for the construction of a turbine generator building,

but the site will remain General Electric's property. The applicant is required to design and construct the turbine generator building, including foundations, and install the turbine generator and all other equipment necessary to receive steam from the boiling water reactor and to return feed water to the reactor. The turbine generator to be used is a 5,000-kw unit from the S. S. Donbass. General Electric is to modify the turbine generator to render it suitable for operation with 450 psi saturated radioactive steam.

Estimated Plant and Operating Cost

The contract provides a ceiling of \$572,000 on the applicant's expenditures for electrical generating facilities. General Electric will reimburse the applicant for all necessary expenditures in excess of \$572,000 required to complete its obligations. The applicant will own the electrical generating facilities and in the event that the ceiling on the applicant's expenditure is exceeded an allocation of ownership will be made so that General Electric will own such parts of the electrical generating facilities as represent its expenditures.

During the term of this agreement or such longer term as may be necessary to carry out its provisions, General Electric will lease to the applicant, at a rental rate of \$1 a year, the ground on which the applicant's property is located.

Applicant is obligated to pay for steam at the rate of one mill per kwhr of electricity generated and delivered at the station meter. Due to the developmental nature of the boiling water reactor, General Electric will not be obligated to produce any particular quantity of steam nor will the applicant be obligated to generate electricity from all steam delivered. General Electric will accept feed water from the applicant at a point outside of the reactor enclosure.

Applicant estimates that the cost to it of this power at the switchboard will be 7 to 8 mills per kwhr assuming a 60 per cent capacity factor. Obviously, a cost for power from this plant as low as this is possible only because of the assistance the applicant is receiving from General Electric. Such cost is about the same as for power from a conventional steam plant.

Personnel

General Electric is to supervise the operation and maintenance of the project and is to provide certain personnel. The applicant is to supply the personnel necessary to operate the electrical generating facilities and, to the extent reasonably requested by General Electric, will supply the personnel necessary to operate the boiling water reactor and associated equipment; however, the applicant is not obligated to pay for more than 14 individuals per work shift.

Maintenance

The applicant will perform all maintenance of the electrical generating facilities which is required at conventional power plants; however, necessary decontamination will be the responsibility of General Electric.

Insurance

Each party will carry for its own account its usual insurance coverage for the following risks:

1. Workmen's compensation liability pertaining to its own employees.
2. Damage to its own property.
3. Liability to third parties for personal injuries, death, and for property damage.

General Electric will carry, for both itself and the applicant, insurance against liability to third parties arising out of atomic hazards. Such insurance is to be in an amount and of a

type which it considers reasonable to protect the interests of both the applicant and itself.

Licenses and Permits

The contract provides that General Electric shall obtain for both itself and the applicant all licenses, permits, or other governmental authorization necessary to operate the project, except for such authorization as only the applicant can legally obtain for itself. General Electric obtained the construction permit from the Atomic Energy Commission, heretofore referred to, and applicant's counsel submitted a copy of the permit for the record as Exhibit No. 5. General Electric also obtained a use permit from the Board of Supervisors of Alameda County under date of January 19, 1956, to establish, maintain and operate a nuclear research and engineering development laboratory, a copy of which is designated Exhibit No. 6. A permit was obtained by General Electric from the Regional Water Pollution Control Board No. 2, under Resolution No. 209, dated February 17, 1956, after filing a report on proposed waste discharge in accordance with Section 13054 of the Water Code of the State of California.

A copy of Resolution No. 209 is designated as Exhibit No. 7. It shows the estimated waste flows from the initial development as follows:

	<u>Gallons Per Day</u>
Sanitary Sewage	3,750
Laboratory Wastes	20,000
Reactor Cooling Water	25,000 to 50,000

The Board prescribed certain requirements as to the purity of this discharge stating its intent:

- a. To protect the surface and ground waters, that may be affected by this proposed laboratory, for domestic, agricultural and industrial purposes;

- b. To protect the waters of Alameda Creek for fish propagation, fishing, wading and bathing;
- c. To prevent nuisance as a result of the proposed waste water discharge.

Atomic Fuel and Wastes

The construction permit issued by the Atomic Energy Commission specifies as fuel uranium enriched in the isotope uranium-235. The estimated schedule of transfers of nuclear materials follows:

Kilograms of Contained U-235

<u>Date of Transfer</u>	<u>From Commission to G. E.</u>	<u>From G. E. to the Commission</u>		<u>Total</u>
		<u>In Fabrica- tion Scrap</u>	<u>In Spent Fuel</u>	
1956	50	19.5	None	19.5
1957	None	None	None	None
1958	30	11.7	None	11.7
1959	30	11.7	10	21.7
1960	30	11.7	15	26.7
1961	30	11.7	10	21.7
1962	30	11.7	15	26.7
Return of Inventory				43.0
				<u>171.0</u>
Total:	200			

General Electric proposes to segregate all liquid wastes that may contain any radioactive material, concentrate them and haul them away from the laboratory site to an AEC approved ocean disposal site.

Atomic Hazards

Most of applicant's testimony dealt with atomic hazards and safety measures. Its first witness¹ provided the sketches and layout to show that the turbine and control buildings were physically separated from the building which houses the reactor vessel. Its second witness² described certain safety measures and stated that a "heavy" concrete wall, two feet thick to the height of a man, will

¹ Mr. J. D. Worthington, supervising civil engineer.
² Mr. Willard H. Nutting, senior mechanical engineer.

be placed around the turbine for shielding purposes. The concrete will be made from ferro-phosphorous aggregate which requires less thickness for the same shielding effect. Its third witness,³ a scientist with extensive experience in atomic matters, formerly was the Chairman of the Advisory Committee on Reactor Safeguards.

The scientist testified that a reactor potentially is a quite hazardous piece of equipment, but when properly constructed and handled by competent and well-trained persons the boiling water type of reactor is inherently stable and should give reliable operation. He stated the fission products are exceedingly dangerous.

The fourth witness⁴ called by the applicant, an employee of the General Electric Company, described the function of the control rods in regulating the power output of the reactor. When the rods are in the core they absorb neutrons and shut the reactor down. He described the safety features of the control rod drives as:

1. Electric power backed up by batteries.
2. Independent air operating mechanism.
3. If the control rods freeze, expulsion of some of the water from the reactor will shut it down.

The reactor operators in the control building must be licensed by the Atomic Energy Commission. Automatic devices are provided in triplicate and there are electric interlocks in case of an earthquake or excessive radioactivity as indicated by monitors located at strategic points around the plant and in the area.

The reactor vessel is a cylindrical vessel, some seven feet in diameter, and is designed to withstand the pressures required by the state code. This reactor is located in a large cylindrical building, some 48 feet in diameter, that provides heavy concrete shielding.

³ Dr. Edward Teller, Professor of Physics in Department of Physics, University of California and Radiation Laboratory.

⁴ Mr. Samuel Untermeyer, Manager of Reactor Operations at Vallecitos Atomic Power Plant.

Applicant anticipates that the plant can be constructed and completed by October 1, 1957.

Findings and Conclusions

In proposing this atomic power plant, applicant is looking to the future when atomic power may reduce the need for bulky fuels. It represents that this installation will enable it to gain technical knowledge, information and experience in designing, constructing, operating and maintaining nuclear electric generating plants. While the output from this plant comparatively will be small for a system of the size of the applicant's, the applicant's capital investment is limited and the power at 60 per cent capacity factor should cost applicant no more per unit than that from a large conventional steam plant. Applicant has agreed to keep its costs in such detail as will fit in with the accounting system that may be prescribed by this Commission.

The construction of the Vallecitos Atomic Power Plant should give applicant basic experience in atomic power plants that will enable it to construct future full scale nuclear plants with improved efficiency. Accordingly this project appears to be in the public interest and should be authorized.

Applicant plans to finance the construction of this nuclear steam-electric generating plant and transmission line by using, to the extent available, its working capital, moneys in reserve, funds not required for immediate use, and the proceeds of the issue and sale of such bonds, stocks, notes or other evidences of indebtedness as the Commission shall hereafter, upon proper application, authorize for that purpose. Applicant represents that this proposed new project will not compete with any person, firm or public or private corporation in the public utility business of furnishing or supplying electric service to the public in or adjacent to the territory in which the plant and transmission line are to be constructed.

It is our opinion that the applicant has the financial means to construct the turbine generator portion of the plant and place it in successful operation and that such energy as may be produced by the plant can be utilized on applicant's system.

The Commission finds that public convenience and necessity require the construction, operation and maintenance of the proposed nuclear steam-electric generating plant and transmission line, and that an order should be issued granting such authority.

The certificate of public convenience and necessity issued herein is subject to the following provision of law:

That the Commission shall have no power to authorize the capitalization of this certificate of public convenience and necessity or the right to own, operate or enjoy such certificate of public convenience and necessity in excess of the amount (exclusive of any tax or annual charge) actually paid to the State as a consideration for the issuance of such certificate of public convenience and necessity or right.

O R D E R

The above-entitled application having been considered, a public hearing having been held, the matter having been submitted and now being ready for decision; therefore,

IT IS HEREBY ORDERED that Pacific Gas and Electric Company be, and it is hereby, granted a certificate that public convenience and necessity require the construction, operation, maintenance and use of the proposed nuclear steam-electric generating plant, consisting of one 5,000-kw turbine generator unit; and transmission line, to be known as Vallecitos Atomic Power Plant located near Pleasanton in Alameda County; the procurement of the necessary land rights, permission or such franchise as may be necessary for the construction and operation of the project; and the production, transmission, distribution and sale of such energy as may be generated

by the project to its present and prospective customers in accordance with its certificates of public convenience and necessity and with its rates and rules duly filed with the Commission.

IT IS HEREBY FURTHER ORDERED that Pacific Gas and Electric Company shall file with this Commission a detailed statement of its capital costs for its portions of the nuclear generating plant and transmission lines within six months following their date of completion.

The authorization herein granted will expire if not exercised within two years after the date hereof.

The effective date of this order shall be twenty days after the date hereof.

Dated at San Francisco, California, this 25th day of February, 1957.

[Signature]
President
[Signature]
[Signature]
[Signature]

Commissioners

Commissioner Rex Hardy, being necessarily absent, did not participate in the disposition of this proceeding.