ALJ/rr/vdl *

Decision 83 04 096 April 27, 1983

ORIGINAL

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

In the matter of the application of PACIFIC GAS AND ELECTRIC COMPANY for a certificate of public convenience and necessity to construct, install, operate, maintain, and use Unit 20 at The Geysers Power Plant, together with transmission lines and related facilities. (Electric)	Application 82-05-50 (Filed May 21, 1982)

O P I N I O N

In this application Pacific Gas and Electric Company (PG&E) seeks a certificate of public convenience and necessity (CPCN) under Public Utilities (PU) Code § 1001 and the Commission's General Order (GO) 131-B declaring that present and future public convenience and necessity require or will require the construction, installation, operation, maintenance, and use of Unit 20 at the Geysers Power Plant (Geysers) together with transmission lines and related facilities. The Geysers presently consists of 15 operating units with a total net capability of approximately 909,000 kilowatts (kW). Existing units are located in a portion of The Geysers Known Geothermal Resources Area (KGRA) in northeastern Sonoma County and southwestern Lake County about 75 miles north of San Francisco. Unit 17 became operational on December 18, 1982 and Unit 18 on February 15, 1983. Construction of Unit 16 began in June 1982 and is scheduled for commercial operation in 1985. Units 17 and 18 are located in Sonoma County, and Unit 16 is located in adjacent Lake County. These three units add 330,000 kW of net generating capacity to bring the total installed capacity at the Geysers to 1,239,000 kW in 1985.

Unit 20 is subject to the jurisdiction of the California Energy Resources Conservation and Development Commission (CEC). An Application for Certificate (AFC) was submitted to the CEC on March 29, 1982. By letter dated April 16, 1982, the CEC staff notified PG&E that the AFC for Unit 20 was accepted for further processing. Six copies of the AFC were forwarded to the Commission under cover letter dated May 13, 1982. On February 9, 1983, the CEC issued its decision granting the AFC for Geysers Unit 20.

One of the principal disputes in the certification procedure before the CEC was the necessity and timing of construction of a new collector line to be built in the Geysers KGRA. The issue was whether the line should be built in 1986 or 1988, with the company favoring the latter date and the CEC staff the former. The parties stipulated and the CEC agreed in its final decision in February 1983 that PG&E would file an application to build the transmission line in July 1983 with the appropriate agency, the line to be operational in 1986. This assumed that further workshops to be conducted indicated the need for the earlier construction date. PG&E agreed to assume the burden of proof if it determined that the evidence supported construction in 1988.

California Environmental Quality Act (CEQA) Requirements

On July 2, 1981, the Resources Agency certified the CEC site certification process as an Environmental Impact Report (EIR) equivalent. This addition of California Administrative Code § 15192(k) to the State EIR Guidelines adds the CEC's power plant site certification process to the list of programs exempt from the EIR process. We have reviewed the CEC decision and conclude that the mitigation measures adopted will reduce the environmental impacts to an acceptable level.

PG&E's Proposal

Proposed Unit 20 is located in eastern Sonoma County in the northwest quarter of Section 28, Township 11 North, Range 8 West,

Mt. Diablo Base and Meridian. The Socrates Mine supplemental fill disposal area where PG&E proposes to dispose of approximately 65,000 cubic yards of excavated material is located in the southeast quarter of Section 33, Township 11 North, Range 8 West, Mt. Diablo Base and Meridian. The Proposed Unit 20 site is on an east-west trending spur ridge northeast of Big Sulphur Creek at an elevation of approximately 2,900 feet above sea level. Maps showing the location of the proposed power plant, fill disposal area, and transmission line, were attached to the application as Exhibit A.

Unit 20 will have a net normal operating capacity of approximately 110,000 kW. It will consist of a two-cylinder, four-flow steam-turbine with a nominal gross rating of 119,000 kW at a steam flow of about 2,000,000 pounds per hour, a steam pressure of 100 pounds per square inch (gauge), a steam temperature of approximately 338 degrees Fahrenheit and a turbine back-pressure of approximately 3 inches of mercury (absolute). The generator will be a 137,800 kilovolt ampere (kVa), 13,800 volt, hydrogen-cooled, three-phase, synchronous unit. Other major components include a surface condenser with steam jet ejectors; condensate pumps; a mechanically-induced draft, cross-flow cooling tower; noncondensible gas removal equipment, a Stretford hydrogen sulfide abatement system, and other appurtenant and related facilities. If necessary to meet applicable air quality standards, PG&E will install secondary H_2S abatement equipment. Transformation will consist of one 137,000 kVa, 13.8-230 kilovolt (kV), three-phase oil and air cooled main transformer.

The Unit 20 site is adjacent to PG&E's Unit 12 230 kV transmission line. PG&E will build a 100-foot tap from Unit 20 to Tower 1/9 of the Geysers 13 tap. This line will be strung with 1,431 kcmil aluminum (AAL) conductor. About 0.6 miles of bundled 1,431 kcmil AAL conductor will be strung on the vacant position (circuit No. 1) of the Geysers 13 tap to connect to the Geysers 9 and 14-Castle Rock Junction 230 kV line.

Two transmission tap towers will be installed, one at Unit 20 and the other at the Geysers 9 and 14 Castle Rock Junction tap location. The existing suspension tower at location 1/9 of the Geysers 13 tap will be replaced with a new deadend tower. No additional right-of-way is needed for these new facilities. A minimum 30-foot ground clearance will be maintained as required by GO 95.

The heights of two existing suspension towers on the Geysers 13 tap will be increased to clear grading to be done for Unit 20.

Contracts for major equipment have been or will be awarded on the basis of competitive bids. Field installation of equipment and construction work will be performed by contractors also selected after competitive bidding. PG&E will be responsible for the project design and will supervise construction activities. Construction was scheduled to begin March 1983 in order to bring the unit on-line by March 1986.

The construction of Unit 20 will involve site preparation activities, foundation construction, structure erection, and electrical and mechanical equipment installation. A leveled fenced area of approximately seven acres will be established by excavating soil and rock material and disposing of this material at two fill disposal locations, namely on-site and Socrates Mine. The final plant site elevation will be approximately 2,825 feet above sea level. The major structures to be built are the turbine building, cooling tower, electrical switchyard, and the hydrogen sulfide abatement facility.

Safety Considerations

Safety considerations are an integral part of plant design requirements. Unit 20 will incorporate appropriate seismic design requirements and will have an adequate fire fighting water supply system. The unit is designed to operate unattended and will have

control devices to shut down the plant in the event of emergency or abnormal operating conditions.

Emergency standby power will be supplied by a 21 kV distribution line to be installed on wood poles starting from an existing line near Unit 13.

Because the unit will be part of PG&E's integrated area system, electric loads to be served by the unit will be met from other system power sources during periods when Unit 20 is on a forced or scheduled outage.

Steam Supply

Geothermal steam to be used in Unit 20 will come from a proven geothermal steam field developed by Union Oil Company of California (Union) on certain of its Big Sulphur Creek leasehold properties in Sonoma County. PG&E will purchase this steam from Union in accordance with the terms of an agreement between PG&E and Union dated May 11, 1970. This agreement has previously been filed with the Commission as part of the Unit 11 certification proceeding (Application 53127). Union under the same agreement supplies the steam for Units 1 through 12, Unit 14, and Units 17 and 18. The agreement also provides that Union is to continue development of steam on its leaseholds to allow installation of additional geothermal units as long as exploration proves sufficient additional steam supplies are available.

Based on experience with existing wells and test data from three wells already drilled by Union for Unit 20, PG&E's reservoir engineering consultants have advised PG&E that Union's steam reserves appear to be sufficient to supply Unit 20 over its expected life of 30 years. (The CEC concurred with this on April 26, 1982 in an "Order on Availability of Commercial Resource".)

Cost of the Proposed Project

The estimated cost of the generating unit and step-up transformers at the time of PG&E's application was $105,000,000. Cost of the transmission tap line was estimated to be $636,000. These estimates reflect projected material and labor price escalation through the completion date of the project. A detailed breakdown of the project cost is shown in Exhibit F-1 attached to the application. PG&E will be required to report on cost monitoring. We expect to limit the rate base treatment for this project to the estimated costs provided in this proceeding since these are the figures used to justify the project, absent a strong showing by PG&E that higher costs were reasonable.

Exhibit F-3 attached to the application lists the estimated generating cost per kilowatt-hour (kWh) based on the capital cost estimate and the projected steam payment, by year from 1986 to 2015. The 1986 cost is estimated to be 66.4 mills per kWh.

The steam payment is calculated each year using a formula which, among other things, is sensitive to fossil fuel price and to the relative proportion of total energy supplied by fossil-fuel plants. Thus, a reduction in the price of oil or gas would cause a reduction in the steam price. Likewise displacement of fossil fuel generation by such things as renewable resources or coal plants would also act to reduce the steam price. In any event, the formula is so constructed that the steam price will always be less than fossil-fuel generation. An explanation of the steam price formula is attached as Appendix A. In its decision granting the AFC for Geysers Unit 20, the CEC found that:

> "Geysers Unit 20 constitutes a preferred resource and a viable electrical supply alternative. Moreover, the proposed facility comports with the policy directives enunciated in the Biennial Report and is in conformity with the 12-year forecast of statewide and service area electric power demands most recently adopted by the Commission pursuant to section 25309(b) of the Public Resources Code. The Commission further finds that the plant will operate in a reasonably efficient manner over its 30-year economic life." (p.18)

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>
> The CEC also stated:
>
> "Geysers Unit 20 will cost approximately $105 million to construct. It will, however, produce electricity at less than one-half the cost of oil-fired generation and will save $84 million in annual oil costs (May 3 RT 98-99). It therefore appears to be an economical source of electrical generation and should not result in adverse ratepayer impacts". (P.17)

Financial Considerations

The financial ability of PG&E to construct and operate the proposed unit is demonstrated by the financial information attached to the application as Exhibit G and by PG&E's Annual Report to the Commission for the year ended 1981. PG&E proposes to finance the construction of Unit 20 by using, to the extent available, money in reserve, funds not required for immediate use, and the proceeds of the issue and sale of such stocks, bonds, notes, or other evidence of indebtedness as the Commission shall here-after authorize for that purpose.

Rates to be charged for electric service to be rendered by the proposed unit are the PG&E system electric rates now in effect or as may be authorized by the Commission in the future.

Additional Support for Authorization

PG&E's operating experience with the existing units at the Geysers has been and continues to be satisfactory. Union has proven geothermal steam reserves in the area of the proposed unit and has

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The Commission staff has brought up the question of the applicability of Assembly Bill (AB) 3242 (Chapter 1253, 1982, adding PU Code §§ 1003 et seq.). This bill adds certain new requirements for filings for certification for projects such as the present one and also provides that the Commission may appoint a board to oversee the project if it determines that potential problems exist with respect to the requirements of the Act. In the case of applications subject to the Warren-Alquist Act (G.C. 25500, et seq.), these requirements are limited to paragraphs (b), (c), and (d) of PU Code § 1003.

The present application was filed on May 21, 1982 before the effective date of AB 3242. A review of the application does not indicate any potential problems with respect to the provisions of the new statute. However, we will require both the applicant and the Commission staff to file with the Commission within 90 days of the date of this order an analysis of that question.

Findings of Fact

1. PG&E seeks for Geysers Unit 20 together with transmission lines and related facilities, a CPCN from the Commission under PU Code § 1001 and GO 131-B.

2. Unit 20 is proposed to have a net normal capability of 110,000 kW.

3. Unit 20 is adjacent to PG&E's Unit 13 230 kV transmission line. A 100-foot tap from Unit 20 to Tower 1/9 of the Geysers 13 tap strung with 1,431 kcmil AAL conductor will be built. About 0.6 miles of bundled, 1,431 kcmil AAL conductor will be strung on circuit No. 1 of the Geysers 13 tap to connect to the Geysers 9 and 14 Castle Rock Junction 230 kV line.

4. Transmission tap towers will be installed at Unit 20 and Geysers 9 and 14 Castle Rock Junction Tap location. The suspension tower at location 1/9 of the Syers 13 tap will be replaced with a new deadend tower.

5. The CEC accepted PG&E's AFC for Unit 20 on April 16, 1982.

6. The CEC certified the final EIR on February 9, 1983.

7. The CEC, in granting PG&E's AFC for Unit 20, has

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addressed and conclusively resolved the issues of need, reliability, safety and environmental impact pursuant to Public Resources Code Sections 25519(c) and 25523(a). As determined and discussed by the CEC in its decision, which we have reviewed, the project will cause significant environmental impacts, but the adopted mitigation measures should reduce these impacts to an acceptable level.

8. PG&E has a contract to purchase geothermal steam developed by Union.

9. The steam supply agreement has previously been filed as part of the Unit 11 certification proceeding (A.53127, D.80479). Union supplies steam under the same agreement for Units 1 through 12, Unit 14, and Units 17 and 18.

10. PG&E has the ability to finance Geysers Unit 20, and the related transmission lines.

11. The estimated cost as filed in June 1982 of the generating unit and step-up transformers is $105,000,000. Estimated cost of the transmission tap line is $636,000. The total cost for the generating unit and step-up transformers in current dollars is $148,876,000.

12. PG&E is responsible for obtaining all other legally required permits and approvals necessary for construction and operation of Unit 20.

13. Geysers Unit 20 will provide an additional economic source of baseload power for PG&E's system.

14. Geothermal generation is a preferred source of providing generation needs.

15. A public hearing is not necessary.

Conclusions of Law

1. Public convenience and necessity require the operation of a 110,000 kW geothermal electric generating facility at Geysers Unit 20 together with appurtenant transmission lines.

2. PG&E should be granted a CPCN to construct, operate, maintain and use Unit 20 at the Geysers together with transmission lines and related facilities under PU Code § 1001, subject to the conditions specified in the decision issued February 9, 1983 by the CEC in Docket No. 82-AFC-1 granting PG&E's AFC of Geysers Unit 20.

3. Because of the public need to place Geysers Unit 20 into operation as soon as possible, the effective date of the following order should be today.

O R D E R

IT IS ORDERED that:

1. A certificate of public convenience and necessity under PU Code § 1001 is granted to Pacific Gas and Electric Company (PG&E) to construct and operate Unit 20 at the Geysers together with transmission lines and related facilities as finally proposed by PG&E in this proceeding on the condition that the unit is constructed as described in PG&E's application to this Commission, and its AFC to the CEC, except where changes are required by competent authority, and subject to the conditions specified in the decision issued

February 9, 1983. by the CEC in Docket No. 82-AFC-1, granting PG&E's AFC of Geysers Unit 20.

2. PG&E shall file with this Commission a detailed statement of the capital cost of Geysers Unit 20, together with transmission lines and related facilities. within six months following the date Unit 20 is placed in commercial operation.

3. Within 60 days, the Executive Director shall formulate and implement a procedure through which PG&E will provide detailed pre-construction cost estimates (including mitigation measures) for Geysers Unit 20, the 230 kV tap line, and the 230 kV double-circuit transmission line for evaluation by Commission staff.

4. The Executive Director shall design a reasonable construction cost-monitoring program prior to commencement of this project and shall implement such a program as he sees fit. The program shall include the explicit consideration of a goal-oriented "milestones" approach to cost monitoring, where estimates of costs for the various phases of the project are compared with actual costs as the project unfolds.

5. PG&E shall file quarterly progress reports on the status of the project. PG&E shall also provide each month a report for each of the following major categories within the project and for the project as a whole:

a. The original estimated costs as of the time of certification.

b. The actual costs to date.

c. The percentage of the work completed to date.

d. The estimated costs to completion.

e. The costs associated with changes made by regulatory bodies to the scope or design of the project.

6. The certificate issued in this application is subject to review and revision if the CEC final decision in Docket No. 82-AFC-1 is remanded for further hearing and revision on judicial review.

7. The authorization granted shall expire if not exercised within three years from the effective date of this order.

8. Within 90 days of the effective date of this order, PG&E and the Commission staff will file statements as to the compliance of this application with the provisions of paragraphs (b), (c), and (e) of PU Code new § 1003. PG&E is further directed to file with the Commission no later than the same day any data and information required by the above paragraphs which are not included in the application as filed.

This order is effective today.

Dated APR 27 1983, at San Francisco, California.

LEONARD M. GRIMES, JR.
President
VICTOR CALVO
PRISCILLA C. GREW
DONALD VIAL
Commissioners

I CERTIFY THAT THIS DECISION WAS APPROVED BY THE ABOVE COMMISSIONERS TODAY.

Joseph E. Bodovitz, Executive Director

COST OF STEAM
STEAM PRICING FORMULA

Formula

$$\text{Rate}\ \frac{\text{mill}}{\text{kWh}} = \left\{ \begin{array}{l} \text{Steam Electric Output, Previous Year} \times 2.11\ \frac{\text{mills}}{\text{kWhr}} \times \text{Ratio of Average Fuel Cost, Previous Year to Base Year} \times \text{Ratio of Best Heat Rates, Previous Year to Base Year} \\ \\ + \dfrac{(\text{Nuclear Electric output}) \times (\text{Average Nuclear Fuel Cost})}{\text{Total Electric Output, Previous Year}} \end{array} \right.$$

Description of Formula (See Note, Below)

Rate for the current year equals the weighted average of: a base year rate multiplied by the ratio of fuel cost for fossil-fired plants and by the ratio of lowest fossil plant net heat rate, and average fuel cost for nuclear plants for the previous year.

- The weighting factor is the net generation from fossil and nuclear plants, respectively, applied to the fuel cost for fossil and nuclear plants.
- The base year is 1968.
- The fuel cost ratio is the average cost for fossil fuel for the previous year divided by the average cost for fossil fuel in the base year, both expressed in cents per million Btu.
- The heat rate ratio is the lowest operating net heat rate for the most efficient fossil unit during the previous year divided by the equivalent heat rate for the base year.

Note: This description should not be represented to be the legal description of the pricing formula, as contained in the contracts.

PACIFIC GAS AND ELECTRIC COMPANY

Geysers Power Plant
Rate for Net Output for Year 1983

	1968	1982
Average annual cost of fossil fuels supplied to steam-electric plants:		
Total cost of fuel	$ 87,864,993	$ 1,136,273,400
Equivalent bbls.	44,411,906	34,467,863
British thermal units (in millions)	277,574,412	215,424,144
Average cost (in cents per million Btu)	31.661778	527.505125
Lowest operating net heat rate of the most efficient unit on system (in Btu per kWh)	8,272	8,598
Average net cost of fuel used in nuclear plants:		
Total cost of fuel		0
Net kWh		0
Average cost (in mills per kWh)		0
Net Output (in kWh):		
Steam-Electric Plants:		19,682,918,420
Nuclear Plant		0
Total		19,682,918,420

$$\text{Rate (mills/kWhr)} = \left(\text{steam-electric output} \left(2.11 \frac{\text{mills/kWh}}{(\text{1968 Avg. fuel cost})} \frac{(\text{1982 Avg. fuel cost})}{(\text{1968 best heat rate})} \frac{(\text{1982 best heat rate})}{}\right)\right.$$

$$\left. + (\text{Nuclear output} \times \text{1982 Avg. nuclear fuel cost})\right) \div \text{Total Output}$$

$$= \left(19{,}682{,}918{,}420 \left(2.11 \times \frac{(527.505125)}{(31.661778)} \times \frac{(8{,}598)}{(8{,}272)}\right) + 0\right) \div 19{,}682{,}918{,}420$$

$$= 36.5393$$

USE: 36.54 mills per kWh of net output (excl. payment for effluent disposal)

Rate Department
February 25, 1983

Decision 83 04 036 APR 27 1983

ORIGINAL

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1 At the request of the staff, PG&E submitted an updated cost estimate for the project. The estimate was developed using a new scheduling and cost control program which, for the first time, separately provides for contingencies. The total estimated cost for the generating unit and step-up transformers in current dollars is $148,876,000. This includes a contingency of 15% or $20,000,000 for unforeseeable costs attributed to such things as weather-related delay and potential increases in the scope of necessary construction activities not identified until the detailed engineering phase. Using the staff's current oil price forecast and assuming an 85% capacity factor, the 30 year levelized cost of power from Geysers Unit 20 including capital, O & M, and steam costs is 75.6 mills per kWh. The 30 year levelized cost of energy alone, produced in a fossil-fuel plant is 93.0 mills per kWh.

February 9, 1983, by the CEC in Docket No. 82-AFC-1, granting PG&E's AFC of Geysers Unit 20.

2. PG&E shall file with this Commission a detailed statement of the capital cost of Geysers Unit 20, together with transmission lines and related facilities, within six months following the date Unit 20 is placed in commercial operation.

3. Within 60 days, the Executive Director shall formulate and implement a procedure through which PG&E will provide detailed pre-construction cost estimates (including mitigation measures) for Geysers Unit 16, the 230 kV tap line, and the 230 kV double-circuit transmission line for evaluation by Commission staff.

4. The Executive Director shall design a reasonable construction cost-monitoring program prior to commencement of this project and shall implement such a program as he sees fit. The program shall include the explicit consideration of a goal-oriented "milestones" approach to cost monitoring, where estimates of costs for the various phases of the project are compared with actual costs as the project unfolds.

5. PG&E shall file quarterly progress reports on the status of the project. PG&E shall also provide each month a report for each of the following major categories within the project and for the project as a whole:

a. The original estimated costs as of the time of certification.

b. The actual costs to date.

c. The percentage of the work completed to date.

d. The estimated costs to completion.

e. The costs associated with changes made by regulatory bodies to the scope or design of the project.

SS 6. The certificate issued in this applicatin is subject to review and revision if the CEC final decision in Docket No. 82-AFC-1 is remanded for further hearing and revision on judicial review.