

DEPARTMENT OF ENERGY**Federal Energy Regulatory Commission****18 CFR Part 292**

[Docket No. RM79-54]

Small Power Production and Cogeneration Facilities—Qualifying Status**AGENCY:** Federal Energy Regulatory Commission, DOE.**ACTION:** Final rule.

SUMMARY: The Federal Energy Regulatory Commission hereby adopts regulations that implement section 201 of the Public Utility Regulatory Policies Act of 1978. These rules set forth criteria and procedures by which small power producers and cogeneration facilities can obtain qualifying status to receive the rate benefits and exemptions set forth in the Commission's rules implementing section 210 of PURPA, which were issued on February 19, 1980 (45 FR 12214, February 25, 1980).

EFFECTIVE DATE: March 13, 1980.**FOR FURTHER INFORMATION CONTACT:**

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SUPPLEMENTARY INFORMATION:

March 13, 1980.

Section 201 of the Public Utility Regulatory Policies Act of 1978 (PURPA) mandates that the Federal Energy Regulatory Commission (Commission) prescribe rules under which small power production facilities and cogeneration facilities can obtain "qualifying" status, and thus become eligible for the rates and exemptions set forth in the Commission's rules implementing section 210 of PURPA.

Section 201 of PURPA¹ defines a "small power production facility" as a facility which:

(1) Produces electric energy solely by the use, as a primary energy source, of biomass, waste, renewable resources, or any combination thereof; and

(2) Has a power production capacity which, together with any other facilities located at the same site (as determined by the Commission), is not greater than 80 megawatts.

A cogeneration facility is defined as a facility which produces electric energy and steam or forms of useful energy (such as heat) which are used for industrial, commercial, heating, or cooling purposes.²

Thus, cogeneration facilities simultaneously produce two forms of useful energy, namely electric power and heat. Cogeneration facilities can use significantly less fuel to produce electricity and steam (or other forms of energy) than would be needed to produce the two separately. By using fuels more efficiently, cogeneration facilities can make a significant contribution to the Nation's effort to conserve its energy resources.

Small power production facilities as defined in the Act use biomass, waste, or renewable resources, including wind, solar energy and water, to produce electric power. Reliance on these sources of energy can reduce the need to consume fossil fuels to generate electric power.

Prior to the enactment of PURPA, a cogenerator or small power producer seeking to establish interconnected operation with a utility faced three major obstacles. First, a utility was not generally willing to purchase the electric output or was not willing to pay an appropriate rate. Secondly, some utilities charged discriminatorily high rates for back-up service to cogenerators and small power producers. Thirdly, a cogenerator or small power producer which provided electricity to a utility's grid ran the risk of being considered an electric utility and thus being subjected to extensive State and Federal regulation.

Sections 201 and 210 of PURPA are designed to remove these obstacles. Each electric utility is required under section 210 to offer to purchase available electric energy from cogeneration and small power production facilities which obtain qualifying status under section 201 of PURPA, and to provide back-up power and other services to such facilities on a non-discriminatory basis. For such purchases, electric utilities are required to pay rates which are just and reasonable to the ratepayers of the utility, which are in the public interest,

and which do not discriminate against cogenerators and small power producers. Section 210(e) of PURPA provides that the Commission can exempt qualifying facilities from State regulation regarding utility rates and financial organization, from Federal regulation under the Federal Power Act (other than licensing under Part I), and from the Public Utility Holding Company Act. Finally, under section 206(c)(3) of the Natural Gas Policy Act of 1978 (NGPA), the Commission may exempt qualifying cogeneration facilities from the incremental pricing program under Title II of the NGPA.

In this rulemaking, the Commission sets forth requirements for qualifying cogeneration and small power production facilities and procedures by which such facilities may obtain qualification. Rules implementing section 210 of PURPA have been prescribed in Docket No. RM79-55.³

Any qualifying facility is eligible for the exemptions set forth in Subpart F of this part of the Commission's regulations immediately upon issuance of these rules. With regard to the rate benefits for qualifying facilities found in Subpart C of this part, however, the statute provides that the State regulatory authorities and nonregulated electric utilities will have up to one year to implement the Commission's rules. Therefore, the latest date by which qualifying facilities will be eligible to receive these PURPA-derived rate benefits is February 19, 1981.

I. Procedural History

On June 27, 1979, the Commission issued proposed rules in this docket⁴ to determine which cogeneration and small power production facilities may become "qualifying" cogeneration or small power production facilities under section 201 of PURPA.

Public hearings on RM79-54 were held in San Francisco on July 23, 1979, Chicago on July 27, 1979, and Washington, D.C. on July 30, 1979. Written comments were also received.

On October 18, 1979, the Commission issued a Notice of Proposed Rulemaking Under Section 210 of PURPA in Docket No. RM79-55.⁵ On October 19, 1979, the Commission made available its preliminary Environmental Assessment (EA) of the proposed rules in Docket Nos. RM79-54 and RM79-55.

In a Request for Further Comments,⁶ the Commission requested further public

¹ 18 C.F.R. Part 292, Subparts A, C, D and F; 45 FR 12214 (Feb. 25, 1980).

⁴ 44 FR 38872 (July 3, 1979).

⁵ 44 FR 61190 (Oct. 24, 1979).

⁶ 44 FR 61977 (Oct. 29, 1979).

¹ Section 3(17)(A) of the Federal Power Act.

² Section 3(18)(A) of the Federal Power Act.

comment on both proposed rules, and on the findings set forth in the preliminary EA. In order to obtain the data, views, and arguments of interested persons, the Commission Staff held public hearings in Seattle on November 19, 1979, in New York City on November 28, 1979, in Denver on November 30, 1979, and in Washington, D.C. on December 4 and 5, 1979. The Commission also received written comment. All of the comments were considered in the formulation of this final rule.

II. Summary

These rules set forth criteria and procedures by which cogeneration and small power production facilities can obtain qualifying status to receive the rate benefits and exemptions set forth in the Commission's rules implementing section 210 of PURPA.

The rules in this docket permit qualification without a need for specific Commission action. They also make available an optional procedure under which, should it prove desirable, a facility can gain certification as a "qualifying facility." For qualifying small power production facilities, the efficiency standards contained in the proposed rule have been eliminated, and the permitted level of oil, natural gas and coal use for startup, testing, flame stabilization, and operation during outages of the primary energy supply system has been increased and the form of that requirement has been simplified. For qualifying cogeneration facilities, efficiency standards still must be met by certain new facilities using oil or gas. In addition, certain operating standards have been adopted for purposes of assuring that a qualifying cogenerator is a *bona fide* cogenerator.

III. Section-by-Section Analysis

§ 292.201 Scope

Section 292.201 describes the scope of Subpart B of the Commission's rules. Subpart B provides the criteria for and manner of qualification of small power production and cogeneration facilities.

§ 292.202 Definitions

This section contains definitions applicable to this subpart of the Commission's rules.

Paragraph (a) defines "biomass" as any organic material not derived from fossil fuels. The proposed rule defined "biomass" as plant materials which are obtained from cultivation, or harvested from naturally occurring vegetation without significant depletion of the resource. Commenters recommended that the Commission expand the definition to include any organic

material not derived from fossil fuels. The commenters stated that most studies dealing with energy recovery from organic material other than fossil fuels have included municipal (and most industrial) solid waste within the more general category of biomass.

The Commission agrees with the commenters who urged the Commission to expand the scope of this definition. The Commission observes that applying a narrow definition of biomass might hinder development of small power production facilities between 30 megawatts and 80 megawatts in capacity. Use of a definition of biomass which includes by-products of the manufacturing, harvesting, and growing of agricultural products, including wood, will enable a greater number of small power producers between 30 and 80 megawatts to take advantage of the exemption from State law and regulation regarding rates and financial organization of electric utilities and from the Public Utility Holding Company Act, as provided in subpart F of this part of the Commission's rules.

One commenter questioned whether the Commission meant to include peat within the definition of biomass. The Commission wishes to clarify this point by stating that peat is included in the definition of biomass for purposes of this subpart.

Paragraph (b) defines "waste" as any by-product materials other than biomass. In most instances, waste is a by-product of fossil fuels. Examples of waste include petroleum coke, refinery gas, and plastics.

Paragraph (c) defines "cogeneration facility" as equipment used to produce electric energy and forms of useful thermal energy (such as heat or steam), used for industrial, commercial, heating, or cooling purposes, through the sequential use of energy.

Several commenters requested clarification of the applicability of the Commission's rules to cogeneration in the residential sector. The issue arises because of the absence of any explicit mention of residential energy use in the statutory language. The Commission's definition of cogeneration facility tracks the statutory language in that residential use is not specifically identified.

The Commission intends that residential sector cogeneration be included. The Commission believes that the phrase "heating, or cooling purposes" applies to any industrial, commercial, or residential heating or cooling purpose. The Commission has not found anything in the legislative history of PURPA which suggests that the terms "industrial" and "commercial" were intended to modify "heating, or

cooling". Separate mention of "residential" use is unnecessary because heating and cooling adequately encompass the residential use of thermal energy. In the industrial sector, thermal energy in the form of process steam is used as an input to many industrial processes. The separate identification of industrial and heating uses is necessary since not all industrial uses of thermal energy are for heating or cooling purposes. In addition, in many instances, commercial heating purposes include heating of residential apartment buildings, so that the exclusion of residential heating and cooling from this program would be difficult to accomplish even if such purpose were within the realm of statutory construction.

Sequential Use

Several commenters recommended that the Commission define cogeneration as the "combined" or "joint" production of heat and power. However, the terms "combined" or "joint" production of heat and power do not fully describe the cogeneration process. The final rules contain an explicit requirement for the sequential use of energy in cogeneration facilities. This means that rejected heat from a power production or heating process is used in another power production or heating process. It is precisely this "cascading" use of energy in sequential processes that gives rise to the energy conserving characteristic of cogeneration.

By adding the phrase "through the sequential use of energy" to the definition of cogeneration facility, the Commission makes explicit what was intended in the proposed rule. The discussions in the proposed rule relating to topping and bottoming-cycle cogeneration and the efficiency standards were expressed in the context of sequential use. Many commenters apparently recognized this fact and, in their discussions of alternative efficiency standards, compared hypothetical cogeneration systems to reference cases of noncogeneration, separate production of heat and power. Additionally the explanation of supplementary firing in the proposed rules implied that energy inputs other than supplementary firing would have to flow through both a thermal and a power production process. The explicit mention of sequential use is therefore not a new requirement; it is a clarification of intent.

Several comments filed in this rulemaking in response to the Commission's November 9, 1979 Interim

Rule 7 raised questions about how the sequential use concept would apply in certain situations. One commenter noted that many industries commonly route steam directly from their boilers to processes without expansion in a turbine. This practice is simply the raising of process steam; it is not cogeneration. The fact that some other steam from the same boiler is routed to cogeneration equipment does not mean that all steam from the boiler is used for cogeneration. The coincident raising of process steam relates to the cogeneration rules in two ways. First, any energy expended in raising such steam should not be entered into any efficiency calculations. Secondly, natural gas used for raising process steam is not rendered exempt from incremental pricing solely because the boiler may also supply steam for cogeneration.

A commenter also questioned the applicability of the sequential use test to a combustion turbine coupled with a waste heat recovery boiler. The commenter noted that the boiler could not capture all of the heat in the turbine exhaust and thus not all of the turbine's power could be said to be sequential. The Commission does not adopt this interpretation. The high efficiency of combustion turbine/waste heat recovery boilers derives from the fact that a substantial quantity of waste heat is recovered. The Commission does not require that all heat be recovered. Strictly speaking, some of the available thermal energy in a steam turbine cogeneration system is lost (due to pressure drop in piping along with convective and radiative heat losses) before the steam is delivered to a useful process. As long as any applicable efficiency and operating standards are met, the Commission is not concerned with energy losses within the system.

A final issue concerning the definition of a cogeneration facility involves combined-cycle electric generation plants. Such plants burn gaseous or liquid fuels in a combustion turbine and use the turbine exhaust to raise steam. The steam is directed through a fully condensing steam turbine. Only electricity is produced, albeit through the sequential use of energy. The Commission is of the opinion that combined-cycle electric generation plants are not cogeneration facilities, since only one form of energy is produced.

In paragraph (d), the Commission has added the definition of "topping-cycle cogeneration facility" which is a cogeneration facility in which the energy input to the facility is first used to produce power, and the reject heat from power production is then used to provide useful heat.

Paragraph (e) has been added to define a "bottoming-cycle cogeneration facility" as a cogeneration facility in which the energy input to the system is first applied to a useful heating process, and the residual heat emerging from the process is then used for power production.

The Commission has added paragraph (f), which defines "supplementary firing" as an energy input to the cogeneration facility used only in the thermal process of a topping-cycle cogeneration facility, or only in the electric generating process of a bottoming-cycle cogeneration facility.

The distinguishing characteristic of supplementary firing as defined here is that none of the energy is used sequentially. In topping cycles, supplementary firing is commonly practiced by introducing natural gas or oil into the hot exhaust of a combustion turbine. The turbine exhaust will typically have sufficient oxygen to support combustion of the added fuel. The resulting heat can either be used directly in a high-temperature direct heat application or used to raise process steam. Supplementary firing is also possible in steam turbine cogeneration facilities, through reheat of steam which exists from a turbine. In all cases, the added energy is not used to produce power as well as useful thermal energy.

In a bottoming-cycle cogeneration facility, supplementary firing can be used to increase the output of the power production equipment by firing additional fuel in the thermal process exhaust. Again, the added energy is not used sequentially for both power production and a thermal process.

Commission recognizes that there will be questions as to the application of the standards of this subpart to complex facilities which may contain combinations of topping and bottoming-cycle cogeneration equipment. The optional procedure for qualification under § 292.207 is available specifically to help any cogenerator who wishes clarification as to whether his facility would qualify.

Paragraph (g) adds the definition of "useful power output" of a cogeneration facility as the electrical or mechanical energy made available for use, exclusive of any such energy used in the power production process. Although electric power output is required of a qualifying

facility, any additional mechanical power may be taken into account in determining "useful power output".

Paragraph (h) has been added to define "useful thermal energy output" of a topping-cycle cogeneration facility as the thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application.

The proposed rules contained a definition of the "useful energy output of a thermal process." The term was intended to reflect the heat actually used in a thermal process rather than heat made available for use. The proposed term found application in proposed efficiency standards for both topping and bottoming cycles. Only a few commenters mentioned the proposed term, but they did raise serious questions about the feasibility (and desirability) of performing the necessary calculations. It was argued that computation of the "useful energy output of a thermal process" in accordance with the proposed definition would be difficult and would yield unintended results—particularly in the case of bottoming cycles.

The Commission notes that in its final rules the efficiency of bottoming-cycle facilities is evaluated only with respect to supplementary firing. No evaluation of efficiency is now required for the thermal process of a bottoming cycle.

For new topping-cycle facilities burning natural gas or oil, however, the degree to which heat is recovered and put to use remains a concern. The final rules contain a definition of "useful thermal energy output" which eliminates the problems of the proposed terminology. Under the new definition, in the case of industrial or commercial process use of thermal energy, the thermal energy made available for use in the process may be considered useful thermal energy output of a cogeneration facility. Thus an industrial process which uses steam or heat need not be analyzed for the purpose of determining what fraction of the energy delivered to the process is actually put to use.

In the case of space heating and cooling, water heating, and related heating and cooling applications, a cogeneration facility's useful thermal energy output is the energy actually used in the application. For example, a cogeneration facility may consist of a combustion turbine with exhaust heat recovery used for space heating. In this example, the useful thermal energy output would be the heat recovered from the exhaust and actually used for space heating, not all of the heat available in the exhaust.

⁷ Interim Rule for Qualification of Gas-fired Cogeneration Facilities for Purposes of the Incremental Pricing Program, 44 FR 65744 (Nov. 15, 1979).

Paragraph (i) defines "total energy output" of a topping-cycle cogeneration facility as the sum of the useful power output and useful thermal energy output.

Paragraph (j) defines the term "total energy input" as the total energy of all forms supplied from external sources, other than supplementary firing, to the facility.

The total energy input to a cogeneration facility includes all fuels and renewable resources used in the facility. Energy taken from one part of the facility and used in another part of the cogeneration process does not meet the test of being supplied from an external source. For example, boiler feedwater pumping, heating, and de-aerating are energy uses internal to the cogeneration facility and are not to be considered as either energy inputs or energy outputs.

The Commission has added the definition of natural gas in paragraph (k) as it is defined in the Natural Gas Act, which is natural gas unmixed, or any mixture of natural gas and artificial gas. This is intended to cover natural gas supplied by any natural gas company as defined in the Natural Gas Act or any distribution company selling natural gas. As a result, the efficiency standards under § 292.205 only apply with respect to the natural gas so defined and do not apply with regard to any synthetic gas which is unmixed in the pipeline, or mixed by the end-user, such as coke oven gas, blast furnace gas, or gas derived from coal or shale oil.

The definition of "oil" has been added in paragraph (l) to mean crude oil, residual fuel oil, natural gas liquids, or any refined petroleum products. This definition does not include refinery-off gas, petroleum coke, or other waste products of the refinery process.

Finally, the Commission has provided in paragraph (m) that, for purposes of this subpart, in the case of energy in the form of natural gas or oil, energy input is to be measured by the lower heating value of such fuel.

In the proposed rules, energy inputs in the form of fossil fuels were to be evaluated in terms of the lower heating value of such fuels. A few commenters took issue with the use of lower heating values and recommended that higher heating values be specified in the final rule.

Lower heating values were specified in the proposed rules in recognition of the fact that practical cogeneration systems cannot recover and use the latent heat of water vapor formed in the combustion of hydrocarbon fuels. By specifying that energy input to a facility excludes energy that could not be recovered, the Commission hoped that

the proposed energy efficiency standards would be easier to understand and apply. The Commission also wished to apply a standard that would be more uniform in the treatment of natural gas and oil. Owing to the difference in chemical composition, more latent, unrecoverable heat is lost in the combustion of gas as compared to oil. The Commission did not wish indirectly to make qualification more difficult for natural gas-fired cogeneration facilities by requiring a higher level of sensible heat recovery.

The commenters opposing the use of lower heating values generally argued that customary practice is to use higher heating values. The Commission does not find this argument compelling. Both heating values of fuels can easily be found in handbooks. Moreover, if a cogenerator wishes to use the higher heating value of fossil fuel inputs for computing efficiency, the Commission has no objection. Any facility qualifying with efficiency so computed would certainly qualify under the more lenient rules set forth. As a result, the Commission does not believe it appropriate to change this aspect of the proposed rule in this final rule.

§ 292.203 General requirements for qualification.

The proposed rule provided that any person seeking qualifying status for a facility had to initiate discussions with the utility with which it wishes to interconnect and file an application with this Commission. The proposed rule set forth the contents of an application for certification which included technical information describing the facility, a summary of discussions required to be held between the applicant and the affected electric utility, and a description of the equity ownership of the facility. In addition, a small power producer was required to provide information about its primary energy source and its location. A cogenerator was required to submit information describing the energy input and output of the facility in both the heat engines and thermal processes.

The majority of comments favored eliminating the filing requirement either for all qualifying facilities or for specific classes of qualifying facilities. Several commenters suggested that the complexity, delays, and uncertainties created by a case-by-case qualification procedure would act as significant economic disincentive to owners of smaller facilities. Other commenters recommended exempting smaller facilities, such as facilities with an aggregate electrical capacity of up to 250 or 500 kW, from formal filing

requirements. A utility⁸ stated that the application procedure does not serve any party or the public's interest. This commenter preferred to see regulations on an "exception" basis where the utility, State regulatory authority or other interested party could object to the granting of qualifying status.

The Commission finds substantial merit in these comments. The Commission believes the initiation of purchase and sale arrangements, pursuant to Subpart C of this part of the Commission's rules, will necessitate the flow of information between potential qualifying facilities and affected electric utilities. The Commission therefore notes that the requirements contained in the proposed rule both for discussions between a potential qualifying facility and the utility with which it wishes to interconnect and for the filing of substantial information with this Commission are not necessary.

For example, one commenter⁹ suggested modifying the pre-application negotiation requirements to require that an applicant initiate discussions with the utility prior to filing if the cogenerator or small power producer is intending to negotiate an individual contract. However, if the applicant merely wants to establish his eligibility for an already-published rate schedule for qualifying facilities, this commenter claims that there would be nothing to negotiate, and thus no reason to require that discussions be held. It was asserted that notification to the utility at the time of application would suffice in such cases. The Commission believes that this is what would and should happen without any requirement from the Commission. In addition, the Commission believes that, as a practical matter, an electric utility, which is notified by a qualifying facility that it wishes to interconnect with the utility in order that the utility may purchase the power produced by the facility, will need to know the nature of the qualifying facility's expected purchases and sales so as to be able to arrange safe and reliable interconnected operation at appropriate rates.

As a result, the requirement for case-by-case qualification has been eliminated. Section 292.207(a) of this rule provides that any small power production or cogeneration facility which meets the requirements for qualification set forth in that section is a qualifying facility.

However, the Commission has provided an optional procedure in § 292.207(b) of this rule whereby an

⁸Pacific Gas and Electric Company.

⁹U.S. Department of Energy.

application for Commission certification of qualifying status may be filed at the discretion of the owner or operator of the facility.

There was some confusion in the comments as to who actually qualifies under this program. The facility qualifies and that entitles the owners and operators of the facility to receive the benefits of qualification under this part. The benefits of qualification under this part, however, are only with respect to the qualifying facility. For example, the owner or operator of a qualifying cogeneration facility is entitled to require the utility to sell power to his qualifying facility in compliance with the terms of § 292.305 as implemented by the State regulatory authority. The owner or operator has no entitlement to require such rate treatment for the utility's sales to other facilities he may own or operate which are not qualifying facilities. Similarly, his sales to the utility will be exempt under Subpart F of this part from certain Federal and State regulation only to the extent the sales are from a qualifying facility.⁹

§ 292.203(a) Small power production facilities.

Section 292.203(a) provides that a small power production facility is a qualifying facility if it meets three criteria.

The first requirement is that the power production capacity of the facility, together with the capacity of any other facilities that use the same energy resource and are owned by the same person and are located at the same site, may not exceed 80 megawatts. The method by which the capacity is determined is described in this preamble under § 292.204.

The second requirement is that the primary energy source of the facility must be biomass, waste, renewable resources, or any combination thereof. This means that more than 50 percent of the total energy input must be in these categories. In addition, the aggregate use of oil, natural gas, and coal by the facility may not exceed 25 percent of its total energy input during any calendar year. These fuel use criteria are discussed further in § 292.204(b).

Thirdly, a small power production facility will not be eligible for qualifying status if more than 50 percent of the equity interest in the facility is held by an electric utility or public utility holding company or any person owned by either. Section 292.206 describes this ownership test in greater detail.

One commenter raised the question as to whether a facility is included within the definition of a small power production facility in the statute, and

hence the Commission's regulations, if the facility is only part of the process of producing electric energy; namely, raising steam. This commenter produces steam using municipal solid waste, which steam is then sold through an adjoining wall to an electric utility to run through a turbine and produce electricity. In a sense, this facility indirectly produces electric energy. It is unclear to the Commission how this steam-raising facility would benefit from the regulations under section 210. It is not selling electric energy to the utility; it may be buying some electric energy from the utility; and it seems unlikely that it would be subject to electric utility regulation. Therefore, the Commission does not, at this time, see the need to allow qualification for these kinds of facilities, without judging as to whether the Commission could allow such qualification under the statute.

§ 292.203(b) Cogeneration facilities.

Section 292.203(b) provides that, with the exception of new diesel cogeneration facilities, a cogeneration facility may be a qualifying facility if it satisfies two requirements. First, it must meet the same ownership test as that required for a small power production facility. Secondly, it must meet any operating and efficiency standards described in § 292.205(a) and (b).

In addition, cogeneration facilities which wish to qualify for the incremental pricing exemption permitted under Title II of the Natural Gas Policy Act of 1978 (NGPA) and Part 282 of the Commission's rules must meet the requirements stated in § 292.205(c).

Section 201 of PURPA provides that "a 'qualifying cogeneration facility' means a facility which—(i) the Commission determines, by rule, meets such requirements (including requirements respecting minimum size, fuel use, and fuel efficiency) as the Commission may, by rule, prescribe * * *". Several comments contended that the statutory language requires the Commission to establish standards relating to all of the mentioned criteria. The legislative history of this section indicates that the phrase "as the Commission may * * *" was added in conference; it did not appear in either the House or Senate bill.¹⁰ The plain meaning of the provision, as adopted by the Conferees, is that a qualifying cogeneration facility must meet requirements that the Commission, in its discretion, establishes. These may, but need not,

include requirements respecting minimum size, fuel use, and fuel efficiency.

The Commission received numerous comments from utilities recommending that oil- and natural gas-fired cogeneration facilities not be considered eligible for qualifying status. These commenters generally argued that encouragement of such facilities would be contrary to Congressional intent and national energy policy. Comments were also received expressing strong support for the policy presented in the proposed rule, which did not impose a restriction on oil and natural gas use.

The Commission believes the policy expressed in the proposed rules is consistent with Congressional intent and national energy policy. Had Congress not intended that the benefits of qualifying status be extended to oil- and natural gas-fired cogeneration facilities, the statute or Joint Explanatory Statement of the Committee on Conference (Conference Report) would have contained a restriction on fuel use similar to that which is provided for small power producers. The Congress knew that cogeneration facilities typically use natural gas and oil. In addition, the Natural Gas Policy Act of 1978 contains an express exemption from the incremental pricing program for natural gas used in qualifying cogeneration facilities, which further indicates Congressional recognition that cogeneration facilities use natural gas.

Thirdly, the Congress enacted the Powerplant and Industrial Fuel Use Act (PIFUA) at the same time as PURPA. PIFUA provides authority to the Secretary of Energy to restrict the use of oil and gas in cogeneration facilities. Therefore, the Commission does not believe it necessary or appropriate to require an additional layer of fuel use regulation on technologies which the Commission is charged with encouraging and for which another agency has authority to restrict fuel use.

The Commission also notes that the findings in section 2 of PURPA specifically require "a program providing for * * * increased efficiency in the use of facilities and resources * * *". To the extent that oil- and natural gas-fired cogeneration facilities provide for more efficient use of these resources, the Commission believes that the benefits of qualifying status should be extended to them.

Some of the comments stated that permitting qualifying cogeneration facilities to use oil, especially in diesel engines, will use up available air quality increments, thereby preventing the conversion of large utility oil-fired

¹⁰ See Comparative Print to H.R. 4018, Public Utility Regulatory Policies Act, 72, 95th Cong., 2d Sess. (1978).

boilers to coal. As noted above, the Commission believes it is not proper to address this fuel use issue within the context of this program. However, the Commission has not made a final determination regarding the environmental effects of new diesel cogeneration facilities, and is therefore including in these regulations an interim exclusion from qualification of this technology until work on an environmental impact statement has been completed.

§ 292.203(c) *Interim exclusion.*

Section 292.203(c) provides that, pending further Commission action, any cogeneration facility which is a new diesel cogeneration facility may not be a qualifying facility. A new diesel cogeneration facility is described as a cogeneration facility which derives its useful power output from a diesel engine, the installation of which began on or after March 13, 1980.

Through the issuance of these rules and the rules implementing section 210 of PURPA, the Commission intends to carry out the legislative mandate to provide encouragement to the energy technologies included within the program. The Commission is required under the National Environmental Policy Act of 1969 (NEPA) to take the environmental effects of this encouragement into account. The Commission has circulated and received public comment on a preliminary Environmental Assessment (EA) of these rules which was issued on October 19, 1979.

(See Appendix I)

Environmental Findings

The identification of the environmental effects associated with a "major Federal action"¹¹ is not ordinarily a difficult task. These effects typically are those associated with the construction and operation of a particular project in which the Federal government is playing a major role, such as by funding or licensing. In contrast, these rules and the rules implementing section 210 of PURPA do not authorize or fund any particular projects; moreover, they do not authorize or forbid the use of certain fuels. Instead, they provide certain economic incentives to, and remove other disincentives (*i.e.*, assurance of a market for electrical production and exemption from utility regulation) from certain classes of technologies. It is important to note that, even without these rules, these technologies have been, and

would continue to be, utilized. The environmental effects associated with this "base-case" level of development cannot be ascribed to these rules. Instead, the proper way to isolate and identify the effects of these rules is to predict the "base-case" (no PURPA) level of development, and determine the environmental effects of that level of development, and compare it to the effects of the projected development with these rules in place. Under this approach, any changes from the base-case review are properly classified as effects of these rules.

The first step used in determining the environmental effects of these rules was to compare, by region, representative electric utility rates with the cost of generating electricity by use of a qualifying facility. This comparison established which technologies would be economically viable. Next, the costs of generating electricity by the facility were compared to an estimate of utilities' avoided costs on a regional basis. If, by receiving the avoided cost for its output, a facility would operate economically, it was considered to have been "PURPA-induced." Avoided cost is the maximum price inducement under this program.

For technologies which would, as a result of PURPA, be economic, regional levels of market penetration were established on the basis of site availability and manufacturing capability. Finally, the environmental effects associated with the predicted level of development were calculated.

The Environmental Assessment accompanying this order describes the environmental effects associated with all of the types of technologies encompassed in section 201 of PURPA. The quantitative effects associated with the predicted market penetration of each technology were then estimated.

The Environmental Assessment includes an extensive market-penetration analysis of each technology eligible for qualification under the Commission's proposed rules and of the aggregate of all of these technologies. Since the proposed rules took the broadest view of which technologies would be eligible for qualification, the analysis covers all technologies, which, under the statute, may be eligible for qualification. On the basis of this analysis, the Commission has estimated the amount of capacity expected to be induced on a regional and national basis through January 1, 1995, assuming the broadest implementation of this program.

This analysis shows that this program may result in the construction of 12,000 MW of new capacity by qualifying

facilities by 1995, and the reduction in utility construction of 10,000 MW of new capacity. It also indicates a possible fuel savings in 1995 of 40,000 bbl/day of oil, 40,000 bbl/day equivalent of natural gas, and 120,000 bbl/day equivalent of coal, as the use of renewable resources increases, and more efficient use is made of both renewable and non-renewable resources.

The Environmental Assessment finds that there will be both adverse and beneficial environmental effects associated with this program. Some of the technologies produce certain air emissions, water effluents, and other environmental effects. However, material and thermal by-products of industrial, commercial, agricultural and other activities that would otherwise contribute to environmental degradation will be consumed or otherwise utilized in the production of useful energy under this program.

In addition, the Environmental Assessment indicates that utilities will be able to defer or cancel construction of certain facilities, originally scheduled for construction between 1980-1995. These deferrals or cancellations are expected to include some eleven 500 MW coal-fired steam plants, one 1,000 MW nuclear plant, a number of 75 MW gas turbines, and certain large scale hydropower and combined cycle installations. The environmental impacts associated with the construction and operation of these facilities would be avoided.

Finally, the market-penetration analysis in the Environmental Assessment indicates that the incentives provided by this program will not significantly affect the development of some technologies while they will significantly encourage others. For example, it appears that this program will significantly encourage small hydroelectric power development. Water power project impacts are usually site-specific and localized, with no cumulative impact on a national basis, and few impacts of regional significance. The Commission notes that hydroelectric projects in almost all cases must be licensed by the Commission. License applications are evaluated on a case-by-case basis to determine the significance of the environmental impacts and the need for a site-specific EIS. In addition, impacts of individual projects on a waterway may be cumulative, and the Commission reviews each project in relation to others on the waterway under the "comprehensive development" standard of section 10(a) of the Federal Power Act. Therefore, even though only the

¹¹ Section 102(2)(c) of the National Environmental Policy Act of 1969, Pub. L. 91-190.

general nature of the kinds of environmental effects can be evaluated in this programmatic environmental assessment of national scope, requirements of the National Environmental Policy Act of 1969 (NEPA) will be met as each application is filed.

For certain other technologies, the level of environmental effects associated with the PURPA-induced market penetration of these technologies will not approach a significant level in the near term.¹² The Commission will monitor the PURPA-induced market penetration of these technologies carefully.

In the public comments, evidence was presented indicating that the environmental consequences of qualifying new diesel cogeneration may be significant in the near term, in certain geographic areas, even with a moderate level of market penetration. Therefore, the Commission believes that it is appropriate to delay action on qualification of new diesel cogeneration until completion of an EIS. The Commission will circulate a draft EIS within the next month and conclude its analysis within 90 days of circulation.

The Commission acknowledges the difficulties in identifying the levels of the environmental effects associated with the programmatic encouragement and deregulation of various types of technologies as are present under this program. There are, of course, a great number of uncertainties in any such analysis. However, the Commission is required under NEPA to assess these effects to the fullest extent possible.

On the basis of its environmental review, the Commission has made the following findings in its Environmental Assessment:

—The program, taken as a whole, will not have a significant impact on the quality of the human environment within the meaning of section 102 of NEPA. The Commission also has noted certain beneficial environmental impacts that may result from this program.

—Where the expected market penetration of technologies which could qualify under this program is not expected to cause any significant environmental effects in the near term, the Commission will allow qualification of these technologies without delay.

—Where a technology is expected to cause significant environmental effects in the near term, an EIS covering the technology will be prepared and considered before the Commission acts on qualification.

—The Commission is establishing a monitoring program to alert the Commission to the likelihood or extent of market penetration by technologies which qualify under this program. This is designed to

produce information that may be relevant to taking appropriate environmental protection action in the future before the program reaches a stage of investment or commitment to implementation likely to determine subsequent development or restrict later alternatives.

§ 292.204(a) Criteria for qualifying small power production facilities.

Section 292.204 sets forth qualification requirements for small power production facilities. Paragraph (a) implements the statutory requirement that the power production capacity of a small power production facility not exceed 80 megawatts at any site. In order to implement this limitation, the proposed rules provided that the capacity of all facilities which use the same energy resource, are owned by the same person, and are located within one mile of each other be added together. Commenters recommended eliminating the site criterion because the important criterion is not siting but that facilities use alternate energy resources. The Commission recognizes the difficulty in prescribing site criteria for purposes of calculation of the size of the facility. However, the Commission is obligated under the statute to limit qualifying status for small power production facilities to those facilities which have "a power production capacity which, together with any other facilities located at the same site (as determined by the Commission), is not greater than 80 megawatts."¹³

In subparagraph (2)(i), the Commission defines "facilities located at the same site" as facilities located within one mile of the facility for which qualification is sought. Hydroelectric facilities (within this distance) are considered to be located at the same site only if the facilities use water from the same impoundment for power generation. The Commission views this additional provision for hydroelectric facilities as necessary because use of the one-mile rule alone might discourage the development of facilities on separate waterways which are within one mile of each other or of closely-spaced impoundments on an individual stream.

The Commission also notes that in some instances hydropower resources may be developed without an impoundment. In this case, the one-mile rule would be the only factor in determining the size of a facility.

In response to comments, the Commission has added subparagraph (2)(ii) which requires, for purposes of determining the distance between facilities, that any measurement shall be made from the electrical generating

equipment of a facility. The comments noted that some facilities may include equipment for gathering energy to be used in the facility which may extend up to a number of miles from the generating facility. The Commission believes that the one-mile limit should be measured from the generating facilities.

The proposed rule enabled an applicant to rebut the presumption that facilities located within one mile of the facility for which qualification is sought, using the same energy resource and owned by the same person, should be considered to be located at the same site. The Commission believes that the requirement to rebut the presumption was burdensome and confusing. Therefore, the final rule has been revised to enable a small power producer or cogenerator to apply to the Commission for a waiver for good cause.

The proposed rule also contained a minimum size limit of 10 kW for qualification of small power production facilities. This proposal was based on the Commission's view that facilities smaller than 10 kW were unlikely to be economically viable, and that the administrative burden of arranging interconnected operation with them would be greater than the benefits they would provide to the system at this time. This proposal attracted considerable comment, both at the public hearings and in written recommendations. The majority of the comments objected to the minimum size provision and indicated that a number of facilities smaller than 10 kW are being built and that some units are presently commercially available. Commenters also stated that these facilities can be equipped with electrical protection equipment which permits safe interconnected operation.

Several utilities, on the other hand, suggested raising the minimum size limit, arguing that small facilities are not cost-effective. The Commission notes that the rules implementing section 210 of PURPA (Subpart C of this part) require that standard rates be provided for facilities up to 100 kW. Those rules together with the self-qualification provisions of these rules greatly ease the administrative burdens on all parties. The Commission also notes that the rules implementing section 210 of PURPA require that a qualifying facility is obligated to pay any interconnection costs assessed against it by the State regulatory authority or nonregulated electric utility. Since under these rules the utility is not obligated to incur any additional costs by reason of interconnected operation with these facilities, the minimum size limitation

¹² See Figures 3 through 7 in the Environmental Assessment.

¹³ Section 3(17)(A)(i) of the Federal Power Act.

has been eliminated to allow individual decisions to govern whether or not to install these very small facilities.

§ 292.204(b) *Fuel Use.*

Paragraph (b) sets forth fuel use requirements for qualifying small power production facilities. In the proposed rule, the term "primary energy source" was not defined. Several commenters noted this fact and asked that the final rules specify a definition for the term. Subparagraph (1) provides that the primary energy source of the facility must be biomass, waste, renewable resources, or any combination thereof, and more than 50 percent of the total energy input must be from these sources. The Commission notes that this requirement is not intended to force small power producers to continually monitor the energy input, but rather that reasonable estimates based on sampling methods are sufficient.

Qualifying small power production facilities using biomass as a primary energy source are treated differently than are facilities using other resources for purposes of exemption from the Public Utility Holding Company Act and certain State law and regulation under section 210(e) of PURPA and under § 292.602 of the Commission's regulations. A further concern in determining a facility's primary energy source is the treatment of mixtures of biomass and waste or renewable resources. Therefore, in subparagraph (1), the Commission specifies that any primary energy source which, on the basis of its energy content, is more than 50 percent biomass shall be considered biomass. In other words, a qualifying facility may be considered biomass-fired if, on an estimated annual basis, at least half the energy input, exclusive of fossil fuel use, is biomass.

The Commission expects that this rule will extend the benefits of the biomass exemption provisions to a broad range of facilities. For example, evidence presented in this rulemaking indicated that much more than half of the energy content in municipal solid waste is due to "organic material not derived from fossil fuels," or "biomass" under the Commission's definitions. Thus, a small power production facility fired with municipal solid waste may be considered a biomass facility. The same treatment applies to facilities fired with forest-industry residues, sewage sludge, or peat.

Another aspect of what constitutes "primary energy source" is a specification of what fuels may be used in addition to the primary energy source for purposes of ignition, startup, testing, flame stabilization and control, and

during equipment outages and emergencies.

Section 3(17)(B) of the Federal Power Act, as amended by section 201 of PURPA, provides that:

" 'Primary energy source' means the fuel or fuels used for the generation of electric energy except that such term does not include, as determined under rules prescribed by the Commission, in consultation with the Secretary of Energy—

"(i) The minimum amounts of fuel required for ignition, startup, testing, flame, stabilization, and control uses, and

"(ii) The minimum amounts of fuel required to alleviate or prevent—

"(I) Unanticipated equipment outages, and

"(II) Emergencies, directly affecting the public health, safety, or welfare, which would result from electric power outages."

The proposed rule set forth limits for the allowable use of fossil fuels. Three separate standards were proposed: One for ignition, startup and testing; another for flame stabilization and control; and a third for fuel use during outages of the primary energy supply system. All of the proposed standards were set in terms of barrels of oil per year per megawatt of rated capacity.

The comments filed on this section generally favored less restrictive fossil fuel limitations. Several commenters noted that standards written in terms of barrels of oil were imprecise, since the energy content of a barrel of oil is not constant. Other commenters argued that separate standards for startup, flame stabilization and outages were unnecessarily burdensome. Commenters claimed that some small power production technologies would be severely constrained by one of the standards, while requiring little or no fossil fuel for other purposes. Additionally, to the extent oil and natural gas remain more expensive than other energy sources available to small power producers, there is an economic disincentive to use oil and natural gas. Thus it was argued that a single standard for allowable fossil fuel use would be more equitable and workable when dealing with a number of types of facilities. The Commission has decided to adopt this recommendation.

Many other commenters recommended that the Commission adopt alternative amounts of fossil fuel for use during outages and for other purposes. For the purpose of specifying the minimum amounts of fuel under clauses (i) and (ii) of section 3(17)(B) of the Federal Power Act, the Commission adopts in this rulemaking the standard, recommended by several commenters, that no more than 25 percent of the total energy input during any calendar year

may consist of fossil fuels—namely oil, natural gas, and coal.

With this simple rule, a qualifying facility can use up to the allowed quantity of fossil fuel for purposes specified in the statute. No question remains concerning what sort of primary fuel system supply outages are within the scope of the rule. The standard does require that a small power producer be able to estimate the energy content of the primary energy source. The Commission recognizes that for some energy sources, municipal solid waste in particular, energy content is not constant. As has been stated earlier, the Commission believes that reasonable estimates will suffice for purposes of this rule. Finally, it should be noted that the fossil fuel limitation applies only to small power production facilities. Some commenters apparently regarded the limitations as equally applicable to cogeneration facilities. This is not the case.

Another issue raised by the proposed rule was the limitation of renewable resources to water used at existing dams. Commenters urged the Commission to expand the definition of renewable resources to include water used at new hydroelectric facilities. The Commission has reviewed the Conference Report and has determined that the conferees did not intend to restrict the term renewable resources to water used only at existing dams. The Commission believes that such an interpretation conflicts with the conventional use of the term "renewable resources" as including all hydroelectric sources, not just those using existing dams. Therefore, the Commission intends that the term renewable resources applies to water used at existing and new hydroelectric facilities of less than 80 megawatts.

§ 292.205 *Criteria for qualifying cogeneration facilities.*

§ 292.205(a)(1) *Operating standards for topping-cycle cogeneration facilities.*

In its Notice of Proposed Rulemaking, the Commission recognized the problem of distinguishing cogeneration facilities which achieve meaningful energy conservation from those which are merely "token" facilities, producing trivial amounts of either useful heat or power. In the proposed rules, the *bona fide* character of a facility was to be determined by minimum amounts of useful heat and power output.

The need for operating standards as a means of identifying *bona fide* cogeneration facilities drew considerable comment. Some comments indicated that this formulation had the

effect of imposing energy efficiency requirements which are not appropriate for some technologies. Commenters stated that a much simpler test than the proposed standards would be adequate for the task. Two commenters suggested a simple test regarding the portion of energy developed in the form of useful heat or steam. One potential qualifying facility¹⁴ suggested that:

for geothermal energy cogeneration facilities, the energy utilization by the non-electric processes must average on an annual basis at least 5 percent of the energy consumption of the heat engine.

Another commenter suggested "a minimum of 10% of the total steam generation must be used as steam send-out."¹⁵

Generally, commenters did not oppose a requirement for distinguishing a *bona fide* cogeneration facility from essentially single purpose facilities, even while taking exception to the form and substance of the proposed efficiency standards. One commenter¹⁶ stated:

A significant portion of the steam, heat or energy available from the cogeneration unit should be used in an industrial, commercial, heating or cooling applications. The concept of an operator of a large thermal generating station applying condensing techniques taking a tiny side stream out to heat a tool shed so that cogeneration could be claimed should be prohibited.

The Department of Energy¹⁷ recommended the inclusion of a requirement that some minimal fractions of useful heat and power be produced.

Consequently, the Commission has decided that a simple means of identifying *bona fide* cogeneration facilities is appropriate. The *bona fide* test has been modified to specify only that a minimum proportion of the useful energy output be useful thermal energy output without regard to the energy input. The standard requires that at least 5 percent of a qualifying cogeneration facility's total energy output be in the form of useful thermal energy output. Compliance with this standard is to be based on estimated annual energy output.

Further, this basic *bona fide* test is applicable only to topping-cycle facilities. "Tokenism" is of concern for bottoming-cycle facilities chiefly with regard to the opportunity for qualifying facilities to obtain exemption from

incremental pricing under the Natural Gas Policy Act. Natural gas used by bottoming-cycle facilities (other than in supplementary firing), will, as a general matter, be exempt from incremental pricing only to the extent that reject heat is utilized in power production. In view of these provisions, no separate *bona fide* test is necessary.

§ 292.205(a)(2)(i) *Efficiency standards for topping-cycle facilities.*

The proposed rules set forth efficiency standards for oil- and gas-fired topping-cycle cogeneration facilities. The efficiency standards were composed of three separate criteria. The first criterion required, in effect, that no less than 20 percent of the energy input to the facility be converted to mechanical or electrical power. The second criterion specified that 45 percent of the heat rejected from the heat engine (a term used in the proposed rule to describe the power production process) be put to use in a thermal process. The final criterion required at least 60 percent of the energy input to the facility be used either as power or useful heat.

Comments on the proposed efficiency standards criticized both their form and substance. Many commenters stated that the 20 percent efficiency criterion for heat engines was overly restrictive. These commenters pointed out that most steam turbines would not be able to meet the standard with conventional steam inlet and exhaust pressures. Many such steam turbine cogeneration systems would represent energy efficient systems when compared to the standard practice of separate steam and electricity production.

Fewer comments were directed toward the efficiency tests concerning heat recovery and overall efficiency. The comments that were made, however, indicated a need for revision. One commenter indicated that the heat recovery standard would exclude diesel-powered cogeneration facilities even though many such facilities would be highly energy efficient. Comments on the overall efficiency standards were mixed. One commenter suggested that the standard was too lenient. Another commenter recommended that the proposed 60 percent test be reduced to 50 percent, although this commenter appeared to be principally concerned with the application of efficiency standards to the use of renewable resources and not to the use of scarce fuels.

Five commenters addressed the question of efficiency standards for oil- and natural gas-fired cogeneration in a comprehensive manner by proposing a complete set of alternative standards.

Four of these five commenters advanced proposals based on energy balance criteria, similar in theory to the proposed standards. A proposal by the New York State Energy Office closely resembled the proposed rule. Under this plan, individual tests for heat engine efficiency, heat recovery, and overall efficiency would still be required. The overall efficiency test would remain at 60 percent, but the heat engine and heat recovery tests would be reduced to 10 percent. This was the only comment in favor of maintaining separate efficiency standards for power production and heat recovery. The criticism of that scheme has caused the Commission to adopt an alternative efficiency standard which better takes into account the variety of technologies which qualify under this rule. The essential issue concerns the proper level of the overall efficiency standard which should be applied in individual cases.

Three commenters proposed efficiency standards relating solely to overall efficiency. A utility¹⁸ recommended a single standard of 50 percent overall efficiency, which was the most lenient standard suggested. This proposal, furthermore, would be related to design efficiency and not actual or estimated operating efficiency. Another commenter¹⁹ recommended a single standard of 65 percent overall efficiency. This standard would be slightly stricter than the first proposal discussed for all facilities except those producing predominantly either electricity or heat. Finally, the Commonwealth of Massachusetts Office of Energy Resources proposed a standard which would weigh thermal energy with only half the value of electricity.

The latter two comments are both supported by well-reasoned examples of cogeneration engineering practice. The Massachusetts proposal is relatively more stringent for facilities producing more heat than electricity, and more lenient for facilities producing much of their output as electricity. The basis for this proposal is a comparison of cogeneration systems based on steam turbine, combustion turbine, and diesel engine prime movers with oil-burning non-cogeneration technology. Essentially, it is argued that any cogeneration facility meeting the proposed efficiency standard will be more efficient than any combination of separately generated electricity and steam using efficient, state-of-the-art technology. By requiring that the sum of useful power output and one-half the

¹⁴ Republic Geothermal, Inc.

¹⁵ Raytheon Corporation.

¹⁶ This commenter, Potlatch Corporation, proposed as a test that at least 25 percent of the steam, or useful energy, available be applied on an annual basis in industrial, commercial, heating or cooling uses.

¹⁷ The Economic Regulatory Administration.

¹⁸ Brooklyn Union Gas Company.

¹⁹ Mechanical Technology Incorporated.

useful thermal output be greater than 45 percent of the facility's energy consumption, this proposal would ensure that qualifying facilities produce heat and power more efficiently than a 8500 Btu/kWh combined cycle generating station and a 90 percent efficient process steam boiler.

Moreover, this proposal appears to impact the various cogeneration technologies more equitably than the other proposed standards. The other proposals for required overall efficiency, by simply summing heat and power on an equal basis, make qualification relatively easy for steam turbine systems which produce little electricity. Cogeneration systems which produce high ratios of electricity to heat would be penalized with difficult heat recovery requirements. Yet the systems with high electricity to heat ratios have the highest "second law" energy efficiencies. Furthermore, a standard which is relatively lenient towards oil- and natural gas-fired steam cogeneration would encourage boiler fuel use of distillate oil and natural gas.

The proposal of another commenter, although considered in detail, would impact different cogeneration technologies differently and would not give assurance of energy conservation.²⁰

In light of the foregoing considerations, the Commission has decided to adopt a standard in paragraph (a)(2)(i) similar to that proposed by the Massachusetts Office of Energy Resources as its standard for efficiency of new oil- and natural gas-fired topping-cycle cogeneration systems. This standard requires that for any topping-cycle cogeneration facility for which any of the energy input is natural gas or oil and the installation of which began on or after March 13, 1980,²¹ the useful power output plus one-

half the useful thermal energy output of the facility must be, during any calendar year, no less than 42.5 percent of the energy input of natural gas and oil to the facility. The Commission adopted a value of 42.5 percent, rather than the 45 percent recommended by the Massachusetts comments because, in the Commission's view, the 45 percent requirement appears overly restrictive for steam turbine cogeneration facilities in that very high boiler efficiencies would have been required. However, if the useful thermal energy output of any such facility is less than 15 percent of its total energy output, the useful power output plus one-half the useful thermal energy output of the facility must be no less than 45 percent of the total energy input of natural gas and oil to the facility.

Existing Versus New Cogeneration Facilities

Although the Commission has found a compelling reason to impose efficiency standards on new oil and gas burning cogeneration facilities, the situation with respect to existing facilities is different. Existing facilities are those for which the installation of the cogeneration equipment began before the Commission actions encouraging cogeneration under this program were finalized. Presumably, such facilities would continue to be installed or operated using whatever fuels they are equipped to burn, with or without the incentives of PURPA.

Allowing existing facilities to qualify will provide for more flexible operation of the facilities. Optimum efficiency of a cogeneration facility may be more easily approached through interconnected operation with an electric utility. Because of the foregoing considerations, denial of qualifying status would serve no useful purpose.

Existing cogeneration facilities burning oil or natural gas were, in large measure, installed in an environment of lower fuel prices. Such facilities may not be able to meet the higher standards now reasonable for use of scarce fuels. Yet failure to meet standards intended for new facilities should not preclude entitlement to sell power to the utility and to receive the other rate benefits, as provided under Subpart C of these rules. In addition, the denial of exemption from regulation as an electric utility may discourage cogeneration at existing facilities.

The Commission has decided against imposing any efficiency standards on existing facilities, regardless of energy

source. There is no assurance that imposing standards would result in fuel savings. The opposite result is more likely, if operating cogeneration facilities are denied the benefits of interconnected operation with an electric utility. Therefore, for any cogeneration facility, the installation of which began before the date the Commission's final rules in this docket were issued, March 13, 1980, no efficiency standards are required for qualification, regardless of energy source or whether it is a topping or bottoming-cycle facility.

Efficiency To Be Based Upon Projected Annual Operation

Several commenters raised the issue of whether efficiency calculations should be based on rated performance characteristics or on expected performance over a period of time. Only half of the commenters that mentioned the issue took a position in favor of one means of computation or another. The balance of the commenters merely asked for clarification.

The Commission is persuaded that the efficiency of a cogeneration facility operating at peak production of power and heat may not necessarily correlate with the efficiency which can be practically realized. A cogeneration facility which serves a highly variable heating load may seldom be operated at peak efficiency. The efficiency standards required for new oil or natural gas cogeneration facilities are intended to assure efficient use of these premium fuels. Use of optimum or design basis circumstances for determining efficiency would not satisfy the Commission's concern. A computation based upon projected or estimated annual operations will more closely reflect the facility's actual energy conservation potential.

The Commission realizes that estimates will be required in order to determine the efficiency of a facility not yet constructed. The Commission believes, however, that such estimates would routinely be performed prior to any decision to invest in cogeneration equipment. No significant burden is therefore expected in determining a cogeneration facility's qualifying status.

Why the Efficiency Standard Based on "Effective Heat Rates" Was Not Adopted

Evaluating the performance of a cogeneration facility in terms of the quantity of additional fuel used per kilowatt hour of electricity generated, above that needed for heating purposes alone, results in a standard known as

²⁰ The efficiency standard proposed by this commenter, the American Paper Institute, differed from all others fundamentally in that an effective heat rate test was required. A qualifying cogeneration facility was defined as:

A cogeneration facility that for the electric energy produced incrementally to steam or useful energy production:

1. Uses less than 9,000 BTU of additional fuel per kilowatt hour and
2. Produces more electric energy than it consumes

And that at least twenty-five percent of the steam, or useful energy, available is applied on an annual basis in industrial, commercial, heating or cooling uses.

²¹ The preamble discusses new versus existing facilities. This is expressed in the regulations as "facilities, the installation of which began on or after March 13, 1980," or before that date. The Commission views the beginning of installation as the beginning of physical modification of the site or of pre-existing facilities. Of course, any sharp line will create its own inequities and raise its own questions. The waiver provision of § 292.205(d) is available to redress those inequities, and the

optional procedure for qualification under § 292.207(b) is available to answer those questions.

the "effective heat rate".²² This form of efficiency evaluation has been widely used to compare cogeneration of electricity to conventional utility generation. For a typical backpressure steam turbine cogeneration facility the effective heat rate of electricity generation may be as low as 4500 BTU/kWh—twice the efficiency of central station utility generation.

The effective heat rate test has some serious drawbacks, however. The test looks only to the efficiency of electricity generation and ignores the balance of the cogeneration facility. While the effective heat rate of a topping turbine may be high, if only a small fraction of the energy produced is in the form of electricity, the overall system is essentially a boiler facility, and the aggregate energy conserved is minimal. Indeed, effective heat rates are most favorable for systems which produce little electricity and a large amount of steam. The effective heat rate is lower for combustion turbine and internal combustion cogeneration, as compared to steam, but such systems produce more electricity per unit of fuel used. When the efficiency of the entire system is computed in such a manner as to credit the quality as well as quantity of energy produced,²³ combustion turbine or internal combustion cogeneration systems consistently score higher than steam systems. Thus the effective heat rate test does not truly measure overall system efficiency, and is not an adequate measure of whether, in the aggregate, energy is conserved through cogeneration.

§ 292.205(a)(2)(ii) Topping-cycle facilities using energy sources other than oil or natural gas.

In the final rule, the Commission has decided not to impose efficiency standards for qualification of topping-cycle cogeneration facilities using energy sources other than oil or natural

gas. The proposed rules contained standards for topping-cycle cogeneration facilities using energy sources other than coal or coal-derived fuels. The efficiency standards were proposed in response to two concerns. First, some energy sources may be viewed as limited in access. Use of such resources by one cogenerator deprives another, possibly more efficient cogeneration facility, of the opportunity to use the resource. Efficiency standards were proposed in order to ensure that the first cogenerator, to gain access to the resource, would build an efficient facility in the absence of an effective market for the resource.

The second concern dealt with a means of distinguishing a *bona fide* cogeneration facility from a small power production facility with incidental recovery and use of steam or heat. The Commission believed that some means was necessary to prevent small power production facilities from evading the statutory size limits. A standard setting forth minimum production of power and minimum recovery of heat was seen as a means of avoiding the qualification of "token" cogeneration facilities.

Neither concern is, however, relevant to the use of coal as a primary fuel. Coal is not characterized by limited access and it cannot be used as a primary fuel by small power production facilities. Therefore, the proposed rule contained no efficiency standards for facilities fueled by coal.

Most commenters addressing this question stated that the proposed standards were impossible to meet in many instances. More importantly, commenters questioned the basic rationale of applying efficiency standards. The limited access concept is complex, and some commenters missed the point, arguing that such resources are renewable or available in large quantity.

EPA pointed out that the degree to which limited access may affect the sort of facility constructed is unknown. The effects of limited access, if any, are likely to be site specific, and will vary with time. Even if these effects could be spelled out with certainty, the specification of appropriate efficiency criteria would be a difficult task at best. If a standard of thermal efficiency were set without detailed knowledge of both the technologies and patterns of resource development, the probable effect would simply be to stifle development of the resource.

The Commission concludes that the proposed cure is far worse than the suspected ailment. In addition, as was stated in the discussion addressing the operating standards, the 5 percent

minimum amount of useful thermal output standard will assure that these facilities are *bona fide* cogenerators under these rules.

§ 292.205(b) Efficiency standards for bottoming-cycle facilities.

The proposed rule contained a two-part efficiency standard for bottoming-cycle cogeneration facilities. All facilities, except those using coal or coal-derived fuels, would have been required to meet the standards. The first part of the efficiency standard dealt with the heat engine. In order to qualify, a facility had to either convert 15 percent of the reject heat from the thermal process to mechanical energy, or in the alternative, achieve 40 percent of the ideal Carnot efficiency with the working fluid temperatures experienced. The second part of the standard simply required an overall energy efficiency of 60 percent for the entire facility.

Numerous commenters were critical of the proposed standards. Although a number of issues were addressed, a common concern was the counter-productive nature of efficiency standards for bottoming-cycle cogeneration facilities relying on reject heat. It was argued that because the heat would otherwise be wasted, efficiency standards would serve no fuel conservation purpose. The only effect of efficiency standards would be a limitation on the number of bottoming-cycle facilities which would be constructed.

Moreover, many commenters noted that the overall energy efficiency standard of 60 percent was overly restrictive, and in fact meaningless in many instances. The overall energy efficiency, as defined in the proposed rule, would be determined by the efficiency of the bottoming-cycle heat engine and the efficiency of the industrial thermal process. Typically the latter efficiency is predetermined by the nature of the process and the design of the industrial plant. When bottoming-cycle cogeneration equipment is added to an existing plant, the efficiency of that plant's energy utilization is irrelevant to the effectiveness of the bottoming cycle. Furthermore, the measurement of overall energy efficiency required under the proposed rules would be difficult, since such efficiency measurements are not a conventional practice.

The Commission recognizes the validity of these comments, and has therefore eliminated efficiency standards for most bottoming-cycle cogeneration facilities. The final rule contains an efficiency standard for only those facilities with oil or natural gas

²²To compute a cogeneration facility's effective heat rate, an assumption is made that the thermal output of the facility would have to be supplied in any event. A certain quantity of fuel would be needed to satisfy the thermal load in the absence of cogeneration. For example, if a steam turbine topping-cycle cogeneration facility were not installed, a conventional steam boiler would raise the steam. With the topping-cycle system, slightly more fuel is burned to raise steam at a higher pressure than is needed for the thermal process. The steam is expanded in a turbine, generating electricity and exhausting steam at the proper pressure for the thermal process. Effective heat rate is computed by dividing the extra energy supplied to the facility by the electricity generated.

²³A Btu of electricity, for example, is worth more than a Btu of low pressure steam. The steam may be used for heat, but it is not useful for lighting or operating a television set. The "Second Law Efficiency" concept accurately reflects the usefulness of various forms of energy.

supplementary firing. The need for standards in this case was acknowledged by several commenters.

When supplementary firing is used in a bottoming-cycle cogeneration facility, more than reject heat is used to generate electricity. Scarce fossil fuels can be introduced without the inherent efficiency advantages of sequential use. In order to restrict the potential for abuse, the Commission has adopted a simple efficiency test similar to that suggested by one of the commenters. The standard relates only to facilities installation²⁴ of which began on or after March 13, 1980, and for which any of the energy input as supplementary firing is oil or natural gas. Paragraph (b)(1) specifies that the useful power output of the bottoming cycle must, during any calendar year, be no less than 45 percent of the energy input of natural gas and oil for supplementary firing. The Commission notes that the fuels used in the thermal process "upstream" from the bottoming-cycle facility's power production system are not considered in this efficiency test. The use of the lower heating value, consistent with the proposed rules, is advantageous to cogenerators in that the latent heat of combustion water cannot be effectively recovered by any practical bottoming-cycle technology currently foreseeable.

§ 292.205(c) Exemption from incremental pricing.

One of the incentives for cogeneration is found not in PURPA but in the Natural Gas Policy Act of 1978 (NGPA). In section 206(c), the Commission is given the discretion to exempt qualifying cogeneration facilities from its incremental pricing program developed under Title II of the NGPA.

On September 28, 1979, the Commission issued final rules implementing the incremental pricing provisions of the Natural Gas Policy Act of 1978.²⁵ These rules provide, among other things, that natural gas used by "a qualifying cogeneration facility" shall be exempt from the incremental pricing provisions of the NGPA.²⁶ A qualifying cogeneration facility is defined in the regulations as a cogeneration facility which meets the requirements prescribed by the Commission pursuant to section 201 of the Public Utility Regulatory Policies Act of 1978 (PURPA).²⁷

²⁴ In the case of bottoming-cycle cogeneration in which electric generating equipment is retrofitted to existing sources of industrial reject heat, the date at which installation begins is the date on which the retrofit is begun.

²⁵ 18 CFR Part 282, 44 FR 57226 (Oct. 5, 1979).

²⁶ 18 CFR 282.201(a).

²⁷ 18 CFR 282.202(e).

In this paragraph, the Commission has set forth the requirements for exemption from incremental pricing. Paragraph (c)(1) allows that any topping-cycle cogeneration facility which is a qualifying facility under § 292.203(b), and, if not already required to do so, meets the operating and efficiency standards under paragraphs (a)(1) and (2)(i) of this section, or is a qualifying facility under Subpart E of this part, may obtain an exemption from incremental pricing for its natural gas use.

Paragraph (c)(2) enables natural gas used in bottoming-cycle cogeneration facilities and which is not exempt from incremental pricing under Subpart E of this part to obtain exemption under this subpart to the extent that reject heat emerging from the useful thermal energy process is made available for use for power production. The Commission feels that these requirements adequately reflect the goal of PURPA to encourage the efficient use of energy by cogeneration facilities. To the extent that a facility makes available its reject thermal energy to produce power, the Commission believes it should obtain the benefit of exemption from incremental pricing.

The Commission does not intend for this subpart to interfere with any exemptions provided under Subpart E. Therefore, paragraph (c)(3) provides that any person who obtained an exemption under Subpart E is not affected by this provision.

Paragraph (c)(4) provides that natural gas used for supplementary firing in any cogeneration facility is not eligible for exemption from incremental pricing under this subpart. However, natural gas used for supplementary firing of a bottoming-cycle facility would be exempted under the Commission's Order No. 49-A, to the extent that the facility generates electricity which is sold to a utility.²⁸

When the final regulations under Phase II of incremental pricing take effect and the Commission can then better assess their implications, the Commission may wish to revise the exemptions from incremental pricing to cogeneration facilities, including the exemption provided in the Interim Rule under Subpart E.

§ 292.205(d) Waiver.

This paragraph provides that the Commission will consider waiving any of the standards described above upon a showing that the facility will produce significant energy savings.

²⁸ See Order No. 49-A, issued December 27, 1979, in Docket No. RM79-14, 45 FR 21 (Jan. 2, 1980).

§ 292.206 Ownership criteria.

Section 292.206 is designed to implement the statutory requirement that a qualifying small power production facility or cogeneration facility must be owned by a person not primarily engaged in the generation or sale of electric power (other than electric power solely from cogeneration facilities or small power production facilities). Regarding this provision, the Commission notes that the Conference Report states that:

[e]lectric utilities may participate in an entity which owns such (qualifying small power production or cogeneration) facilities with other persons, and such entity could qualify under these definitions.

The test of this case is whether the entity which owns the facility is primarily engaged in the generation or sale of electric power other than in connection with its ownership of the cogeneration facilities or small power production facilities.²⁹

Thus, either directly or through a subsidiary company, an electric utility could participate in the ownership of a qualifying cogeneration or small power production facility.

Several commenters noted that under a literal interpretation of the Conference Report's statement, several electric utilities could form a subsidiary which owned small power production or cogeneration facilities. Such a subsidiary would constitute an entity which is not primarily engaged in the generation or sale of electric power other than in connection with its ownership of cogeneration or small power production facilities. Under such an interpretation, the subject facilities would be eligible to receive qualifying status.

The Commission believes, however, that the thrust of section 201 of PURPA is to limit the advantages of qualifying status to cogeneration and small power production facilities which are not owned primarily by electric utilities or their subsidiaries. The proposed rule provided that if, based on the proportion of ownership by electric utilities, public utility holding companies, or subsidiaries of either, more than 50 percent of the entity which owns the cogeneration or small power production facility is comprised of these electric utility interests, then the facilities are not qualifying facilities. This language has been incorporated into these final rules; the comments on this section provided no sufficient reasons in the Commission's judgment for changing the percentage.

²⁹ Conference Report on H.R. 4018, Public Utility Regulatory Policies Act of 1978, H. Rep. No. 1750, 89, 95th Cong., 2d Sess. (1978).

The Commission emphasizes the fact that nothing in this program limits the extent of utility ownership or operation of cogeneration or small power production facilities. The Commission notes the statement in the Conference Report that:

... it is also the intention of the conferees that the definition of "qualifying cogeneration facility" and "qualifying small power production facility" will not be construed as prohibiting or discouraging electric utilities from cogenerating.³⁰

Utilities may not, however, qualify for the benefits under this program if their ownership interests exceed the limits set forth in this rule.

Both the provisions in section 3(17)(C)(ii) and 3(18)(B)(ii) of the Federal Power Act, as amended by section 201 of PURPA, use the term person in describing who may own a qualifying cogeneration facility and qualifying small power production facility. The Commission has incorporated the ownership criteria under this section of the regulations and has used the term—person—found in the statute.

A few commenters questioned whether a municipality (or any other agency or instrumentality of State or Federal government) falls within the definition of the term "person" as used in definitions (17) and (18) in section 3 of the Federal Power Act. It is the Commission's view that the term "person," for purposes of qualifying under this program, does include municipalities (or any other agency or instrumentality of State or Federal government). This view is supported by case law in which the courts have treated municipalities and other units of State and Federal government as persons under other sections of the Federal Power Act. See, e.g., *United States v. Public Utilities Commission of California*, 345 U.S. 295 (1953); and *New England Power Co. v. FPC*, 349 F.2d 258 (1st Cir. 1965). The cases touching on the issue of these agencies as persons are very expansive (see the *California Public Utility Commission* decision cited above which was decided by the Supreme Court in 1953). Therefore, under past practice, the Commission and the courts have not interpreted "person" to exclude a municipality or other unit of State and Federal government from the benefits of any action of the Federal Power Act.

In addition, in that there is no indication that the Congress meant to deny qualification to these agencies or instrumentalities, the Commission finds

no policy grounds for denying these agencies or instrumentalities qualifying status. Therefore, both as a matter of law and as a matter of policy, the term "person" as used in section 3(17)(C)(ii) and 3(18)(B)(ii) includes these agencies or instrumentalities. The effect of this is to allow these agencies or instrumentalities the opportunity to participate in this program if they otherwise meet the standards for qualification set out in this subpart.

§ 292.207 Procedures for obtaining qualifying status.

This section sets forth the procedures for obtaining qualifying status.

Paragraph (a)(1) provides that a small power production facility which meets the criteria for qualification set forth in § 292.203 is a qualifying facility. As discussed above, the Commission has eliminated the mandatory case-by-case qualification procedure contained in the proposed rule.

Paragraph (a)(2) requires any owner or operator of a facility qualifying under paragraph (a)(1) to furnish notice to the Commission. The contents of the notice shall contain the information required of an applicant for qualifying status in paragraph (b)(2)(i) through (b)(2)(iv) described below. The Commission is requiring such notice for purposes of monitoring the market penetration of qualifying facilities, in compliance with its responsibilities under the National Environmental Policy Act of 1969, as previously discussed in this preamble.

Paragraph (b) provides an optional procedure whereby the owner or operator of a small power production facility may, should it prove desirable, file an application with this Commission for certification that the facility or cogeneration facility is a qualifying facility. The application must contain enough information to enable the Commission to make an accurate finding that the facility should or should not be certified.

Specifically, paragraph (b)(i) through (v) provides that each application must contain the name and address of the applicant and the location of the facility, a brief description of the facility including a statement indicating whether such facility is a small power production facility or a cogeneration facility, the primary energy source used or to be used by the facility, the rated power production capacity of the facility, and the percentage of ownership by electric utilities, or public utility holding companies, or by any person owned by either.

Applications by owners or operators of small power production facilities must also contain the location of the

facility in relation to any other small power production facilities within one mile of the facility owned by the applicant which use the same energy resources, and information identifying any planned usage of natural gas, oil or coal.

An application by a cogenerator must contain the date installation facility commenced, a description of the cogeneration of the facility, including whether the facility is a topping or bottoming cycle, and sufficient information to determine that any applicable efficiency or operating requirements have been met.

Paragraph (b)(5) sets forth the procedures to be used by the Commission to determine whether a facility is to be granted qualifying status. It provides that, within 90 days of the filing of a complete application, the Commission shall issue an order granting or denying the application, extending the time for issuance of an order, or setting the matter for hearing. If no order is issued within 90 days of the filing of the application, it shall be deemed to have been granted.

The Commission will rely on its existing procedures for any person to file a petition for reconsideration of any Commission action instead of employing the protest procedure contained in the proposed rule.

Several commenters, while offering support for the elimination of filing and notice requirements for smaller facilities, acknowledged the useful purpose that would be served by a requirement that a larger facility give notice to the affected utility of its qualifying status and its intention that such utility purchase its power.

Accordingly, the Commission has provided a requirement in paragraph (c) that an electric utility is not required to purchase electric energy from a facility with a design capacity of 500 kilowatts or more until 90 days after the facility notifies the utility that it is a qualifying facility, or 90 days after the facility has applied to the Commission under paragraph (b).

Paragraph (d)(1) provides that the Commission may revoke the qualifying status of a facility if it ceases to comply with any of the statements contained in its application for Commission certification. The Commission may do so on its own motion, or upon a motion to reconsider any certification previously granted. In either case, the Commission will act only after providing an opportunity for a hearing. Paragraph (d)(2) provides that, prior to undertaking any substantial alteration of a qualifying facility, a small power producer or cogenerator may, should it prove

³⁰ Conference Report on H.R. 4018, Public Utility Regulatory Policies Act of 1978, H. Rep. No. 1750, 89-90, 95th Cong., 2d Sess. (1978).

desirable, apply to the Commission for a determination that the facility, as modified, will retain its qualifying status.

IV. Effective Date

The Conference Report indicates that rules respecting criteria for qualifying facilities be prescribed "as soon as practicable" in order that persons may ascertain in advance of construction or operation of any facility whether or not such facility will meet the criteria established. The Commission believes, therefore, that good cause exists under 5 U.S.C. 553(d) to make the rules promulgated in this order effective immediately.

These rules have been promulgated under the Federal Power Act, as amended by PURPA, and, therefore, a right to rehearing exists under section 313 of the Federal Power Act.

(Public Utility Regulatory Policies Act of 1978, 16 U.S.C. 2601, *et seq.*, Energy Supply and Environmental Coordination Act, (15 U.S.C. 791 *et seq.*), Federal Power Act, as amended, 16 U.S.C. 792 *et seq.*, Department of Energy Organization Act, (42 U.S.C. 7101 *et seq.*), E.O. 12009, 42 FR 46267, Natural Gas Policy Act of 1978, (15 U.S.C. 3301, *et seq.*))

In consideration of the foregoing, the Commission amends Part 292 of Chapter I, Title 18, Code of Federal Regulations, as set forth below, effective immediately.

By the Commission.

Kenneth F. Plumb,
Secretary.

1. Part 292 of Subchapter K is amended by adding a new Subpart B to read as follows:

Subpart B—Qualifying Cogeneration and Small Power Production Facilities

Sec.

292.201 Scope.

292.202 Definitions.

292.203 General requirements for qualification.

292.204 Criteria for qualifying small power production facilities.

292.205 Criteria for qualifying cogeneration facilities.

292.206 Ownership criteria.

292.207 Procedures for obtaining qualifying status.

Authority: Public Utility Regulatory Policies Act of 1978, (16 U.S.C. 2601, *et seq.*), Energy Supply and Environmental Coordination Act, (15 U.S.C. 791 *et seq.*), Federal Power Act, as amended, (16 U.S.C. 792, *et seq.*), Department of Energy Organization Act, (42 U.S.C. 7101 *et seq.*), E.O. 12009, 42 FR 46267, Natural Gas Policy Act of 1978, (15 U.S.C. 3301, *et seq.*)

Subpart B—Qualifying Cogeneration and Small Power Production Facilities

§ 292.201 Scope.

This subpart applies to the criteria for and manner of becoming a qualifying small power production facility and a qualifying cogeneration facility under sections 3(17)(C) and 3(18)(B), respectively, of the Federal Power Act, as amended by section 201 of the Public Utility Regulatory Policies Act of 1978 (PURPA).

§ 292.202 Definitions.

For purposes of this subpart:

(a) "Biomass" means any organic material not derived from fossil fuels;

(b) "Waste" means by-product materials other than biomass;

(c) "Cogeneration facility" means equipment used to produce electric energy and forms of useful thermal energy (such as heat or steam), used for industrial, commercial, heating, or cooling purposes, through the sequential use of energy;

(d) "Topping-cycle cogeneration facility" means a cogeneration facility in which the energy input to the facility is first used to produce useful power output, and the reject heat from power production is then used to provide useful thermal energy;

(e) "Bottoming-cycle cogeneration facility" means a cogeneration facility in which the energy input to the system is first applied to a useful thermal energy process, and the reject heat emerging from the process is then used for power production;

(f) "Supplementary firing" means an energy input to the cogeneration facility used only in the thermal process of a topping-cycle cogeneration facility, or only in the electric generating process of a bottoming-cycle cogeneration facility;

(g) "Useful power output" of a cogeneration facility means the electric or mechanical energy made available for use, exclusive of any such energy used in the power production process;

(h) "Useful thermal energy output" of a topping-cycle cogeneration facility means the thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application;

(i) "Total energy output" of a topping-cycle cogeneration facility is the sum of the useful power output and useful thermal energy output;

(j) "Total energy input" means the total energy of all forms supplied from external sources other than supplementary firing to the facility;

(k) "Natural gas" means either natural gas unmixed, or any mixture of natural gas and artificial gas;

(l) "Oil" means crude oil, residual fuel oil, natural gas liquids, or any refined petroleum products; and

(m) Energy input in the case of energy in the form of natural gas or oil is to be measured by the lower heating value of the natural gas or oil.

§ 292.203 General requirements for qualification.

(a) *Small power production facilities.* A small power production facility is a qualifying facility if it:

(1) Meets the maximum size criteria specified in § 292.204(a);

(2) Meets the fuel use criteria specified in § 292.204(b); and

(3) Meets the ownership criteria specified in § 292.206.

(b) *Cogeneration facilities.* (1) Unless excluded under paragraph (c), a cogeneration facility is a qualifying facility if it:

(i) Meets any applicable operating and efficiency standards specified in § 292.205 (a) and (b); and

(ii) Meets the ownership criteria specified in § 292.206.

(2) For purposes of qualification of a cogeneration facility for exemption from incremental pricing, a cogeneration facility must qualify under § 292.205(c).

(c) *Interim exclusion.* (1) Pending further Commission action, any cogeneration facility which is a new diesel cogeneration facility may not be a qualifying facility.

(2) A new diesel cogeneration facility is a cogeneration facility:

(i) Which derives its useful power output from a diesel engine, and

(ii) The installation of which began on or after March 13, 1980.

§ 292.204 Criteria for qualifying small power production facilities.

(a) *Size of the facility.*—(1) *Maximum size.* The power production capacity of the facility for which qualification is sought, together with the capacity of any other facilities which use the same energy resource, are owned by the same person, and are located at the same site, may not exceed 80 megawatts.

(2) *Method of calculation.* (i) For purposes of this paragraph, facilities are considered to be located at the same site as the facility for which qualification is sought if they are located within one mile of the facility for which qualification is sought and, for hydroelectric facilities, if they use water from the same impoundment for power generation.

(ii) For purposes of making the determination in clause (i), the distance between facilities shall be measured from the electrical generating equipment of a facility.

(3) *Waiver.* The Commission may modify the application of subparagraph (2) for good cause.

(b) *Fuel use.* (1)(i) The primary energy source of the facility must be biomass, waste, renewable resources, or any combination thereof, and more than 50 percent of the total energy input must be from these sources.

(ii) Any primary energy source which, on the basis of its energy content, is 50 percent or more biomass shall be considered biomass.

(2) Use of oil, natural gas, and coal by a facility may not, in the aggregate, exceed 25 percent of the total energy input of the facility during any calendar year period.

§ 292.205 Criteria for qualifying cogeneration facilities.

(a) *Operating and efficiency standards for topping-cycle facilities—*

(1) *Operating standard.* For any topping-cycle cogeneration facility, the useful thermal energy output of the facility must, during any calendar year period, be no less than 5 percent of the total energy output.

(2) *Efficiency standard.* (i) For any topping-cycle cogeneration facility for which any of the energy input is natural gas or oil, and the installation of which began on or after March 13, 1980, the useful power output of the facility plus one-half the useful thermal energy output, during any calendar year period, must:

(A) Subject to paragraph (a)(2)(i)(B) of this section be no less than 42.5 percent of the total energy input of natural gas and oil to the facility; or

(B) If the useful thermal energy output is less than 15 percent of the total energy output of the facility, be no less than 45 percent of the total energy input of natural gas and oil to the facility.

(ii) For any topping-cycle cogeneration facility not subject to paragraph (a)(2)(i) of this section there is no efficiency standard.

(b) *Efficiency standards for bottoming-cycle facilities.* (1) For any bottoming-cycle cogeneration facility for which any of the energy input as supplementary firing is natural gas or oil, and the installation of which began on or after March 13, 1980, the useful power output of the facility must, during any calendar year period, be no less than 45 percent of the energy input of natural gas and oil for supplementary firing.

(2) For any bottoming-cycle cogeneration facility not covered by subparagraph (1) of this paragraph, there is no efficiency standard.

(c) *Exemption from incremental pricing.* (1) Natural gas used in any

topping-cycle cogeneration facility is eligible for an exemption from incremental pricing under Title II of the Natural Gas Policy Act of 1978 (NGPA) and Part 282 of the Commission's rules if:

(i) The facility meets the operating and efficiency standards under paragraphs (a)(1) and (2)(i) of this section and is a qualifying facility under § 292.203(b)(1); or

(ii) The facility is a qualifying facility under Subpart E of this part.

(2) Natural gas used in any bottoming-cycle cogeneration facility, not subject to an exemption from incremental pricing under Subpart E of this part, is eligible for an exemption under Title II of the NGPA and Part 282 of the Commission's rules to the extent that reject heat emerging from the useful thermal energy process is made available for use for power production.

(3) Nothing in this subpart affects any exemption provided under Subpart E of this part.

(4) Natural gas used for supplementary firing in any cogeneration facility is not eligible under this part for exemption from incremental pricing.

(d) *Waiver.* The Commission may waive any of the requirements of paragraphs (a), (b) and (c) of this section upon a showing that the facility will produce significant energy savings.

§ 292.206 Ownership criteria.

(a) *General rule.* A cogeneration facility or small power production facility may not be owned by a person primarily engaged in the generation or sale of electric power (other than electric power solely from cogeneration facilities or small power production facilities).

(b) *Ownership test.* For purposes of this section, a cogeneration or small power production facility shall be considered to be owned by a person primarily engaged in the generation or sale of electric power, if more than 50 percent of the equity interest in the facility is held by an electric utility or utilities, or by a public utility holding company, or companies, or any combination thereof. If a wholly or partially owned subsidiary of an electric utility or public utility holding company has an ownership interest in a facility, the subsidiary's ownership interest shall be considered as ownership by an electric utility or public utility holding company.

§ 292.207 Procedures for obtaining qualifying status.

(a) *Qualification.* (1) A small power production facility or cogeneration

facility which meets the criteria for qualification set forth in § 292.203 is a qualifying facility.

(2) The owner or operator of any facility qualifying under this paragraph shall furnish notice to the Commission providing the information set forth in paragraph (b)(2)(i) through (iv) of this section.

(b) *Optional procedure—*(1) *Application for Commission certification.* Pursuant to the provisions of this paragraph, the owner or operator of the facility may file with this Commission an application for Commission certification that the facility is a qualifying facility.

(2) *General contents of application.* The application shall contain the following information:

(i) The name and address of the applicant and location of the facility;

(ii) A brief description of the facility, including a statement indicating whether such facility is a small power production facility or a cogeneration facility;

(iii) The primary energy source used or to be used by the facility;

(iv) The power production capacity of the facility; and

(v) The percentage of ownership by any electric utility or by any public utility holding company, or by any person owned by either.

(3) *Additional application requirements for small power production facilities.* An application by a small power producer for Commission certification shall contain the following additional information:

(i) The location of the facility in relation to any other small power production facilities located within one mile of the facility, owned by the applicant which use the same energy source; and

(ii) Information identifying any planned usage of natural gas, oil or coal.

(4) *Additional application requirements for cogeneration facilities.* An application by a cogenerator for Commission certification shall contain the following additional information:

(i) A description of the cogeneration system, including whether the facility is a topping or bottoming cycle and sufficient information to determine that any applicable requirements under § 292.205 will be met; and

(ii) The date installation of the facility began or will begin.

(5) *Commission action.* Within 90 days of the filing of an application, the Commission shall issue an order granting or denying the application, tolling the time for issuance of an order, or setting the matter for hearing. Any order denying certification shall identify

the specific requirements which were not met. If no order is issued within 90 days of the filing of the complete application, it shall be deemed to have been granted.

(c) *Notice requirements for facilities of 500 kW or more.* An electric utility is not required to purchase electric energy from a facility with a design capacity of 500 kW or more until 90 days after the facility notifies the utility that it is a qualifying facility, or 90 days after the facility has applied to the Commission under paragraph (b) of this section.

(d) *Revocation of qualifying status.* (1) The Commission may revoke the qualifying status of a qualifying facility which has been certified under this section if such facility fails to comply with any of the statements contained in its application for Commission certification.

(2) Prior to undertaking any substantial alteration or modification of a qualifying facility which has been certified under this section, a small power producer or cogenerator may apply to the Commission for a determination that the proposed alteration or modification will not result in a revocation of qualifying status.

Appendix I

Note.—This Appendix should not be included in the text of the regulations in the Code of Federal Regulations.

Summary of Comments on Preliminary Environmental Assessment

General. Numerous comments addressed the Environmental Assessment in general and discuss the need for a programmatic environmental impact statement (EIS).

Some of the comments favored an environmental impact statement. The New England Chapter of the Sierra Club stated that it is in accord with the general thrust of the Environmental Assessment. However, it is concerned with the encouragement of those technologies which utilize non-renewable energy resources and with those technologies which, if uncontrolled, tend to produce large quantities of pollutants. Therefore, the commenter stated that a generic EIS is needed to examine the absolute environmental effects of the rulemaking in encouraging all the assumed "benign" technologies.

This commenter also concurred with the suggestion that, pending issuance of a generic environmental impact statement, the Commission should proceed with the implementation of rules and regulations under sections 201 and 210 of PURPA, except for technologies which may result in

significant impacts as a result of the rules. For these technologies, the comments recommended that the Commission should proceed promptly to produce a comprehensive generic environmental impact statement.

Southern Company Services suggested that while the requirement to file an environmental impact statement may temporarily discourage cogeneration or small power production, it appears to be the only procedure for determining the environmental acceptability of a qualifying facility.

The Solar Lobby endorsed preparation of an EIS only where the environmental consequences of a qualifying facility are clearly negative. This commenter recommended that the more benign technologies should be encouraged even while appropriate generic environmental impact studies are performed.

Arthur D. Nadler Associates added that the environmental impact statement requirements should be kept to a minimum and be consistent with the small size of the facilities generally associated with those technologies.

Other commenters are opposed to the idea of a generic EIS. The California Energy Commission argued that the Commission's Environmental Assessment is adequate and that an EIS should not be required, particularly since any individual qualifying facility will receive State and Federal environmental scrutiny before it is constructed.

The California Energy Commission also suggested that the delay in adopting these regulations while an EIS is prepared and issued would itself cause adverse environmental and socioeconomic effects. Arizona Public Service Company and Brooklyn Union Gas Company concurred with the thrust of California's comment that, "Qualifying facilities will be delayed or not developed if the regulations are not adopted immediately. The failure to develop these qualifying facilities in a timely fashion will result in increased air pollution and adverse socioeconomic impacts from the increased consumption of imported oil and other fossil fuels during the period until the regulations are issued."

The Missouri Public Service Commission stated that for residential cogenerators or small power production facilities, an environmental impact statement will work as a disincentive, hindering consumer efforts at alleviating the energy problem. This commenter noted that while section 201 and 210 rules do have an effect on the quality of the human environment, it is a very beneficial one in that this program offers

some viable alternatives for easing the energy problem. "As little interference by government with its agencies should be the goal so that American ingenuity and know-how can flourish."

Pan Tech Management stated that the PURPA rules will not constitute an action that will significantly affect the environment. This commenter recommended that the Commission promulgate the proposed rule with appropriate modifications based on public comment, but that it should not withhold promulgation of any part of the rules pending preparation of an EIS. The Commission should, in this commenter's view, review case-by-case, certain locations where environmental quality may already be below the standard (i.e. non-attainment areas with regard to air quality criteria), thus precluding the implementation of certain technologies.

The Colorado Office of Energy Conservation suggested that a much more critical need than an EIS for small power producers is a social and economic impact analysis.

Cogeneration technologies and their environmental impacts.

With regard to cogeneration, the commenters generally suggested that diesel cogeneration in congested urban areas may have adverse air quality effects.

Consolidated Edison, Boston Edison and Union Electric and separate comments by Southern Company Services stated that the proliferation of relatively small diesel cogeneration units installed in residential and commercial buildings would significantly affect the environment. The joint comments noted that each individual unit would likely escape any meaningful environmental review by State and Federal environmental authorities under current regulations, and yet the cumulative impact could well be serious. It was asserted that the problem will be particularly acute in areas where the attainment of national ambient air standards already is marginal (most congested urban areas), and where increases in pollutant concentrations would restrict opportunity for urban development and economic recovery. It was further asserted that most of the cogeneration is likely to be diesel engines, which these commenters stated emit larger amounts of some critical pollutants, per unit of energy produced, than do properly designed central power station plants. The joint comments stressed that cogeneration facilities discharge pollutants in non-buoyant plumes at roof-top levels which it was claimed will cause far greater pollution concentrations at street levels where

people live and breathe, than do the buoyant plumes from the high, free-standing stacks of powerplants.

One of the commenters, Consolidated Edison, stated that on-site electric generation using diesel engines with waste heat recovery systems is already an economic alternative to its electric service or, in some cases, a combination of its electric and steam services, for some 395 customers representing a combined peak load of more than 1,000 MW. As additional incentives are added to the already favorable tax and regulatory climate for cogeneration installations in its service area, the utility claimed that the potential for conversions from central station to on-site generation could increase.

Consolidated Edison cited several studies prepared at its request which indicated that nitrogen dioxide (NO₂) standards in Manhattan could be contravened with the addition of as little as 240 MW of diesel cogeneration facilities in that borough. Consolidated Edison also stated that the studies indicated that the primary annual air quality standard for sulfur dioxide (SO₂) will be exceeded after several hundred more megawatts of diesel cogeneration capacity are installed.

Thomas Casten, speaking on behalf of The Cogeneration Society of New York, criticized several assumptions used in the Consolidated Edison studies. First he stated that several of the cogeneration facilities which the studies assumed would be installed in New York City violate existing environmental laws, and, therefore would not be installed. Secondly, he stated that these studies assume that 75 percent of the cogeneration plants would be installed in Manhattan, where environmental impacts would be most severe. He noted that eighteen of nineteen existing cogeneration plants in New York city are located outside of Manhattan.

This commenter next criticized the assumption that more than one thousand megawatts of diesel cogeneration will be installed in the New York City area, on the basis that this figure seems to exaggerate greatly the likely amount of cogeneration capacity. In addition, he contended that the standards used for measuring the emissions were those used for truck and bus-type engines which operate at varying speeds. He stated that a typical diesel cogeneration facility would operate at a fairly constant speed; and that, at constant speeds, emissions are about one-fourth of those produced at varying speeds.

Finally, the commenter noted that these studies assumed that there would be no improvements in the environment

resulting from other factors during the time that the one thousand megawatts of diesel cogeneration were projected to be installed in New York City.

Commonwealth Edison and Consolidated Edison suggested that noise produced by diesel engines is a very serious environmental impact, and that the impact in any specific area is independent of the total number of units in any region. These commenters recommended that an environmental noise impact assessment be prepared and the appropriate noise abatement measures be included in the on-site diesel-engine installations. This could be done, they asserted, by requiring potential cogeneration facilities to prepare a noise emission analysis showing that the emissions would not contravene local or State requirements.

Consolidated Edison, Boston Edison, Union Electric and Southern Company Services, Inc. recommended that in light of the serious environmental consequences which are likely to flow from these rules, it is incumbent upon the Commission to accompany its proposed rules with a draft environmental impact statement.

Furthermore, Consolidated Edison, Boston Edison, and Union Electric suggested that an environmental impact statement should be required with respect to each new cogeneration facility having the potential for a significant adverse impact on the environment. The comments stated that any proposed facility having a generating capacity of 500 kW or more would have such an impact and should require an EIS.

Brooklyn Union Gas Company surveyed eight companies with cogeneration facilities and concluded that no environmental problems have been associated with the operation of the facilities. The facilities obtained the required air emissions permits and have been operating in compliance with applicable air quality regulations.

Penti Aalto, a consultant, suggested that all types of cogeneration facilities be permitted without an EIS, subject to periodic review of the system as a whole. If problem areas appear, then appropriate action could be taken.

The New York State Public Service Commission proposed limiting qualifying status to suitable locations or limiting the density of qualifying facilities in any given area.

The New York State Energy Office stated that an EIS is not necessary at this time. It proposed as an alternative that the Commission consider imposing a direct limitation upon the density of diesel cogeneration in large populated urban areas since the preliminary EA

concludes that the number and density of urban diesel cogenerators determines the environmental risk.

Small Power Production Facilities.

Solar Energy. The Colorado Solar Energy Association stated that nearly all solar electric options are far less damaging to the environment than fossil-fueled or nuclear electric generation. He noted that implementation of PURPA must not be delayed by requiring the preparation of lengthy and time consuming environmental impact statements for renewable energy based qualifying facilities.

Geothermal Energy. The New England Chapter of the Sierra Club suggested that geothermal power production using hot brine sources is acknowledged to pose problems of air and water pollution and a potential toxic waste disposal problem. This commenter recommended that since there are no immediate plans for small power plant construction using hot geothermal brine (it is their understanding that such power production is currently uneconomic), it seems unnecessary to promulgate rules to encourage its use prior to preparation of the generic EIS.

Small-Scale Hydropower. The State of Vermont—Agency of Environmental Conservation stated that the small hydro summary in the preliminary EA was incorrect in stating that instances are rare where there is significant impact from facilities being added to an existing dam. It was stated that as in the Bolton Falls project, or at Ball Mountain, the impact of development could be significant in terms of water quality, fishery habitat and production, recreation, and possibly aesthetics.

The New England Chapter of the Sierra Club suggested that run-of-river hydro installations suffer from the same siltation, turbidity, and biological oxygen demand problems as do generating capacity additions at existing dams. Because almost all new non-Federal hydroelectric projects must be licensed by the Commission and environmentally evaluated on a case-by-case basis, this commenter concurred with the promulgation of rules allowing qualification of small hydroelectric projects at existing dams. It was asserted that run-of-river hydroelectric projects, however, pose an additional problem: the potential for diversion of water from existing channels. Unless all run-of-river hydro projects are to be environmentally evaluated on case-by-case basis, this commenter recommended that qualifying status be withheld until after completion of the generic EIS.

Municipal Waste. Wheelabrator-Frye, Inc. stated that the encouragement of small power production and cogeneration fueled by municipal solid waste does not constitute a "major federal action significantly affecting the quality of the human environment." This commenter stated that small power production facilities which use such a feedstock produce a significant net positive impact on the overall environment since they reduce dependence upon highly polluting "open dumping" practices and encourage more efficient community solid waste management practices. He cited as an example one of the projects sponsored by his firm which has achieved waste volume reduction of more than 90 percent through currently available mass combustion technologies. He suggested that the quantity of waste requiring land disposal sites, as a result of processing through such facilities, is greatly reduced and more readily controlled and contained.

This commenter also suggested that since current EPA standards governing State implementation plans and new source performance procedures assure the conformance of such projects with the attainment of national air quality standards, no environmental impact statement need be filed by these facilities.

However, the New England Chapter of the Sierra Club stated that incineration of municipal wastes for power production purposes presents a potential problem in the emission of toxic substances, especially the more volatile heavy metals like mercury, cadmium and lead. With the eventual issuance of EPA regulations implementing the Toxic Substances Control Act, these emissions will be regulated; at this time they are not. This commenter does not propose an exception for municipal waste, but is concerned that any Commission regulations which encourage the incineration of municipal waste should insist on appropriate control technology.

Biomass. The New York State Energy Office and the Hawaiian Sugar Planter's Association stated that a detailed Environmental Assessment is not warranted for any of the biomass fuels already in use at small power production facilities.

The Hawaiian Sugar Planter's Association suggested that, in large part, the PURPA incentives should operate to encourage sugar factories to make more efficient use of the biomass already being burned and more efficient use of the steam being produced.

The New England Chapter of the Sierra Club stated that emission, soil tilth, fertility, and land use questions are

present for biomass fuel. This commenter is concerned with the social effects of industrialization of agricultural areas induced by new biomass cogeneration facilities.

"Biomass generally will provide relatively small amounts of net energy per unit mass or volume. As a result, encouragement of new biomass cogeneration facilities will tend to increase rural industrialization because high transportation costs will attract industrial cogenerators to the source of the biomass."

This commenter stated that it is not necessary to require an environmental impact statement for existing facilities or biomass cogeneration which use on-site produced waste—such as sawdust. However, it was suggested that an impact statement for new biomass-based cogeneration facilities which import off-site produced forest or agricultural products for the purpose of cogeneration should be required.

"Cogeneration based on the use of stockyard wastes, kelp or similar sources need not be excepted if a thorough generic EIS is planned."

The Solar Energy Research Institute suggested that it is a mistake to group all types of "biomass" generating facilities together for environmental scrutiny. Many biomass systems use biogas in a combustion turbine and have minimal environmental impacts. This commenter recommended that several different classes of "biomass" facilities be identified and that each be considered separately.

The American Paper Institute stated that it was concerned that the Commission staff may not have taken into account many of the environmental benefits of burning wood and other biomass fuels.

Potlatch Corporation suggested that the definition of biomass in the preliminary environmental assessment is unusual and narrow. "Well-recognized concepts of biomass include all plant material including by-products of manufacturing, harvesting, and growing."

Wind. Two commenters suggested that the environmental effects of large wind energy conversion systems (WECS) can be significant. The State of Vermont—Agency of Environmental Conservation raised several problem areas. The first is that electromagnetic interference (as with radio or telecommunications) is an unknown quantity at the moment, with disagreement as to the extent of disruption that will actually be caused by a large WECS.

The second problem discussed was road construction and site preparation,

especially on the fragile areas such as sites above 2500 feet in elevation. The wind energy resource appears to exist predominately at these higher elevations, yet sites which may be desirable from a power point of view are fragile and easily disrupted. Loss of vegetation cover and erosion of soil are two of the main concerns.

A third problem raised by this commenter was that the noise pollution and visual impact of the WECS were not mentioned in the summary of the preliminary Environmental Assessment.

The Solar Energy Research Institute recommended that the environmental impacts of large wind machines may need more careful scrutiny than the preliminary EA acknowledged. It was asserted that difficulties with low frequency sound and land use impacts need careful attention.

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