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June 30, 2014

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
2014 JUN 30 PM 4:23
CHIEF CLERKS OFFICE

Ms. Bridget C. Bohac
Chief Clerk
Texas Commission on Environmental Quality
P.O. Box 13087, MC 105
Austin, TX 78711-3087

RE: TCEQ Docket No. 2012-1648-MIS-U; Brazos Electric Power Cooperative, Inc.; Jack County Generation Facility- Jack 2 Expansion Project; CN600128821 / RN100221985; Account No. JA-0068-E; Permit No. 83801 / PSD-TX-117; Filing of Appeal for Application for Use Determination for Pollution Control Property Application No. 16413

Dear Ms. Bohac:

Brazos Electric Power Cooperative, Inc. ("BEPC") received a Notice of Negative Use Determination for Application for Use Determination for Pollution Control Property Application No. 16413 from Mr. David Brymer, Director of the Air Quality Division of the Texas Commission on Environmental Quality, dated June 5, 2014 ("Notice of Negative Use Determination"). The Notice of Negative Use Determination was sent to BEPC's tax consultant, Mr. Jim Harris, with insufficient postage. As a result, Mr. Harris did not receive the Notice of Negative Use Determination until June 13, 2014, upon his payment to the United States Postal Service of the additional $0.21 that was required for proper delivery. In an abundance of caution, BEPC is utilizing the presumed three business day delivery period set forth in 30 Tex. Admin. Code § 17.25(b) to establish the date of BEPC's receipt of the Notice of Negative Use Determination. As such, this appeal of the Negative Use Determination is timely filed.

The following information is provided, as required in 30 Tex. Admin. Code § 17.25(b)(1-5), in support of BEPC's appeal:

1. **Name, address, and daytime telephone number of person filing appeal:**

Paul C. Sarahan
Counsel for Brazos Electric Power Cooperative, Inc.
Thompson & Knight LLP
98 San Jacinto Blvd., Ste. 1900
Austin, Texas 78701
Day Time Phone#: (512) 469-6106

2. **Name and address of the entity to which the use determination was issued:**

Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
3844 Henderson Ranch Road
Bridgeport, Texas 76426

3. **Use determination application number for the application for which the use determination was issued:**

Use Determination Application No. 16413 ("Application No. 16413)

4. **Request on appeal:**

BEPC respectfully requests the Commission's consideration of the use determination issued on June 5, 2014. Specifically, BEPC requests that the Commission remand this matter to the Executive Director with the following instructions:

A. Texas Tax Code § 11.31(m) removes the need for an environmental rule to be cited in a HRSG application for a determination of pollution control use. If the Commission determines an environmental rule must be cited, BEPC's Application No. 16413 and its responses to the Executive Director's Notices of Technical Deficiency have cited several rules met or exceeded by its use of the HRSGs at the Jack County facility, and the Executive Director shall find that this requirement has been met;

B. The Executive Director's inputs that were required to be used in TCEQ's CAP formula are contrary to Tex. Tax Code § 11.31(b);

C. HRSGs have been statutorily designated as pollution control equipment. As such, some portion of the value of that equipment must be attributed to pollution control, and provided a tax exemption;

D. The purpose of the calculation is to determine what percentage of the equipment's value is attributable to production and what percentage is attributable to pollution control. The percentages must add up to 100%;

E. Because the CAP formula is capable of generating a negative number, and in the case at hand, a significantly negative number, it is inconsistent with state law, and invalid as a matter of law;

F. The Executive Director is required to initiate rulemaking to revise the calculation utilized to determine the percentage of the equipment's value that is attributable to production and the percentage of the equipment's value is attributable to pollution

control. In doing so, the percentages for the two calculations shall add up to 100% and neither calculation shall result in a negative number;

G. With respect to the pending application, the Executive Director shall grant a positive use determination of 74.66% for the equipment claimed in BEPC's Application No. 16413, as originally filed on or about March 5, 2012, and as reflected in its responses to the Executive Director filed in this matter.

5. **Basis for the Appeal:**

BEPC respectfully requests that the Commission consider the Executive Director's use determination based specifically on the two issues that form the bases of the Negative Use Determination issued in this matter on June 5, 2014, and based on that consideration, remand this matter to the Executive Director for further actions, as set forth above. In support of this request, BEPC would show as follows:

**A. The Executive Director Relies on Two Bases for His Negative Use Determination with respect to BEPC's Application No. 16413**

The Executive Director bases his Negative Use Determination issued in this matter on two issues: (i) his determination that he "cannot find that the HRSGs are used, constructed, acquired, or installed wholly or partly to meet or exceed any cited laws, rules, or regulations adopted by any environmental protection agency of the United States, Texas or a political subdivision of Texas for the prevention, monitoring, control, or reduction of air, water, or land pollution" (the "'meet or exceed'" requirement"); and (ii) his finding that BEPC's methods for determining the use determination are unreasonable.

**B. "Meet or Exceed" Requirement**

The Executive Director's analysis with respect to this issue is conclusory at best. He states, "While the application and responses provided numerous rule citations, none were to rules that the HRSG was required to meet." Notice of Negative Use Determination, at 2. While the Executive Director has at last acknowledged that the applicant is not required to provide a citation to a law or rule that mandates the installation of a specific type of equipment, he has provided no analysis of or justification for his decision that none of the six environmental standards cited by BEPC in its application and subsequent responses comply with the "meet or exceed" requirement. He further has not provided any statutory analysis justifying his apparent conclusion that Texas Tax Code § 11.31(m) does not vitiate or invalidate any requirement that an environmental rule be cited in a HRSG application.

The Executive Director's entire discussion of this basis for his negative use determination is encapsulated in a single paragraph consisting of four sentences. Given the extensive briefing provided by BEPC and the other HRSG applicants with respect to this issue, the Executive

Director's conclusory statement is insufficient to support a negative use determination in this matter.[1]

As BEPC sets forth below, the Executive Director erred in basing the negative use determination on the "meet or exceed" requirement because: (i) Texas Tax Code § 11.31(m) removes the need for an environmental rule to be cited in a HRSG application; (ii) to the extent that such a requirement is applicable, the Executive Director has inconsistently applied the "meet or exceed" requirement in violation of BEPC's equal protection rights under the United States Constitution and the Texas Constitution; and (iii) to the extent that such a requirement is applicable, BEPC's application cites several rules met or exceeded by its use of the HRSGs.

**(1) Texas Tax Code § 11.31(m) Removes Need for Environmental Rule to Be Cited in HRSG Application**

As BEPC has stated in prior proceedings before the Commission, as well as in its responses to the Executive Director's Notice of Technical Deficiency issued on February 21, 2013 and the Executive Director's Second Notice of Technical Deficiency issued on January 24, 2014, BEPC objects to the Executive Director's requirement to identify an environmental regulation that is met or exceeded through the use of a HRSG. The Texas Legislature expressed its intent that HRSGs be treated as pollution control devices when it amended Section 11.31 of the Tax Code in 2007 to include subsection (k). That subsection requires that TCEQ adopt a list of such devices and mandates that HRSGs be included on that list. *See* TEX. TAX CODE § 11.31(k).

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[1] For purposes of establishing the record before the Commission, BEPC understands that the prior filings under this Docket No. 2012-1648-MIS-U are before the Commission and BEPC is not required to refile these documents in order for them to be considered a part of the Commission's record. To complete the record, BEPC has attached to this Appeal BEPC's Application No. 16413; the Executive Director's Notice of Technical Deficiency, dated February 21, 2013; BEPC's Response, dated June 24, 2013; the Executive Director's Second Notice of Technical Deficiency, dated January 24, 2014; BEPC's Response, dated March 21, 2014; and the Executive Director's Negative Use Determination, dated June 5, 2014. These documents are attached hereto as Attachments A-F, respectively, and are incorporated herein. Further, the argument and evidence presented by those similarly situated HRSG applicants is incorporated herein by reference as if fully set forth herein including, without limitation, the argument and evidence presented in relation to Application Nos. UD 07-11914 (Tenaska Gateway Partners, Ltd- Rusk County); UD 07-11966 (Freestone Power Generation, L.P. –Freestone County); UD 07-11971 (Borger Energy Associates, L.P.- Hutchinson County); UD 07-11969 (Brazos Valley Energy, L.P.- Fort Bend County); UD 07-11994 (Freeport Energy Center, L.P.- Brazoria County); UD 07-11926 (CER-Colorado Bend Energy LLC (f/k/a Navasota Wharton Energy Partners, L.P .) -Wharton County); UD 12696 (EN Service's LP- Harrison County); UD 16409 (Bosque Power Company, LLC- Bosque County); UD 12210 & 12211 (Topaz Power Group, LLC- Nueces County); UD 15506, 16410, 16411 & 16412 (Cottonwood Energy Company LP - Newton County); UD 12268 (WolfHollow I, LP- Hood County); UD 13534 (South Texas Electric Cooperative, Inc. –Victoria County); UD 13544 (Brazos Electric Cooperative, Inc.- Johnson County); UD 12004 (NRG Texas Power LLC- Limestone County); UD 07-12271 (Midlothian Energy Limited Partnership – Ellis County); UD 07-12202 (Wise County Power Company, LLC- Wise County); UD 07-12203 (Ennis Power Company, LLC- Ellis County); UD 15020 (Motiva Enterprises, LLC- Jefferson County); UD 07-12272 (Hay Energy Limited Partnership- Hays County); and UD 12826 (GIM Channelview Cogeneration LLC- Harris County).

Here, the Legislature deliberately and purposefully included HRSGs in its list of items that "must" be treated as "facilities, devices, or methods for the control of air, water, or land pollution ..." TEX. TAX CODE § 11.31(k). The Legislature did so with full knowledge that HRSGs are devices that are necessarily part of the production process and are commonly used as power plant components. Accordingly, HRSGs must be treated as pollution control devices and the Executive Director cannot interpret the statute in an alternative manner to avoid this unambiguous legislative mandate.

Section 11.31(m) states:

> (m) *Notwithstanding the other provisions of this section*, if the facility, device, or method for the control of air, water, or land pollution ... is a facility, device or method included on the list adopted under Subsection (k), the executive director ... and *without regard to whether the information required by Subsection (c)(1) has been submitted* ... shall determine that the facility, device, or method described in the application is used wholly or partly as a facility, device or method for the control of air, water, or land pollution and shall take the actions that are required by Subsection (d) in the event such a determination is made.

TEX. TAX CODE § 11.31(m) (emphases added). This legislative directive is definitive and unambiguous. The list comprises equipment that the Legislature has conclusively determined meet all criteria to constitute pollution control equipment. The phrase "notwithstanding the other provisions of this section" directly contradicts the Executive Director's position that it must independently evaluate and apply criteria found in other parts of Section 11.31 before a positive use finding may be issued.

Further, the Executive Director is to make his determination without regard to whether the environmental benefit information required by Tex. Tax Code § 11.31(c)(1) has been submitted. The applicants are exempted from submitting information regarding environmental benefit, i.e., the environmental law or rule that is being met or exceeded by the HRSG, because inclusion of equipment on the list represents a legislative determination that environmental benefit exists.

**(2) The Executive Director Has Inconsistently Applied the "Meet or Exceed" Requirement**

The Executive Director has raised the "meet or exceed" requirement issue in only some of the Notices of Negative Use Determinations that he recently issued to HRSG applicants. *See, e.g.*, Attachments G and H, which do not cite the "meet or exceed" requirement as a basis for those negative use determinations. This inconsistent treatment of similar applications runs afoul of equal protection principles established under the United States Constitution and the Texas Constitution. *See* U.S. CONST. Amend. 14, § 1; TEX. CONST. Art. 8, § 1. Having apparently determined that the citations of some applicants were sufficient to comply with the "meet or exceed" requirement asserted by the Executive Director, the Executive Director is barred from

determining that applicants relying on those same regulatory citations have not complied with the "meet or exceed" requirement.

The Executive Director's inconsistent application of the "meet or exceed" requirement in his most recent Negative Use Determinations falls on the heels of similar inconsistent treatment of the pending HRSG applicants compared to other HRSG applicants who received positive use determinations based on their reliance on 40 C.F.R. Part 60, Subpart Da. On May 1, 2008, the Executive Director issued six positive use determinations for HRSGs, each of which was premised on the HRSG's use to meet or exceed the requirements of 40 C.F.R. Part 60, Subpart Da. *See* Attachment I. In the Technical Review Document that was provided for and in support of each positive use determination, the Executive Director expressly found, among other things, that "the appropriate [supporting] rule is: 40 CFR 60.44Da."

BEPC's expanded Jack County Generation Facility (also known as Jack 2) that is the subject of Application No. 16314 is subject to 40 C.F.R. Part 60, Subpart KKK. This subpart applies to emissions from the HRSGs and duct burners associated with the stationary combustion turbine. 40 C.F.R. § 60.4305(a). Therefore, the HRSGs and duct burners are exempted from similar requirements under 40 C.F.R. Part 60, Subparts Da, Db, and Dc. Because the requirements of the four subparts all apply to HRSGs and duct burners and because the Executive Director has previously approved of the use of Subpart Da as a basis for a positive use determination, the Executive Director is barred from determining that BEPC's reliance on 40 C.F.R. Part 60, Subpart KKKK.

The Executive Director's determination that BEPC's reliance on 40 C.F.R. Part 60, Subpart KKKK, and specifically 40 C.F.R. §§ 60.4305(a), 60.4320, 60.4330, and 60.4333 is insufficient to comply with his asserted "meet or exceed" requirement violates BEPC's equal protection rights. As such, the Commission should remand this matter to the Executive Director for further proceedings as described above.

**(3) BEPC's Application Cites Several Rules Met or Exceeded by Use of HRSGs**

Subject to, and without waiving the objections set forth in the two sections above, the installation and use of the HRSGs and dedicated ancillary equipment allows BEPC to meet or exceed the following environmental rules or regulations:

**i. HRSGs are Used to Meet 40 C.F.R. Part 60, Subpart KKKK**

Subpart KKKK establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that have a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on a higher heating value of the fuel and that commenced construction, modification, or reconstruction after February 18, 2005. The expanded Jack County Generation Facility is equipped with two gas turbines that meet this qualification criteria. This subpart also applies to emissions from the associated HRSGs and duct burners.

BEPC asserts that the HRSGs are used to meet 40 C.F.R. §§ 60.4305(a), 60.4320, 60.4330, and 60.4333. BEPC began construction of its electric utility steam generating unit after February 18, 2005. BEPC uses the HRSGs to meet or exceed 40 C.F.R. Part 60, Subpart KKKK emissions standards primarily by reducing fossil fuel consumption and related $NO_x$ and $SO_2$ emissions. The use of BEPC's HRSGs in the combined cycle configuration described in the Application results in significantly lower $NO_x$ emissions for the same electric power that could be generated by a simple cycle plant without pollution control equipment. HRSGs accomplish this result by capturing/recycling and using heat generated by BEPC combustion turbines to convert water into steam to power steam (rather than natural gas) turbines which produce additional power without use of additional fossil fuel or its associated, additional $NO_x$ emissions. Stated conversely, without its HRSGs, BEPC would be unable to produce the same amount of power without producing more $NO_x$ emissions and might well, in that instance, even exceed the environmental standards of 40 C.F.R. Part 60, Subpart KKKK.

The applicability of 40 C.F.R. Part 60, Subpart KKKK is premised on 40 C.F.R. § 60.4305(a), which states that the HRSGs and duct burners associated with a stationary combustion turbine with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on a higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005, are subject to Subpart KKKK.

Further, in the permit issued by the Executive Director to BEPC, dated September 12, 2011, for the Plant that is the subject of Application No. 16413, the Executive Director asserted that the HRSGs are subject to Subpart KKKK. *See* Attachment J, Permit No. 83801 and PSDTX1117, Special Condition 1(A). BEPC's federal operating permit, No. O-02169, also recognizes that the HRSGs are subject to Subpart KKKK. *See* Attachment K, Applicable Requirements Summary for Units HRSG-3 and HRSG-4. The Executive Director cannot assert that the HRSGs are subject to Subpart KKKK for purposes of TCEQ permitting program and then deny that the HRSGs are used to meet Subpart KKKK for purposes of the Tax Relief for Pollution Control Property Program.[2]

Even under the Executive Director's interpretation, BEPC's citation of 40 C.F.R. Part 60, Subpart KKKK meets the requirements necessary for BEPC to be eligible for the tax abatement. The HRSGs are used to meet the requirements of 40 C.F.R. Part 60, Subpart KKKK. The Executive Director admits as much, when he states, "Subpart Da[3] is a standard of performance

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[2] As former Commissioner Rubenstein noted at the Commission's December 2012 discussion of the pending HRSG applications, "...I don't disagree that there's great production value in having the HRSGs there. None. Nobody disputes that. But, I also don't think it's appropriate to discount the fact that that efficiency ends up in emission avoidance, and . . . we've touted the improvements in air quality that we've made because we're targeting the emissions, in large respects the increased efficiencies because of the regulations that we have also let us get there, and so we can't like it here and not like it over on this end."

[3] BEPC had previously inadvertently cited 40 C.F.R. Part 60, Subpart Da, and specifically 40 C.F.R. § 60.44Da in its application, and subsequently filed responses with the Commission and the Executive Director. BEPC amended its Application No. 16413 on March 21, 2014, through its filing of its Response to the Executive Director's Second Notice of Technical Deficiency, to properly assert its reliance on 40 C.F.R. Part 60, Subpart KKKK. *See* BEPC's

for electric utility steam generating units, i.e., the HRSG, and provides emission limits for nitrogen oxides ($NO_x$), particulate matter, and sulfur dioxide ($SO_2$)." Jan. 24, 2014 NOTD, p. 2. Subpart KKK establishes similar emission requirements, which is recognized by the fact that a HRSG that is regulated under Subpart KKKK is exempted from the requirements of Subpart Da, as well as Subparts Db and Dc. These various subparts establish emission standards for similar equipment that differ by size or date of construction. Through his statement in the 2014 Notice of Technical Deficiency, the Executive Director has recognized the clear connection between the listed equipment and the cited rule for which the Executive Director has asked. *See* Jan. 24, 2014 NOTD, pp. 1-2.

As discussed above, this conclusion is further supported by the Executive Director's prior decisions in other applications relying on 40 C.F.R. Part 60, Subpart Da. On May 1, 2008, the Executive Director issued six positive use determinations for HRSGs, each of which was premised on the HRSG's use to meet or exceed the requirements of 40 C.F.R. Part 60, Subpart Da. *See* Attachment I. In the Technical Review Document that was provided for and in support of each positive use determination, the Executive Director expressly found, among other things, that "the appropriate [supporting] rule is: 40 CFR 60.44Da." Given the similar requirements in Subparts Da and KKKK, BEPC has met this eligibility requirement for the tax abatement, to the extent it is applicable.

### ii. HRSGs are Used to Meet the Clean Air Interstate Rule ("CAIR"), 30 TEX. ADMIN. CODE § 101.506

BEPC's HRSGs also meet or exceed the requirements of CAIR. CAIR was implemented by EPA to reduce the interstate transport of pollutants, especially $NO_x$ and sulfur dioxide. 70 Fed. Reg. 25162 (May 12, 2005). Section 101.506 of TCEQ's rules implementing CAIR $NO_x$ reductions in Texas directly relies upon increased fuel efficiency. *See* 30 TEX. ADMIN. CODE § 101.506. The increased fuel efficiency resulting from the use of a HRSG meets or exceeds Section 101.506's requirement to reduce $NO_x$ emissions. These requirements are included as part of BEPC's federal operating permit, No. O-02169. *See* Attachment K, Special Terms and Conditions No. 15. Section 101.506 is applicable to BEPC, and BEPC meets this requirement through the use of the HRSG. As such, there is a clear connection between the listed equipment and the cited rule for which the Executive Director has asked, and BEPC has met this eligibility requirement for the tax abatement, to the extent it is applicable.

### iii. BEPC's HRSGs Exceed Greenhouse Gas Regulations

BEPC's use of the HRSGs exceed current greenhouse gas ("GHG") regulations. EPA has decided that GHGs must be regulated under the Clean Air Act and has started implementation of that regime through BACT reviews. On January 8, 2014, EPA proposed

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Response to the Executive Director's Second Notice of Technical Deficiency, p. 6, which is attached hereto as Attachment E.

Standards of Performance for Greenhouse Gas Emissions From New Electric Utility Generating Units. *See* 79 Fed. Reg. 1430 (Jan. 8, 2014). On June 18, 2014, EPA proposed emission guidelines for states to follow in developing plans to address GHG emissions from existing fossil fuel-fired power plants. *See* 79 Fed. Reg. 34830 (June 18, 2014). The baseline for emission reductions under this most recent proposed rule predates the installation of BEPC's HRSGs and thus, the pollution control benefits arising from the installation and the use of the HRSGs will assist Texas's efforts to comply with the proposed regulations, if and when the regulations are finalized.

Based on EPA's GHG BACT reviews to date, efficiency reflected through lower output-based emissions of GHGs is the most important factor in meeting the GHG BACT requirements. In its GHG BACT Guidance Document, EPA states, "Considering the most energy efficient technologies in the BACT analysis helps reduce the products of combustion, which includes not only GHGs but other regulated NSR pollutants (e.g. NOx, SO2, PM/PM10/PM2.5, CO etc.) Thus, it is also important to emphasize that energy efficiency should be considered in BACT determinations for all regulated NSR pollutants (not just GHGs)." EPA, PSD and Title V Permitting Guidance for Greenhouse Gases, at 22 (Nov. 2010).

Output-based emission reductions, such as those obtained through the use of HRSGs, have been expressly identified by EPA as a preferred method of compliance with BACT for a wide range of pollutants. BEPC's early implementation of this pollution prevention mechanism exceed the regulatory requirements and therefore meets this eligibility requirement for the tax abatement, to the extent this eligibility requirement is applicable.

### iv. HRSGs are Used to Meet BACT Requirements

Best Available Control Technology or BACT is defined as the reduction in total emissions that can be achieved through the use of either (i) add-on pollution control equipment; or (ii) *production processes*, systems, methods, or work practices. 30 TEX. ADMIN. CODE § 116.10(1) (emphasis added). HRSGs serve as part of the production process and reduce the total $NO_x$ emissions from the facility.

BACT is an issue that is addressed through a permit application (*see, e.g.*, Attachment L) and TCEQ's processing of that permit application (*see, e.g.*, Attachment M). The permit reflects the results of that analysis but does not identify specific equipment as being "required Best Available Control Technology." However, as a permit application's representations are considered conditions upon which the permit is issued, and are enforceable as such, BEPC is entitled to rely on these representations for purposes of establishing that the HRSGs constituted BACT for the Plant, so as to establish that the HRSGs meet or exceed the requirements of 30 Tex. Admin. Code §§ 116.111(a)(2)(C), 116.160(c)(1)(A); 40 C.F.R. § 52.21(b)(12). BEPC has met this eligibility requirement for the tax abatement, to the extent it is applicable.

**v. HRSGs are Used to Meet Federal Goals of Pollution Prevention Set Forth in 42 U.S.C. § 7401(c)**

The provision of the Federal Clean Air Act found at 42 U.S.C. § 7401(c) establishes, as a primary goal of the Act, the encouragement and promotion of pollution prevention. HRSGs prevent pollution. This fact has been recognized explicitly by the Legislature by its inclusion of HRSGs on the list set forth in Tex. Tax Code § 11.31(k). As such, there is a clear connection between the HRSG and the pollution prevention goal established in 42 U.S.C. § 7401(c). BEPC has met this eligibility requirement for the tax abatement, to the extent it is applicable.

**vi. HRSGs are Used to Meet NAAQS Requirements**

BEPC's HRSGs are used to meet or exceed the National Ambient Air Quality Standards ("NAAQS") for $NO_x$ (40 C.F.R. § 50.11), along with 30 Tex. Admin. Code §§ 101.20 and 101.21 (incorporating federal standards). The use of BEPC's HRSGs also assist in meeting NAAQS for $SO_2$ (40 C.F.R. § 50.17), PM10 (40 C.F.R. § 50.6) and CO (40 C.F.R. § 50.8). Without the use of such equipment, areas of Texas would not be able to achieve compliance with the NAAQS without further reductions by others. It is for this reason that the EPA has adopted standards such as those set forth in 40 C.F.R. Part 60, Subpart Da, as well as CAIR. Further, it is why these requirements have been incorporated into TCEQ's rules and the permits TCEQ issues. As Commissioner Rubenstein explained, "I also don't think it's appropriate to discount the fact that that efficiency ends up in emission avoidance, and . . . we've touted the improvements in air quality that we've made because we're targeting the emissions, in large respects the increased efficiencies because of the regulations that we have also let us get there."

BEPC's HRSGs are pollution prevention devices, and have been designated as pollution control devices. This fact has been recognized by the Legislature. This fact has been recognized by the Commission, both formally through its Chapter 17 rulemaking, and in its discussion in the December 2012 proceedings before the Commission in this matter. BEPC's HRSGs are used to meet NAAQS and BEPC has met this eligibility requirement for the tax abatement, to the extent it is applicable.

**(4) The Negative Use Determination Must Be Remanded Because the Executive Director Erred in Basing His Negative Use Determination on Failure to Comply with the Asserted "Meet or Exceed" Requirement**

BEPC respectfully requests that the Commission remand this matter, with instructions as set forth above, because the Executive Director erred in basing the negative use determination on a determination that BEPC had not complied with the "meet or exceed" requirement. This conclusion is premised on three factors: (i) Texas Tax Code § 11.31(m) removes the need for an environmental rule to be cited in a HRSG application; (ii) to the extent that such a requirement is applicable, the Executive Director has inconsistently applied the "meet or exceed" requirement in violation of BEPC's equal protection rights under the United States Constitution and the Texas

Constitution; and (iii) to the extent that such a requirement is applicable, BEPC's application cites several rules met or exceeded by its use of the HRSGs.

### C. Calculation of Pollution Control Percentage

Following the Commission's remand of the Executive Director's prior negative use determination related to BEPC's Application No. 16413, the Executive Director mandated the use of particular inputs to the cost analysis procedure ("CAP") formula set forth in 30 Tex. Admin. Code §17.17(c). BEPC objected to these mandated inputs for reasons set forth below, but, without waiving such objections, provided the requested calculation in two responses filed with the Executive Director. In addition, BEPC provided four alternative approaches to calculating the percentage of the equipment's value that is attributable to production and the percentage that is attributable to pollution control.

By statute, TCEQ is charged with adopting rules that "allow for determinations that distinguish the proportion of property that is used to control, monitor, prevent, or reduce pollution from the proportion of property that is used to produce good or services." TEX. TAX CODE §11.31(g)(3). "Proportion" is commonly defined as "a part considered in relation to the whole." AMER. HERITAGE COLLEGE DICT. at 1117 (4th ed., 2004). The Legislature has designated HRSGs as pollution control property. TEX. TAX CODE §11.31(k)(8). BEPC has conceded that HRSGs have both pollution control and production purposes. To effectuate the Legislature's direction as established in Tex. Tax Code §11.31(g)(3), TCEQ is charged with developing a calculation that will determine the proportion of property that is used to control, monitor, prevent, or reduce pollution and the proportion of property that is used to produce good or services. The two portions form the whole, and therefore the two percentages must add up to 100%. Utilizing the Executive Director's mandated inputs, TCEQ's CAP procedure fails this test. Because the CAP procedure formula, as interpreted by the Executive Director, generates a negative number, it is inconsistent with state law, and invalid as a matter of law. Given this outcome, BEPC respectfully requests that the Commission remand this matter to the Executive Director with specific instructions consistent with the Legislature mandate that HRSGs constitute pollution control equipment.

#### (1) The Executive Director's Mandated Inputs are Contrary to Tex. Tax Code § 11.31(b)

In his February 21, 2013 Notice of Technical Deficiency, the Executive Director required that BEPC calculate a partial use determination using specific inputs for the variables set forth in the CAP. BEPC objected and continues to object to the mandated inputs, as this action constitutes improper and illegal rulemaking. Without waiving that objection, BEPC provided the requested calculation, which resulted in a partial use determination of -382.13%. Based on further direction from the Executive Director set forth in his January 24, 2014 Second Notice of

Technical Deficiency, BEPC revised the calculation as directed, which resulted in a partial use determination of -277.50%.[4]

The Executive Director mandated that a boiler is the appropriate comparable equipment for the CCO input in the CAP formula calculation. By doing so, the Executive Director erred in three ways.

First, the HRSG is not solely production equipment. As the Executive Director well knows and as the Legislature has expressly recognized, the HRSG serves two functions: (1) it allows BEPC to reuse heat to generate steam and thereby generate more electricity; and (2) by doing so, it reduces the amount of energy needed to generate the increased amount of electricity and, as a result, prevents pollution that would occur in the absence of the HRSG. The Legislature has recognized that the HRSG is pollution control equipment. The Executive Director and the Commission, through rulemaking, have also recognized this fact.

Second, BEPC has never contended that the HRSG was installed solely for the purpose of preventing pollution. The process in which BEPC and the Executive Director are currently engaged is to determine the allocation of the HRSG's two functions, i.e., what percentage is attributable to production and what percentage is attributable to pollution prevention. A resulting consequence is that the two percentages must add up to 100%. As noted herein, and in BEPC's previous submissions, the Executive Director's use and interpretation of the CAP formula does not meet this test.

Third, by fiat, the Executive Director has determined that a boiler sized to create the same amount of steam as the HRSG is *the*, i.e., the one and only, appropriate comparable equipment that may be used in a CAP calculation for a HRSG. The Executive Director has exceeded his authority by mandating one and only one approach to this variable, and further, in that regard, mandating the consideration of quite possibly the most expensive equipment possible. "Comparable equipment" is not a defined term in 30 Tex. Admin. Code ch. 17. "Comparable" is defined in normal usage as similar, or capable of comparison. Synonyms include "analogous," "corresponding," "matching," and "resembling." BEPC asserts that replacement boilers do not match or resemble a HRSG, and therefore the Executive Director's mandate is improper.

Further, even if replacement boilers were analogous to a HRSG, it cannot be argued that replacement boilers are the only comparable equipment. If a CCO must be used, BEPC asserts that an appropriate comparable equipment is a pipe that would vent heat in the absence of the HRSGs. This approach is discussed in further detail below.

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[4] In the Negative Use Determination for Application No. 16413, the Executive Director inadvertently misstated the result of the calculation as being -83%, which is actually the result of the Executive Director's mandated calculation for BEPC's Application No. 13544. Application No. 13544 is also the subject of a negative use determination and for which BEPC is submitting an appeal to the Commission.

In his January 24, 2014 Second Notice of Technical Deficiency, the Executive Director directed that BEPC remove certain equipment, specifically the CEMS units;[5] feedwater systems; boiler systems; chemical injection; cooling air systems; nitrogen systems; and condensate systems be removed from each of the three CAP-based calculations. In addition, the Executive Director required that BEPC remove from the calculation of Production Costs, in each of the three CAP-based calculations that BEPC had submitted, any costs related to operating the gas turbine, the water systems, or the steam turbine. The Executive Director acknowledged that his initial refusal to include costs related to the operation of the duct burners, including fuel costs, was in error, and he requested that these costs be included in the calculation of Production Costs.

The Executive Director contended that the feedwater systems, boiler systems, chemical injection, cooling air systems, nitrogen systems, and condensate systems are all production equipment for which a positive use determination is not available. However, these systems are essential to the operation of the HRSGs. Without these pieces of equipment, the HRSGs will not function and neither the production nor the pollution prevention benefits will be achieved. The HRSGs must include all ancillary equipment and production costs required for the equipment to operate. The HRSGs do not function without the heat generated from fuel burned by a combustion turbine ("CT"), nor will it function without water to make steam. In order for water to be introduced to the HRSGs, the following equipment must be present: the feed water system, cooling air systems, condensate systems, and chemical injection systems. The production costs essential for HRSGs to operate, and produce the required megawatts ("MW") demanded by the grid, must include CT fuel consumption, duct burner fuel consumption, and Steam Turbine production costs. In order for the HRSGs to produce the MW required to supply the grid with the load required by ERCOT while limiting the total emissions produced, as required by applicable environmental regulations, HRSGs must function as designed. This design includes the feed water system, cooling air systems, condensate systems, and chemical injection systems. The allocation of the production and pollution prevention functions of the equipment serves to appropriately identify the proportion of the equipment costs for which a tax abatement may be obtained.

Without the operation of these units, and their associated expenses (including fuel costs), no electricity would be generated from any steam produced via the HRSGs, and therefore no marketable product would be generated. The Executive Director cannot have it both ways. If electricity is the marketable product, the HRSG Applicants must be allowed to take into account the costs (and the equipment) associated with generating that marketable product as part of its NPVMP calculation. TCEQ's rules mandate it.

The Executive Director, through the processing of this application, also narrowed the scope of the CAP's Production Cost variable by asserting that the cost attributed to the

[5] While BEPC had included the CEMS units in its equipment list for the HRSGs, BEPC had attributed no value to these units because they were already addressed in a prior use determination application; for which it obtained a positive use determination.

production of electricity, which the Executive Director has designated as the marketable product, must exclude costs relating to operating the gas turbine or the steam turbine including fuel costs.

The exclusion of fuel costs from Production Cost is particularly problematic and inappropriate. "Production Cost" expressly includes the cost of "raw materials." *See* 30 TEX. ADMIN. CODE §17.17(c)(2). In this context, fuel is the raw material for the production of the steam and its costs are an element of Production Cost, by definition. Additional costs that are included in Production Cost include storage, transportation, and personnel costs. *See id.* The interpretation of the elements to be included in, and excluded from, the calculation of NPVMP is inaccurate and constitutes improper and illegal rulemaking.

Without waiving its objections to the Executive Director's directives included in the Executive Director's Notices of Technical Deficiency, as set forth above, and in prior proceedings and filings in this matter, BEPC has prepared revised calculations in conformance with these directives. These calculations were prepared for purposes of responding to the Notices of Technical Deficiency lest the Executive Director find that BEPC had failed to submit a complete application and therefore determine that its application is void. BEPC expressly reserved its right to contest the Executive Director's directives, which it does through this appeal. Applying the Executive Director's mandated approach, BEPC arrived at a use determination calculation of -277.50%.

It is BEPC's conclusion that the calculation, using the specific inputs mandated by the Executive Director, will in each and every case result in a negative use determination, based on a CAP calculation that will be significantly negative. Such a result is no more appropriate than a situation in which a calculation consistently results in a use determination of greater than 100%. This result is contrary to the Legislature's enactment of Tex. Tax Code § 11.31(b).

HRSGs have been statutorily designated as pollution control equipment. As such, some portion of the value of that equipment must be attributed to pollution control, and provided a tax exemption. A result of zero, less than zero, or far less than zero is not valid, any more than a result of greater than 100% would be valid. The purpose of the calculation is to determine what percentage of the equipment's value is attributable to production and what percentage is attributable to pollution prevention. The percentages must add up to 100%.

Because the formula, as interpreted by the Executive Director, is capable of generating a negative number, it is inconsistent with state law, and invalid as a matter of law. Given this outcome, BEPC respectfully requests that the Commission remand this matter to the Executive Director with specific instructions consistent with the Legislature mandate that HRSGs constitute pollution control property.

**(2) Alternative Calculations Consistent with the Legislature's Designation of HRSGs as Pollution Control Property**

In an effort to reach a resolution of this matter, and without waiving its rights to pursue a partial use determination of 74.66%, BEPC proposed four other calculations for the Executive Director's consideration. Two involved approaches that did not follow the CAP formula, specifically: (i) The Executive Director's 2008 Adopted Recommendation, which proposed an across-the-board 61% positive use determination for HRSG applicants; and (ii) a five-step Avoided NOx Emissions calculation that would result in a 57.5% positive use determination. The final two calculations utilized the CAP formula with inputs for the variables that were consistent with the CAP formula, but which differed from the inputs mandated by the Executive Director. BEPC asserts that these approaches each constitute a more reasoned calculation of a positive use determination given the flaws identified in the CAP formula, as interpreted by the Executive Director. Each approach is addressed below:

**a) The Executive Director's 2008 Adopted Recommendation**

On December 3, 2008, the Executive Director affirmatively represented to the Commission that, "The Executive Director *intends to apply the adopted recommendation to all subsequently filed similar use determination applications, and to those applications currently pending adjudication.*" Executive Director's December 3, 2008 Response Brief to Rusk County, et al., Appraisal Districts' Appeals of the Executive Director's Use Determinations, § IV, pp. 10-11 (emphasis added). That recommendation was based, among other things, on the Work Group's efforts and reads as follows:

> The thermal efficiency increase or production gain derived from the installation of a HRSG is approximately 39%. Since this percentage represents the additional amount of electrical energy produced for a given heat input, it therefore represents the production value of the equipment. Based on this production value, the pollution control percentage of a HRSG installed at a combined-cycle facility is 61%. *Staff is therefore recommending the positive use determination of 61% for the installation of a HRSG in a combined-cycle facility.*

*Id.* at 11 (emphasis in original).

In his Negative Use Determination, the Executive Director rejected the proposed use of the Executive Director's 2008 Adopted Recommendation because it "did not accurately calculate an appropriate use determination because the less efficient the equipment, the higher the positive use determination it yielded." Negative Use Determination, at 2. Through this analysis, the Executive Director erred in two ways.

First, given that the percentage would be applied across-the-board to all HRSG applicants, the percentage appears to have been intended to represent the average pollution

control proportion attributable to the installation of a HRSG in a combined-cycle facility. Because the percentage would be applied to all HRSG applicants, no advantage would be gained as a result of inefficiency at a particular facility.

Second, the deficiency that the Executive Director's claims to exist in the Executive Director's 2008 Adopted Recommendation is also present in the Executive Director's interpretation of the CAP formula. Specifically, the Executive Director has asserted that electricity is the marketable product for which BEPC must calculate a net present value as part of the CAP formula. The more efficient a facility is, the more electricity it will produce over the life of the facility. The more electricity the facility produces over its life, the greater the net present value of that stream of electricity will be. Because the net present value is a deduction in the numerator of the CAP formula, a more efficient plant will generate a higher net present value, and therefore a lower use determination percentage under the CAP procedure. Using the Executive Director's reasoning, if the Executive Director's 2008 Adopted Recommendation produces an unreasonable result and should not be used as a basis for a final use determination because it rewards inefficiency and punishes efficiency, then neither should the CAP formula, as interpreted by the Executive Director, because it has the same effect.

**b) Avoided Emissions Approach**

The CAP formula focuses on the productivity aspects of a piece of equipment, rather than on the pollution control benefits derived from the use of that equipment. BEPC respectfully suggests that the calculation should be focused on the HRSGs pollution control benefits. One approach to doing so would be to calculate the amount of $NO_x$ emissions that are avoided by the use of the HRSG.

Step 1 of this approach converts the input-based emissions (those calculated based on the input to the process, specifically lb/MMBtu, the format reported to several agencies) to an output-based format (specifically lb/MWh) using BEPC's heat rate (Btu/kW).

Step 2 multiplies this output-based emission rate by BEPC's capacity and annual capacity factor (a measure of actual plant output compared to the maximum) to calculate annual emissions.

Step 3 and 4 mirror Steps 1 and 2 but are performed for a "Baseline" simple cycle plant using BEPC's heat rate for a six-unit simple cycle facility.

Step 4 uses BEPC's capacity and capacity factor to calculate the Baseline facility's emissions on an equal basis to BEPC.

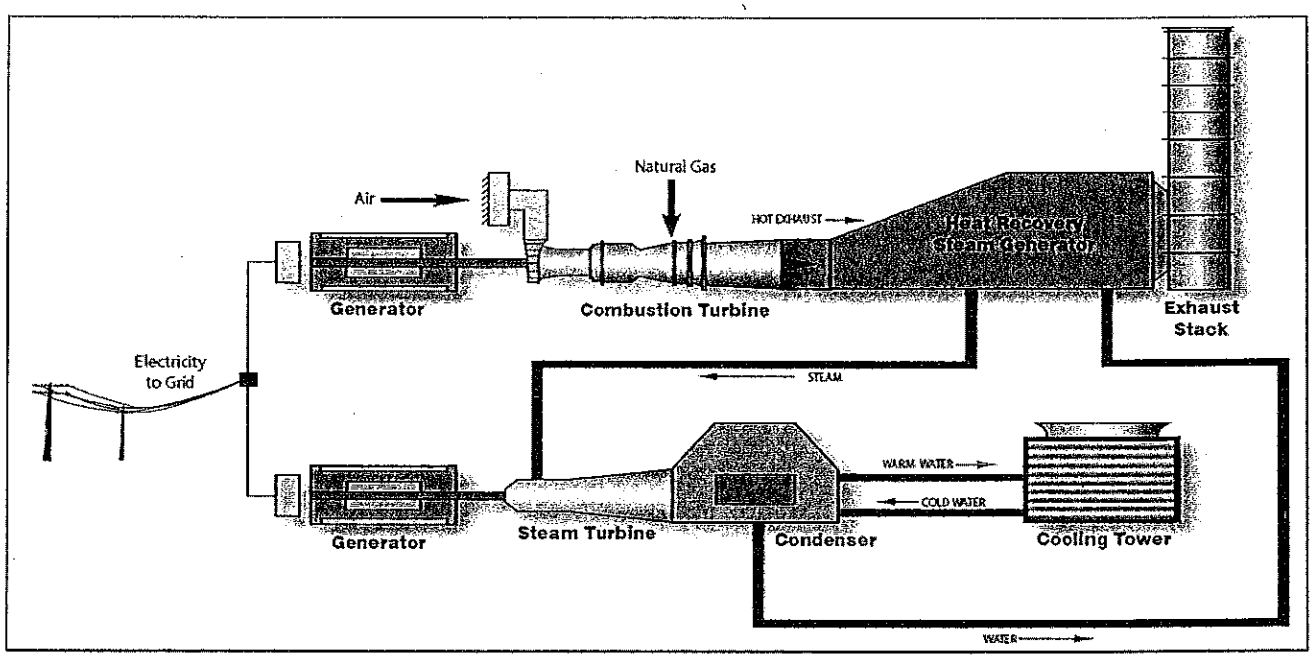
Finally, Step 5 calculates the difference in emissions of BEPC's facility and the Baseline facility and then divides by the lower BEPC emissions to arrive at the avoided emissions calculation. For this application, BEPC's avoided emissions percentage was 58%.

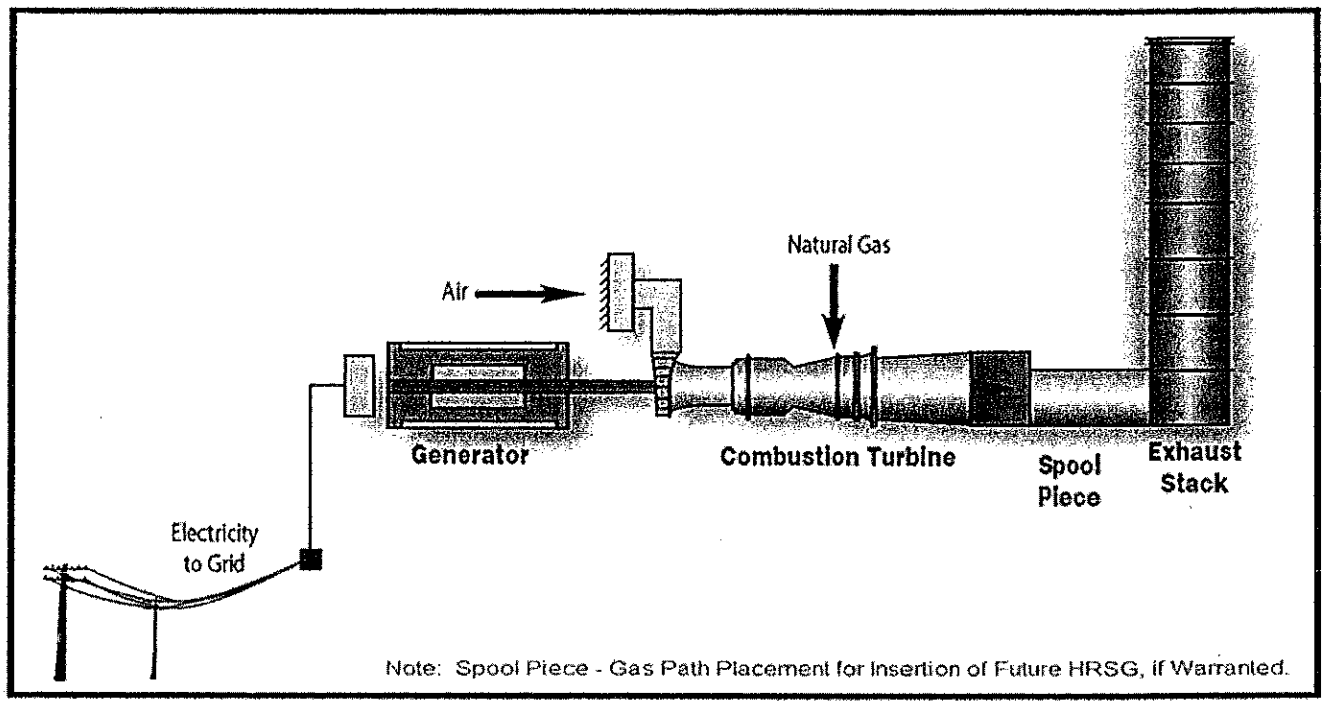
The Executive Director rejected this approach by asserting that it did not distinguish between pollution control and production, and does not attribute any value to production. This is incorrect. The avoided emissions percentage is the pollution control percentage. The production percentage is calculated by subtracting the avoided emissions percentage from 1, resulting in this case in a production percentage of 42%.

The Executive Director further contends that this approach ignores $NO_x$ reductions from other property for which a positive use determination has been issued. Such a hypothetical would only apply to equipment that also had the dual pollution control and production functions present in the HRSG scenario. If such a hypothetical presented itself, the Executive Director may be required to conduct further analysis to ensure that the use determination was properly allocated among the various equipment. This hypothetical complication is, however, not a basis for completely rejecting the suggested approach.

**c) CAP Calculation Using Piping or Spool Piece**

BEPC proposed piping or spool piece as "comparable equipment" that could be used to calculate the Capital Cost Old ("CCO") in the CAP formula. The HRSG and its ancillary equipment hypothetically take the place of the piping or spool piece. The two designs are depicted below:




Using this approach, the application of the CAP formula results in a positive use determination of 74.52%. As stated in BEPC's responses to the Executive Director, without the HRSG, exhaust gases would be conveyed via piping from the combustion chamber to a control device or stack. No additional power would be generated, and no pollution prevention would be achieved. With the use of the HRSG, both objectives are realized.

The Executive Director notes that CCO is the cost of comparable equipment without the pollution control feature. Negative Use Determination, at 2; *see also* 30 TEX. ADMIN. CODE §17.17(c)(1) and its associated Figure. The Executive Director has apparently rejected the piping as the CCO because it produces no steam. Through this analysis, the Executive Director erred in four ways.

First, the rule does not require that the proposed CCO have the same productive capacity as, in this, the HRSG. It simply must be comparable equipment. "Comparable" is not defined in the rules. "Comparable" is defined in normal usage as similar, or capable of comparison. Synonyms include "analogous," "corresponding," "matching," and "resembling." BEPC asserts that replacement boilers do not match or resemble a HRSG, and therefore the Executive Director's mandate is improper.

Second, with respect to the "comparable equipment" variable, the Executive Director has exceeded his authority by mandating one and only one approach to this variable. Further, the Executive Director has mandated the consideration of quite possibly the most expensive equipment possible as CCO. The Executive Director's mandate constitutes improper rulemaking.

Third, the use of the CCO, as interpreted by the Executive Director, simply makes the HRSG twice as expensive - first, the entity must purchase the HRSG, then it must discount the value of the HRSG by the cost of hypothetical equipment designed to mimic the productivity of the HRSG itself. Such an approach negates the purpose of installing the HRSG in the first place, i.e., producing greater quantities of steam while reducing the environmental impact that would occur without the use of this equipment.

Fourth, the mandate of a boiler(s) as CCO results in a consideration of the production benefits of the HRSG twice, once by determining the size and cost of the boiler required to be considered as CCO, and again in the calculation of the net present value of the electricity that the Executive Director has deemed to be the marketable product for the HRSGs. This is, again, improper. NPVMP is designed to capture "the production benefits of property used partially for pollution control and partially for production." *See* 35 Tex. Reg. 10964, 10965 (Dec. 10, 2010). Because the CCO and CCN have been equalized or normalized, the HRSG is no longer producing additional steam beyond that produced by CCO. Therefore, there is no basis for NPVMP under such circumstances.

Under BEPC's approach, the HRSG "replaces" the piping or spool piece that allows the steam generated by the combustion turbine to be directed to an exhaust stack where the steam is emitted. The metal piping is replaced by the metal HRSG which is designed to reutilize the steam and generate additional steam, achieving pollution control and production benefits. The piping is equipment that is comparable to the HRSG in that both are metal pieces of equipment that serve as conduits for steam. The piping does not have the pollution control feature present

with the HRSG, and thus meets the definition of CCO. Granted, the piping does not have productive value, but the definition of CCO does not require it to have productive value. The productive value generated from the use of the HRSG is addressed in the CAP formula through the calculation of the net present value of the additional electricity produced by virtue of the HRSG over its lifetime.

**d) CAP Calculation with CCO as 0**

Finally, in this regard, BEPC proposed using zero as the CCO and NPVMP variables. Using these inputs for the designated variables, BEPC's HRSGs would be entitled to a 100% positive use determination. As set forth above, BEPC asserts that replacement boilers do not match or resemble a HRSG, and therefore the Executive Director's mandate is improper. Indeed, an application of TCEQ's hierarchical definition of "Capital Cost Old," found in 30 Tex. Admin. Code § 17.17(c)(1), note 3, will conclude that no CCO should be used in the CAP calculation for a HRSG.

The Executive Director, in his February 21, 2013 Notice of Deficiency, directed the HRSG Applicants to calculate the Production Capacity Factor ("PCF") "by dividing the capacity of the existing equipment or process by the capacity of the new equipment or process." This calculation accurately reflects the first portion of the TCEQ's rules, found in 30 Tex. Admin. Code §17.17(b). However, the Executive Director failed to acknowledge that, under 30 Tex. Admin. Code §17.17(b), the PCF is to be included in the CAP formula only in limited circumstances. The rule notes, "when there is an increase in production capacity, PCF is used to adjust the capacity of the new equipment or process to the capacity of the existing equipment or process. When there is a decrease in production capacity, PCF is used to adjust the capacity of the existing equipment or process to the production capacity of the new equipment or process. In this case, this calculation is modified so that PCF is applied to Capital Cost Old (CCO) rather than Capital Cost New." *Id.*

First, there is no existing equipment or process. As a result, there is no increase or decrease in capacity. Under such circumstances, the rule recognizes that no calculation of PCF should be made. As a result, that portion of the CAP calculation is to be omitted. Inserting a value in for CCO requires that there be "old equipment." As stated, this is not a replacement of an HRSG. There is no old equipment.

Second, the Executive Director directed BEPC to calculate CCO as the cost of a boiler(s) required to produce the same amount of steam produced by the HRSGs. The Executive Director's interpretation of CCO is contrary to TCEQ's rules, which define "Capital cost old" as "The cost of the equipment that is being or has been replaced by the equipment covered in an application." 30 TEX. ADMIN. CODE §17.2(2). The definition continues by directing that the

calculation of this variable in the CAP procedure is to be performed using one of the four hierarchical methods set forth in 30 Tex. Admin. Code §17.17(b)(1).[6]

The hierarchical methods, with an analysis of their applicability, are as follows:

**Method 3.1**: If comparable equipment without the pollution control feature is on the market in the United States, then an average market price of the most recent generation of technology must be used.

**Analysis**: There is no equipment that serves the function of the HRSG without its pollution control feature. The HRSG is the equipment that is the subject of the use determination application. There is no substitute for this equipment. Method 3.1 is therefore inapplicable.[7]

**Method 3.2**: If the conditions in variable 3.1 do not apply and the company is replacing an existing unit that already has received a positive use determination, the company shall use the CCO from the a location for the previous use determination.

**Analysis**: The company is not replacing an existing unit that already has received a positive use determination. Method 3.2 is therefore inapplicable.

**Method 3.3**: If the conditions in variable 3.1 and 3.2 do not apply and the company is replacing an existing unit, then the company shall convert the original cost of the unit to today's dollars by using a published industry specific standard. If the production capacity of the new equipment or process is lower than the production capacity of the old equipment or process CCO is divided by the PCF to adjust CCO to reflect the same capacity as CCN.

**Analysis**: The company is not replacing an existing unit. Method 3.3 is therefore inapplicable.

**Method 3.4**: If the conditions in variables 3.1, 3.2, and 3.3 do not apply, and the company can obtain an estimate of the cost to manufacture the alternative equipment without the pollution control feature, then an average estimated cost to manufacture the unit must be used. The comparable unit must be the most recent generation of technology. A copy of the estimate must be provided with the worksheet including the specific source of the information.

**Analysis**: With the exception of the piping or spool piece discussed in the approach above, there is no alternative equipment that could be manufactured to serve the function of the HRSG without its pollution control feature. The HRSG is the equipment that is the subject of the

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[6] It appears that this reference should be to 30 Tex. Admin. Code § 17.17(c)(1).

[7] For purposes of facilitating a timely resolution of this matter, and without waiving its rights to pursue a partial use determination of 74.66%, BEPC is submitting alternatives for the Executive Director's consideration. One of these alternatives is the treatment of the HRSG as the "replacement" for piping necessary to fill the gap that would otherwise exist between pieces of equipment if one were to remove the HRSG and its dedicated ancillary equipment.

use determination application. There is no substitute for this equipment. Method 3.4 is therefore inapplicable.

As applied, unless TCEQ relies on the cost of the piping or spool piece, TCEQ's hierarchical methods are not applicable. Therefore, for purposes of this Application and its CAP calculation, CCO is zero. The mandate of "comparable equipment" that is, in fact, not comparable as hypothetical "replaced" equipment is inappropriate and constitutes improper and illegal rulemaking. On the basis of this objection, BEPC respectfully requests that the Executive Director determine that there be no CCO for CAP calculations related to HRSGs or, in the alternative, that the hypothetical "replaced" equipment be considered to be the piping reflected as "Spool Piece" in the diagram set forth above.

**D. Request for Specific Instructions with Remand**

As the Commission knows, the pending HRSG applications for which the Executive Director recently issued negative use determinations were filed years ago. BEPC's Application No. 16413 is of somewhat a more recent vintage, having been filed with the Commission on March 5, 2012. After years of inaction on the HRSG use determination issue, the Executive Director issued his first negative use determination to BEPC in June 2012. After the filing of appeals and associated briefing, the Commission heard argument from the parties in December 2012 and remanded the applications to the Executive Director for further review.

On February 21, 2013, the Executive Director issued his first Notice of Deficiency following the remand. Responses were timely filed on June 24, 2013. On January 24, 2014, the Executive Director issued a Second Notice of Deficiency to BEPC. BEPC timely filed its response on March 21, 2014. The Executive Director issued its second negative use determination with respect to Application No. 16413 on June 5, 2014.

The substance of the Executive Director's objections to BEPC's application are identical to those reflected in the June 2012 negative use determination. Despite hours of work on the part of the Executive Director's staff and the HRSG applicants, and the production of reams of information by the HRSG applicants to the Executive Director for his consideration, we stand in the same place that we were in two years ago. The HRSG applicants and their respective appraisal districts have no certainty with respect to how this matter will be resolved.

It is for this reason that BEPC respectfully requests more than a simple remand of this matter to the Executive Director. BEPC fears that such an action would result solely in more delay and more uncertainty. Instead, BEPC respectfully requests that the Commission remand this matter to the Executive Director with the following instructions:

1. Texas Tax Code § 11.31(m) removes the need for an environmental rule to be cited in a HRSG application for a determination of pollution control use. If the Commission determines that an environmental rule must be cited, BEPC's Application No. 16413 and

its responses to the Executive Director's Notices of Technical Deficiency have cited several rules met or exceeded by its use of the HRSGs at the Jack County facility, and the Executive Director shall find that this requirement has been met;

2. The Executive Director's inputs that were required to be used in TCEQ's CAP formula are contrary to Tex.Tax Code § 11.31(b);

3. HRSGs have been statutorily designated as pollution control equipment. As such, some portion of the value of that equipment must be attributed to pollution control, and provided a tax exemption;

4. The purpose of the calculation is to determine what percentage of the equipment's value is attributable to production and what percentage is attributable to pollution control. The percentages must add up to 100%;

5. Because the CAP formula is capable of generating a negative number, and in the case at hand, a significantly negative number, it is inconsistent with state law, and invalid as a matter of law;

6. The Executive Director is required to initiate rulemaking to revise the calculation utilized to determine the percentage of the equipment's value that is attributable to production and the percentage of the equipment's value is attributable to pollution control. In doing so, the percentages for the two calculations shall add up to 100% and neither calculation shall result in a negative number;

7. With respect to the pending application, the Executive Director shall grant a positive use determination of 74.66% for the equipment claimed in BEPC's Application No. 16413, as originally filed on March 5, 2012, and as reflected in its responses to the Executive Director filed in this matter.

**E. Conclusion**

Based on the foregoing, BEPC respectfully requests that the Commission consider the negative use determination issued by TCEQ Executive Director with respect to BEPC's application and that, following such consideration, the Commission remand the matter to the Executive Director with the instructions set forth above.

In addition, given the short time allowed for providing this response to the negative use determination, BEPC respectfully requests the opportunity to supplement this filing with any additional materials that may be relevant to the Commission's consideration of the appeal. It is BEPC's understanding that it will have an opportunity to reply to any response that may be filed by the Executive Director or the tax appraisal district.

Sincerely,

Paul C. Sarahan

PS/cb
Enclosure

Cc: Mr. Ronald Hatlett, TCEQ, Tax Relief for Pollution Control Property (Receiving 1 of 7 filed copies via the Chief Clerk)
Chief Appraiser, Jack County Appraisal District, P.O. Box 958, Jacksboro, TX 76458-0958

PAY TO THE ORDER OF STATE COMPTROL... TCEQ

16413

# Texas Commission on Environmental Quality

## Use Determination for Pollution Control Property Application

22194 E-7

A person seeking a use determination must complete this application form. For assistance in completing the application form please refer to the *Instructions for Use Determination for Pollution Control Property Application Form TCEQ-00611*, as well as the rules governing the Tax Relief Program in Title 30 Texas Administrative Code Chapter 17 (30 TAC 17). Information relating to completing this application form is also available in the TCEQ regulatory guidance document, *Property-Tax Exemptions for Pollution Control Property, RG-461*. For additional assistance, please call the Tax Relief Program at 512-239-4900.

***You must supply information for each field of this application form unless otherwise noted.***

## Section 1. Eligibility

1. Is the property/equipment subject to any lease or lease-to-own agreement? Yes ☐ No ☒
2. Is the property/equipment used solely to manufacture or produce a product or provide a service that prevents, monitors, controls, or reduces air, water or land pollution?

   Yes ☐ No ☒
3. Was the property/equipment acquired, constructed, installed, or replaced before January 1, 1994? Yes ☐ No ☒

If the answer to any of these questions is **'Yes'**, then the property/equipment is not eligible for a tax exemption under this program.

## Section 2. General Information

1. What is the type of ownership of this facility?

| | | |
|---|---|---|
| Corporation ☒ | Partnership ☐ | Utility ☐ |
| Sole Proprietor ☐ | Limited Partner ☐ | Other: |

2. Size of Company: Number of Employees

| | | |
|---|---|---|
| 1 to 99 ☐ | 500 to 999 ☐ | 2,000 to 4,999 ☐ |
| 100 to 499 ☒ | 1,000 to 1,999 ☐ | 5,000 or more ☐ |

3. Business Description: (Briefly describe the type of business or activity at the facility)

   Electric Power Generation and Transmission Cooperative
4. Provide the North American Industry Classification System (NAICS) six-digit code for this facility. 221112

## Section 3. Type of Application and Fee

1. Select only one:

   Tier I – Fee: $150 ☐ Tier II – Fee: $1,000 ☐ Tier III – Fee: $2,500 ☒

2. Payment Information:

   Check/Money Order/Electronic Payment Receipt Number: xxxxxx
   Payment Type: Check
   Payment Amount: 2500
   Name on payment: TCEQ
   Total Amount: 2500

***NOTE: Enclose a check, money order to the TCEQ, or a copy of the ePay receipt along with the application to cover the required fee.***

## Section 4. Property/Equipment Owner Information

1. Company Name of Owner: Brazos Electric Power Cooperative, Inc.
2. Mailing Address: 2404 LaSalle Ave. ; PO Box 2585
3. City, State, Zip: Waco, Texas, 76702-2585
4. Customer Number (CN): 600128821
5. Regulated Entity Number (RN):100221985
6. Is this property/equipment owned by the CN listed in Question 4? Yes ☒ No ☐

   *If the answer is 'No,' please explain:*
7. Is this property/equipment leased from a third party? Yes ☐ No ☒

   *If the answer is 'Yes,' please explain:*
8. Is this property/equipment operated by the RN listed in Question 5? Yes ☒ No ☐

   *If the answer is 'No,' please explain:*

## Section 5. Name of Property/Equipment Operator (If different from Owner)

1. Company Name:
2. Mailing Address:
3. City, State, Zip:
4. Customer Number (CN):
5. Regulated Entity Number (RN):

## Section 6. Physical Location of Property/Equipment

1. Name of Facility or Unit where the property/equipment is physically located: Jack County Generation Facility
2. Type of Mfg. Process or Service: Electric Power Generation

3. Street Address: 3844 Henderson Ranch Road
4. City, State, Zip: Bridgeport, Texas, 76426

## Section 7. Appraisal District with Taxing Authority

1. Appraisal District: Jack County
2. District Account Number(s):

## Section 8. Contact Name

1. Company Name: H&H Associates
2. First Name of Contact: Jim
3. Last Name of Contact: Harris
4. Salutation: Mr. ☒ Mrs. ☐ Ms. ☐ Dr. ☐ Other:
5. Title: President
6. Mailing Address: 406 FM 3016
7. City, State, Zip: Grapeland, Texas, 75844
8. Phone Number/Fax Number: (936) 687-4230 / (936) 687-9064
9. Email Address: h-h@hughes.net
10. Tracking Number (optional):

## Section 9. Property/Equipment Description, Applicable Rule, and Environmental Benefit

For each piece, or each category, of pollution control property/equipment for which a use determination is being sought, answer the following questions.

*Attach additional response sheets to the application for each piece of integrated pollution control property/equipment if a use determination is being sought for more than one (1) piece.*

## General Information

1. Name the property/equipment: Jack 2 Heat Recovery Steam Generators (HRSG3/HRSG4) and Dedicated Ancillary Systems
2. Is the property/equipment used 100% as pollution control equipment? Yes ☐ No ☒

   *If the answer is 'Yes,' explain how it was determined that the equipment is used 100% for pollution control:*
3. Does the property/equipment generate a Marketable Product? Yes ☒ No ☐

   *If the answer is 'Yes,' describe the marketable product:* Electric Power
4. What is the appropriate Tier I Table or Expedited Review List number? B-8
5. Is the property/equipment integrated pollution control equipment? Yes ☒ No ☐

   *If the answer is 'No,' separate applications must be filed for each piece of property/equipment.*

6. List applicable permit number(s) for the property/equipment: Jack 2 - 83801/PSD-TX-1117 ; Title V O-02169

## Incremental Cost Difference

7. Is the Tier I Table percentage based on the incremental cost difference? Yes ☐ No ☒

*If the answer is 'Yes,' answer the following questions:*

8. What is the cost of the new piece of property/equipment?
9. What is the cost of the comparable property/equipment?
10. How was the value of the comparable property/equipment calculated?

## Property/Equipment Description

11. Describe the property/equipment. (What is it? Where is it? How is it used?) See Attachment 1

## Applicable Rule

12. What adopted environmental rule or regulation is being met by the construction or installation of the property/equipment? The citation must be to the subsection level. See Attachment 1

## Environmental Benefit

13. What is the anticipated environmental benefit related to the construction or installation of the property/equipment? See Attachment 1

# Section 10. Process Flow Diagram (Optional)

Attach documentation to the application showing a Process Flow Diagram for the property/equipment.

# Section 11. Partial-Use Percentage Calculation

This section must be completed for all Tier III applications. Attach documentation to the application showing the calculations used to determine the partial-use percentage for the property/equipment.

# Section 12. Property Categories and Costs

List each piece of property/equipment of integrated pollution control property/equipment for which a use determination is being sought.

| Property/Equipment Name | Tier 1 Table No. or Expedited Review List No. | Use Percent | Estimated Dollar Value |
|---|---|---|---|
| Land: | | | |
| Property: Jack 2 - Heat Recovery Steam Generators and Dedicated Ancillary Sys | B-8 | 74.66 | $105,244,426 |

| | | | |
|---|---|---|---|
| Property: | | | |
| Property: | | | |
| | | Total: | $78,573,042 |

*Attach additional response sheets to the application if more than three (3) pieces.*

***NOTE: Separate applications must be filed for each piece of nonintegrated pollution control property/equipment.***

## Section 13. Certification Signature

***Must be signed by owner or designated representative.***

By signing this application, I certify that I am duly authorized to submit this application form to the TCEQ and that the information supplied here is true and accurate to the best of my knowledge and belief.

Printed Name: Mike Meyers Date:

Signature: Mike Meyers 3/5/2012

Title: Manager, Environmental Services

Company Name: Brazos Electric Power Cooperative, Inc.

Under Texas Penal Code 37.10, if you make a false statement on this application, you could receive a jail term of up to one year and a fine up to $2,000, or a prison term of two to 10 years and a fine of up to $5,000.

## Application Submission

Send the completed application and the appropriate fee, along with a complete copy of the completed application for the appraisal district, to:

*U.S. Mail*

Cashiers Office, MC 214
Tax Relief Program
TCEQ
PO Box 13088
Austin TX 78711-3088

*Physical Address*

Cashier's Office, MC 214
Building A
TCEQ
12100 Park 35 Circle
Austin TX 78753

Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
HRSG – B-8

Pollution Control Property/Equipment Use Determination

# Attachment 1

**9.11. Describe the property. (What is it? Where is it? How is it used?)**
*The pollution control property described in this application is the heat recovery steam generators (HRSGs) and dedicated ancillary systems (PC Property) installations.*

*Jack County - Jack 2 Expansion Project – HSRG3 and HRSG4*

*The Jack 2 expansion project consists of a set of a combined–cycle power plant with (2) gas combustion turbines (CTs) equipped with (2) heat recovery steam generators (HRSG3 and HRSG4) and dedicated ancillary systems necessary to capture heat from the CTs exhaust and convert it into electrical power. The HRSGs are installed at the exit of the CTs to capture and utilize the waste heat of combustion from the CTs exhaust gas and utilizes this waste heat to produce steam, which in turn powers a steam turbine-generator set to produce electrical power at the Facility in addition to the electrical power generated by the CTs alone.*

*The Facility gains both production and pollution control benefits from the subject PC Property. First, the use of this waste heat of combustion by the HRSGs create a thermal efficiency benefit for the Facility. Specifically, the use of waste heat from the CT exhaust gas results in the conversion of some of 50-55% of the chemical energy of the natural gas utilized at the Facility into electricity (HHV basis), a gain over the approximately 36% efficiency of the CTs alone use of the fuel in a simple cycle gas turbine (Brayton Cycle). Secondly, due to this efficiency gain, the Facility is able to generate fewer emissions (particularly NOx emissions) than a traditional power generation facility utilizing a single thermodynamic cycle; and allowing the subject PC Property to appear on the Expedited Review List.*

**9.12. What adopted environmental rule or regulation is being met by the construction or installation of this property?**
*The Pollution Control Property (PC) was installed to meet the requirements of 40 CFR Part 60.44da(a) "Standards for nitrogen oxides (NOX) for Electric Utility Steam Generating Units for new source performance standards (NSPS).*

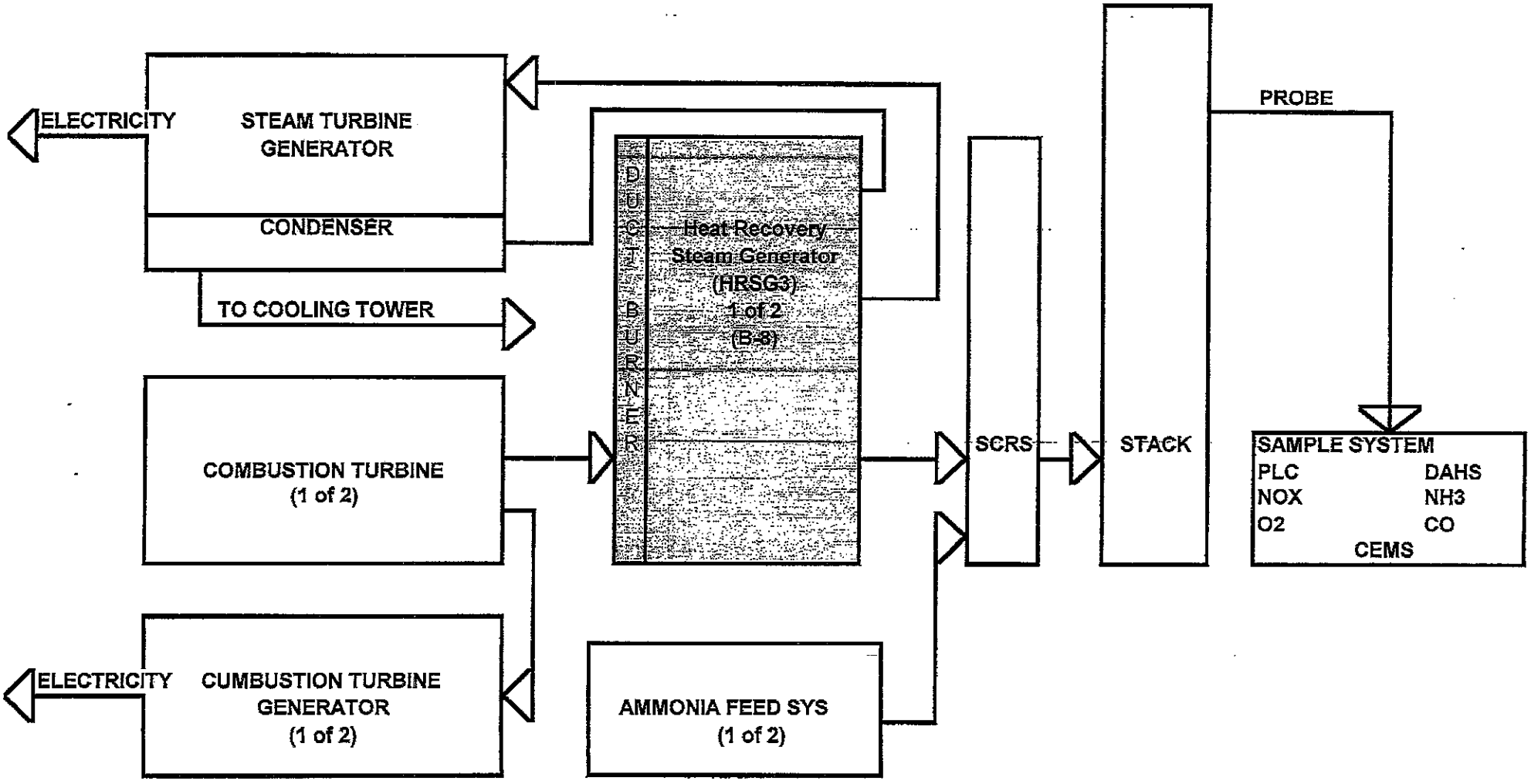
*As well, the PC Property allows emissions to meet or exceed best available control technology (BACT) emission limitations established in federal operating permit # O-2169. Per 30 Texas Administration Code (TAC) §122.143(4), the permit holder must comply with all terms and conditions codified in the permit and any provisional terms and conditions required to be oncluded with the permit.*

**9.13. What is the anticipated environmental benefit related to the construction or installation of the property?**

*The PC Property reduces the formation of and/or controls the emission of NOx and other air emissions associated with the combustion of natural gas used in combined cycle power generation at the Facility. Since less fuel is required per kilowatt of power produced, less exhaust gas emissions (NOx, CO, CO2) are emitted. Therefore, the HRSG's primary purpose of capturing and converting waste heat from the combustion turbine results in meaningful environmental benefits.*

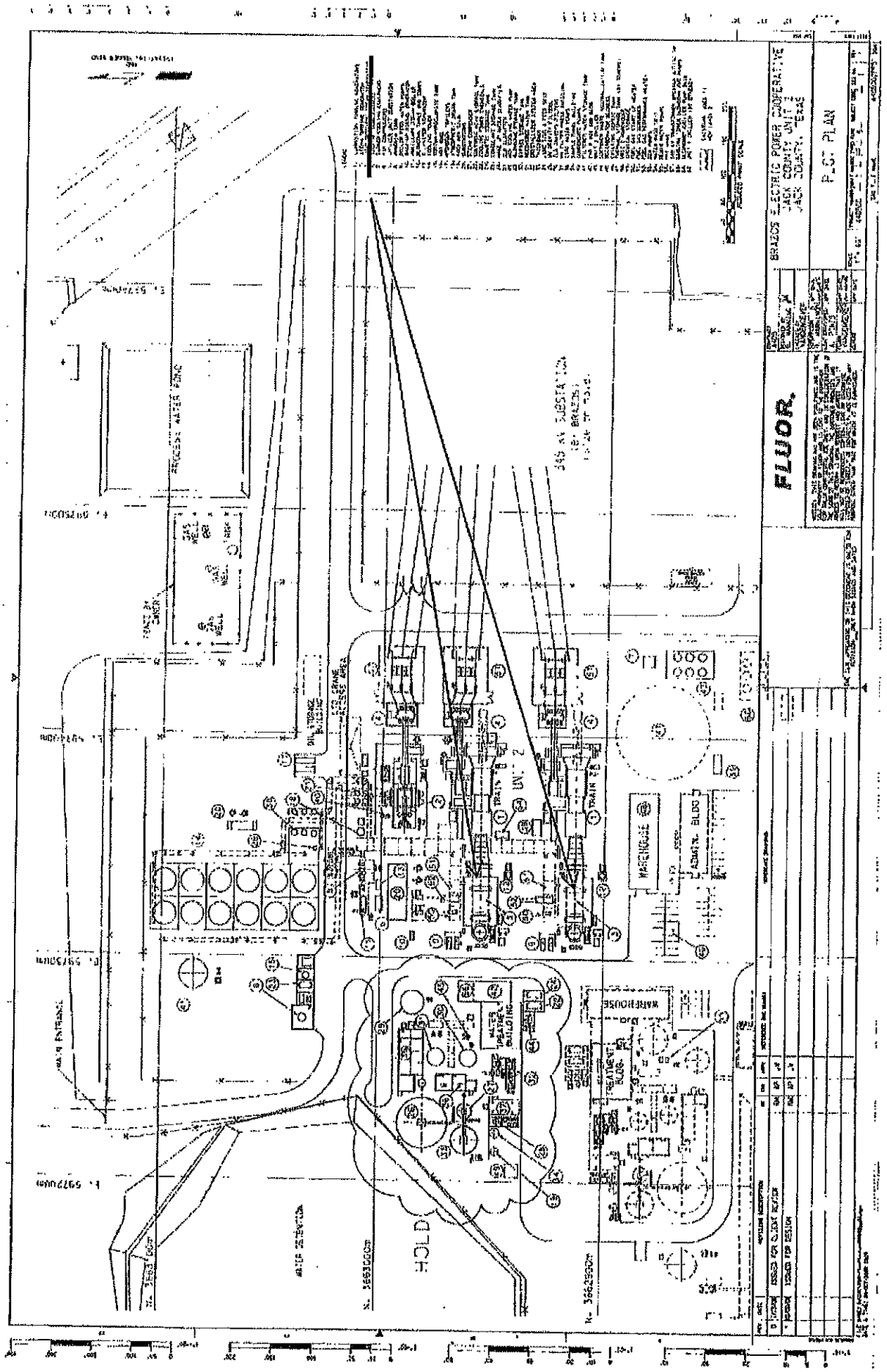
*See Attachment 4 for calculation methodology used to calculate the partial use determination per requirements of TCEQ Pub. No. RG-461.*

**Brazos Electric Power Cooperative, Inc.**
**Jack County Generation Facility**
**Jack 2**
**Pollution Control Equipment Use Determination Document**
**Attachment 2**




Note: Flow Diagram for CT and HRSG is same for CT4/HRSG4 arrangement.

# Attachment 3



Bryan W. Shaw, Ph.D., *Chairman*
Carlos Rubinstein, *Commissioner*
Toby Baker, *Commissioner*
Zak Covar, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

February 21, 2013

Mr. Jim Harris
Agent
H & H Associates
406 FM 3016
Grapeland, Texas 75844

Re: Notice of Technical Deficiency
Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
3844 Henderson Ranch Road
Bridgeport (Jack County)
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Application Number: 16413

Dear Mr. Harris:

This letter responds to Brazos Electric Power Cooperative, Inc.'s Application for Use Determination, received March 7, 2012 pursuant to the Texas Commission on Environmental Quality's (TCEQ) Tax Relief for Pollution Control Property Program for the Jack County Generation Facility.

The TCEQ has conducted further technical review and determined that additional information required by Title 30 Texas Administrative Code (TAC) §17.10 is warranted for application #16413 Please revise your application to include the following.

Issue 1: Please review the enclosed application to ensure that all information is still current.

Issue 2: Specify the subsections of Title 40 Code of Federal Regulations (CFR) §60 Subpart Da being met as a result of the installation and use of the heat recovery steam generators (HRSG) and explain how the HRSG use causes the facility to meet or exceed the rule.

Issue 3: Provide a copy of permit O-02169. Explain where in the permit HRSGs are required Best Available Control Technology.

Issue 4: Provide a list of the equipment included in the description "Dedicated Ancillary Systems." Does this listing include items that appear on either the Tier I Table located in 30 TAC §17.14(a) or the Expedited Review List located in 30 TAC §17.17(b)?

Issue 5: Please resubmit your partial calculation. We agree that the proper method for calculating a partial use determination is the Cost Analysis Procedure located

in 30 TAC §17.17. We do not agree with the method used to calculate the variables in your equation. The variables used in the CAP should be calculated as follows:

$$\frac{(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{NPVMP}}{\text{Capital Cost New}} \times 100$$

- Production Capacity Factor: calculated by dividing the capacity of the existing equipment or process by the capacity of the new equipment or process.
- Capital Cost New: Cost of HRSGs
- Capital Cost Old: Cost of a boiler(s) required to produce the same amount of steam produced by the HRSGs.
- Net Present Value of the Marketable Product: The net present value of the marketable product recovered for the expected lifetime of the property, calculated using the equation in §17.17(c)(2).

$$\text{NPVMP} = \sum_{t=1}^{n} \frac{(\text{Marketable Product Value} - \text{Production Cost})_t}{(1 + \text{Interest Rate})^t}$$

- Marketable Product:
  1. If steam is used to generate electricity that is sold to external parties or used on site, then the value of the marketable product is considered the value of electricity sold or used on site as a result of the steam generated by the HRSG.
  2. If steam is sold to an external party, then the value of the marketable product is considered to be the retail value of the steam sold.
  3. If steam is used on site, then the value of the marketable product is the value assigned to the steam for internal accounting purposes. It is the responsibility of the applicant to show that the internally assigned value is comparable to the value assigned by other similar producers of steam.

For 1 above, the thermal power of steam generated by the facility is converted into electrical power. Using steam tables and basic thermodynamic equations, the thermal power of the steam can be determined.

$W_{thermal} = (h_1 - h_o) \times m$

where $h_o$ is the initial specific enthalpy of the liquid (the HRSG feedwater) and $h_1$ is the final specific enthalpy of the steam at a given temperature and pressure exiting the HRSG. m is the mass flow rate of the steam. Use the steam tables to determine the specific enthalpy of the steam based on the required specifications (temperature and pressure) of the steam produced.

To determine the electrical power represented by $W_{thermal}$, $W_{thermal}$ must be converted to electrical power using the thermal efficiency ($\eta_{thermal}$) of the steam turbine(s). You may either use the rated efficiency of the actual steam turbine at the facility or assume $\eta_{thermal}$ of 36%, which is an average steam turbine thermal efficiency for non-nuclear applications.

$$W_{electrical} = W_{thermal} \times \eta_{thermal}$$

$W_{electrical}$ represents the electrical power generation associated with the HRSG. In order to determine the marketable product value, multiply this value by the number of hours the HRSG operated in each of the last three years while electricity was being generated for sale or use on site. This value should then be multiplied by the average retail rate of electricity sold during each of the last three years in order to determine the marketable product value of the steam used to generate electricity sold to external parties or used on site for the last three years. The marketable product values for the last three years should be added and the sum divided by three to obtain the average marketable product value over the last three years.

- Production Cost: Itemized costs directly attributed to the operation of the HRSG excluding non-cash costs, such as overhead and depreciation and excluding costs related to operating the gas turbine, associated duct burners, or the steam turbine including fuel costs.
- Interest Rate: 10%
- n: estimated useful life in years of the HRSG

The TCEQ appreciates your response in this matter. The revised application must be submitted by March 26, 2013 to the TCEQ Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087. Failure to submit a complete application, including the requested information, may result in your application being voided and the associated application fee being forfeited in accordance with 30 TAC §17.20(b).

If you have questions regarding this letter or need further assistance, please contact Ronald Hatlett of the Tax Relief for Pollution Control Property Program by telephone at (512) 239-6348, by e-mail at ronald.hatlett@tceq.texas.gov, or write to the Texas Commission on Environmental Quality, Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

cgoodin

Chance Goodin, Team Leader
Stationary Source Programs
Air Quality Division

CG/RH

NORTON ROSE FULBRIGHT

June 24, 2013

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United States

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Fax +1 512 536 4598
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VIA EMAIL & U.S. MAIL

Mr. Ronald Hatlett
TCEQ
Tax Relief for Pollution Control Property Program
MC-110
P.O. Box 13087
Austin, Texas 78711-3087

RE: Brazos Electric Power Cooperative Inc; Jack County Generation Facility; Use Determination Application No. 16413; Response to Notice of Technical Deficiency

Dear Mr. Hatlett:

On behalf of Brazos Electric Power Cooperative, Inc. ("BEPC"), I am submitting this response to the Notice of Technical Deficiency ("NOTD") issued by the Executive Director's staff on February 21, 2013. A copy of the NOTD is attached hereto as Attachment A. Through the NOTD, the Executive Director's staff requested additional information related to five issues. In response, BEPC provides the following:

**Issue 1: Please review the enclosed application to ensure that all information is still current.**

**Response**: Following a review of Application No. 16413, BEPC provides the following information, which supplements the information previously provided in Application No. 16413:

**Section 9.12**: BEPC objects to the Executive Director's staff's requirement to identify an environmental regulation that is met or exceeded through the use of a HRSG. The Texas Legislature expressed its intent that HRSGs be treated as pollution control devices when it amended Section 11.31 of the Tax Code in 2007 to include subsection (k). That subsection requires that TCEQ adopt a list of such devices and mandates that HRSGs be included on that list. *See* TEX. TAX CODE § 11.31(k).

Here, the Legislature deliberately and purposefully included HRSGs in its list of items that "must" be treated as "facilities, devices, or methods for the control of air, water, or land pollution ..." TEX. TAX CODE § 11.31(k). The Legislature did so with full knowledge that HRSGs are devices that are necessarily part of the production process and commonly used as power plant components. Accordingly, HRSGs must be treated as pollution control devices and the Executive Director cannot interpret the statute in an alternative manner to avoid this unambiguous legislative mandate.

Section 11.31(m) states:

> (m) Notwithstanding the other provisions of this section, if the ... device is a ... device ... included on the list adopted under Subsection (k), the executive director ... and without regard to whether the information required by Subsection (c)(1) has been submitted ... shall determine that the ... device ... is used wholly

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> or partly as a ... device ... for the control of air, water, or land pollution and shall take the actions that are required by Subsection (d) in the event such a determination is made.

TEX. TAX CODE § 11.31(m). This legislative directive is definitive and unambiguous. The list comprises equipment that the Legislature has conclusively determined meet all criteria to constitute pollution control equipment. The phrase "notwithstanding the other provisions of this section" directly contradicts the Executive Director's staff's position that it must independently evaluate and apply criteria found in other parts of Section 11.31 before a positive use finding may be issued.

Further, the Executive Director is to make his determination without regard to whether the environmental benefit information required by Tex. Tax Code § 11.31(c)(1) has been submitted. The applicants are exempted from submitting information regarding environmental benefit, i.e., the environmental law or rule that is being met or exceeded by the HRSG, because inclusion of equipment on the list represents a legislative determination that environmental benefit exists.

Subject to, and without waiving this objection, the installation of the HRSG and its dedicated ancillary equipment allows BEPC to meet or exceed the following environmental rules or regulations:

(1) 40 C.F.R. Part 60 Subpart Da, and specifically, 40 C.F.R. § 60.44Da (Standard for Nitrogen Oxides);
(2) Clean Air Interstate Rule ("CAIR"); 30 TAC § 101.506;
(3) Greenhouse Gas Regulations;
(4) Best Available Control Technology ("BACT") requirements; 30 TAC §§ 116.10(1), 116.111(a)(2)(C), 116.160(c)(1)(A); 40 C.F.R. § 52.21(b)(12);
(5) 42 U.S.C. § 7401(c);
(6) 40 C.F.R. § 50.11 – establishing National Ambient Air Quality Standards ("NAAQS") for $NO_x$. HRSGs also assist in meeting NAAQS for $SO_2$ (40 C.F.R. § 50.17), $PM_{10}$ (40 C.F.R. § 50.6) and CO (40 C.F.R. § 50.8).

BEPC has provided a more detailed discussion of this issue in Attachment B, the substance of which is incorporated herein for all purposes.

**Issue 2: Specify the subsections of Title 40 Code of Federal Regulations (CFR) §60 Subpart Da being met as a result of the installation and use of the heat recovery steam generators (HRSG) and explain how the HRSG use causes the facility to meet or exceed the rule.**

**Response:** 40 C.F.R. § 60.44Da establishes standards of performance for $NO_x$ emissions for electric utility steam generating units for which construction commenced after September 18, 1978, and BEPC began construction of its electric utility steam generating unit long after that date. As described more particularly in the Application itself, BEPC's HRSG helps and was acquired to help the BEPC facility meet or exceed 40 C.F.R. § 60.44Da's emissions standards primarily by reducing fossil fuel consumption and related $NO_x$ emissions. The use of BEPC's HRSG in the combined cycle configuration described in the Application results in significantly lower $NO_x$ emissions for the same electric power that could be generated by a simple cycle plant without pollution control equipment. HRSGs accomplish this result by capturing/recycling and using heat generated by BEPC's combustion turbines to convert water

into steam to power steam (rather than natural gas) turbines which produce additional power without use of additional fossil fuel or its associated, additional $NO_x$ emissions. Stated conversely, without its HRSGs, BEPC would be unable to produce the same amount of power without producing more $NO_x$ emissions and might well, in that instance, even exceed the environmental standards of 40 C.F.R. § 60.44Da.

The applicability of 40 C.F.R. Part 60, Subpart Da is premised on the definitions of "affected facility" and "electric utility steam generating unit". The "affected facility" to which 40 C.F.R. Part 60, Subpart Da applies is an electric utility combined cycle gas turbine other than an IGCC electric utility steam generating unit, as specified in 40 C.F.R. § 60.40Da(e)(1) through (3). 40 C.F.R. § 60.40Da(e). "Electric utility steam generating unit" is defined as:

... any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW net-electrical output to any utility power distribution system for sale.

40 C.F.R. § 60.41Da. The HRSGs that are the subject of Application No. 16413 are each an "affected facility" under 40 C.F.R. § 60.40Da. BEPC's citation of 40 C.F.R. § 60.44Da(a) complies with any requirement to identify an applicable EPA regulation that is met or exceeded through the use and installation of the HRSG.

Further, in the permit issued by the Executive Director to BEPC, dated September 12, 2011, for the Plant that is the subject of Application No. 16413, the Executive Director asserted that the HRSGs are subject to Subpart Da. *See* Attachment C, Permit No. 52756 and PSDTX1026, Special Condition 1(A). BEPC's federal operating permit, No. O-02169, also recognizes that the HRSGs are subject to Subpart Da. *See* Attachment D, Applicable Requirements Summary. The Executive Director cannot assert that the HRSGs are subject to Subpart Da for purposes of TCEQ's permitting program and then deny that the HRSGs are used to meet Subpart Da for purposes of the Tax Relief for Pollution Control Property Program.[1]

**Issue 3: Provide a copy of permit O-00543. Explain where in the permit HRSGs are required Best Available Control Technology.**

**Response**: Please find a copy of permit O-02169, attached hereto as Attachment D. As the Executive Director's staff is aware, the permit does not identify particular pieces of equipment as "required Best Available Control Technology." Best Available Control Technology or BACT is defined as the reduction in total emissions that can be achieved through the use of either (i) add-on pollution control equipment; or (ii) ***production processes***, systems, methods, or work practices. 30 TAC § 116.10(1) (emphasis added). HRSGs serve as part of the production process and reduce the total $NO_x$ emissions from the facility.

BACT is an issue that is addressed through a permit application (*see, e.g.*, Attachment E) and TCEQ's processing of that permit application (*see, e.g.*, Attachment F). The permit reflects the results of that analysis but does not identify specific equipment as being "required Best Available Control Technology." However, as a permit application's representations are

[1] As Commissioner Rubenstein noted at the Commission's discussion of the pending HRSG applications, "...I don't disagree that there's great production value in having the HRSGs there. None. Nobody disputes that. But, I also don't think it's appropriate to discount the fact that that efficiency ends up in emission avoidance, and . . . we've touted the improvements in air quality that we've made because we're targeting the emissions, in large respects the increased efficiencies because of the regulations that we have also let us get there, and so we can't like it here and not like it over on this end."

considered conditions upon which the permit is issued,[2] and are enforceable as such, BEPC is entitled to rely on these representations for purposes of establishing that the HRSGs constituted BACT for the Plant, so as to establish that the HRSGs meet or exceed the requirements of 30 TAC §§ 116.111(a)(2)(C), 116.160(c)(1)(A); 40 C.F.R. § 52.21(b)(12).

**Issue 4: Provide a list of the equipment included in the description "Dedicated Ancillary Systems." Does this listing include items that appear on either the Tier I Table located in 30 TAC §17.14(a) or the Expedited Review List located in 30 TAC §17.17(b)?**

**Response**: Enclosed please find, in Attachment G to this Response, the list of equipment for which BEPC claims a use determination. This listing does include items that appear on either the Tier I Table located in 30 TAC § 17.14(a) or the Expedited Review List located in 30 TAC § 17.17(b).

**Issue 5: Please resubmit your partial calculation.**

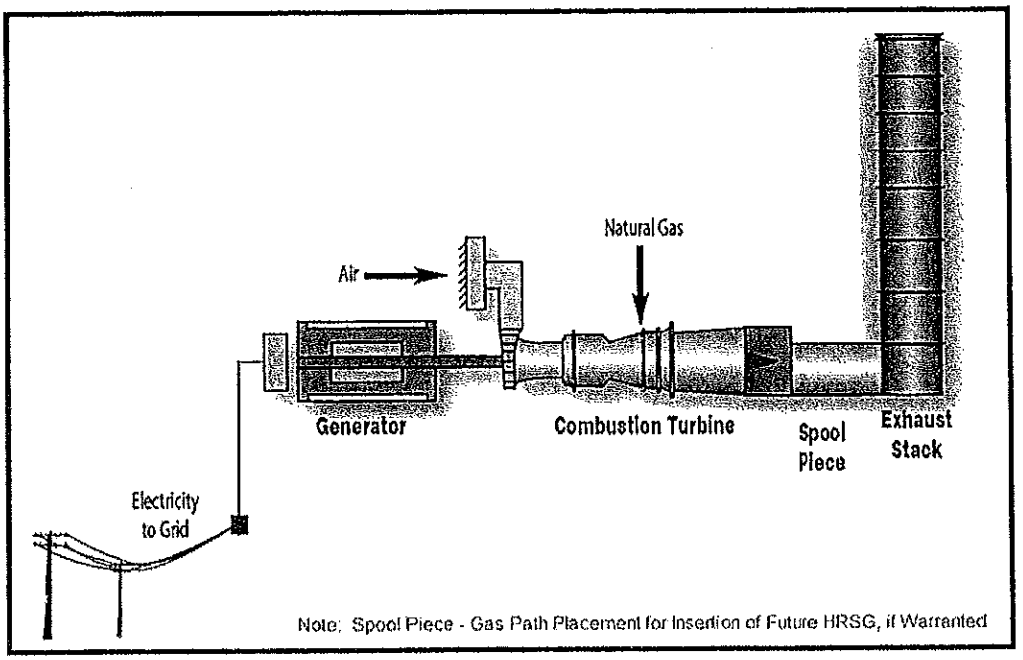
**Response**: BEPC respectfully resubmits the partial use calculation previously included in Application No. 16413, along with supporting documentation, attached hereto and incorporated herein for all purposes as Attachment H. The supporting documentation is also relied on by BEPC for purposes of the additional calculations provided herein in Attachments J-L.

The Executive Director's staff has specifically requested that BEPC calculate a partial use determination using specific inputs for the variables set forth in the Cost Analysis Procedure set forth in 30 TAC § 17.17(b). See Attachment A, pp. 2-3. BEPC objects to the Executive Director's staff's mandate of these specific inputs, as this action, without opportunity for notice and comment, constitutes improper and illegal rulemaking. Specifically, the Executive Director's staff has mandated the use of specific equipment it has defined to be the only "comparable equipment" that may considered in a HRSG application, and the exclusion of fuel costs in the calculation of Production Costs, as a part of the calculation of Net Present Value of the Marketable Product.

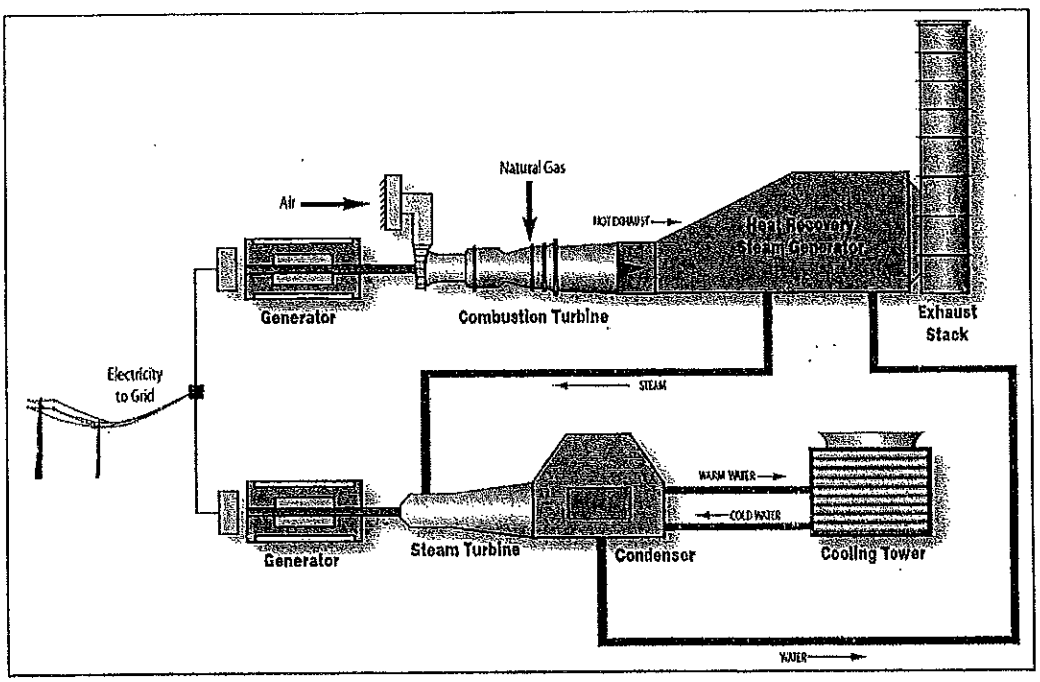
With respect to the "comparable equipment" variable, the Executive Director's staff has exceeded its authority by mandating one and only one approach to this variable, and further, in that regard, mandating the consideration of quite possibly the most expensive equipment possible. "Comparable equipment" is not a defined term in 30 TAC ch. 17. "Comparable" is defined in normal usage as similar, or capable of comparison. Synonyms include "analogous," "corresponding," "matching," and "resembling." BEPC asserts that replacement boilers do not match or resemble a HRSG, and therefore the Executive Director's staff's mandate is improper. Indeed, an application of TCEQ's hierarchical definition of "Capital Cost Old," found in 30 TAC § 17.17(c)(1), note 3, will conclude that no CCO should be used in the CAP calculation for a HRSG.

Further, even if replacement boilers were analogous to a HRSG, it cannot be argued that replacement boilers are the only comparable equipment. BEPC has provided a more detailed discussion of its objection in this regard in Attachment I, the substance of which is incorporated herein for all purposes. As noted therein, if a CCO must be used, BEPC asserts that the appropriate comparable equipment is a pipe that would vent heat in the absence of HRSG. The following depiction reflects the proposed pipe replacement:

[2] *See* 30 TAC § 116.116(a).




Under this approach, the spool piece is the comparable equipment that is hypothetically "replaced" by the HRSG, as depicted below:




The staff's mandate of "comparable equipment" that is, in fact, not comparable as hypothetical "replaced" equipment is inappropriate and constitutes improper and illegal rulemaking. On the basis of this objection, BEPC respectfully requests that the Executive Director determine that there be no CCO for CAP calculations related to HRSGs or, in the alternative, that the hypothetical "replaced" equipment be considered to be the piping reflected as the "spool piece" set forth in the first diagram set forth above.

With respect to the exclusion of fuel costs, TCEQ's rules define "Production Cost" as "The costs directly attributed to the production of the product, including raw materials, storage, transportation, and personnel, but excluding non-cash costs. such as overhead and depreciation." 30 TAC § 17.17(c)(2). Through its NOD, the staff narrows the scope of Production Cost by asserting that the cost attributed to the production of electricity, which the staff has designated as the marketable product, must "exclude costs relating to operating the gas turbine, associated duct burners, or the steam turbine including fuel costs." Attachment A, p. 3. Without the operation of these units, and their associated expenses (including fuel costs), no electricity would be generated from any steam produced via the HRSG, and therefore no marketable product would be generated. The staff cannot have it both ways. If electricity is the marketable product, the HRSG Applicants must be allowed to take into account the costs (and the units) associated with generating that marketable product as part of its NPVMP calculation. TCEQ's rules mandate it.

The exclusion of fuel costs from Production Cost is particularly problematic and inappropriate. "Production Cost" expressly includes the cost of "raw materials." *See* 30 TAC § 17.17(c)(2). In this context, fuel is the raw material for the production of the steam, and its costs are an element of Production Cost, by definition. Additional costs that are included in Production Cost include storage, transportation, and personnel costs. *See id.* The staff's interpretation of the elements to be included in, and excluded from, the calculation of NPVMP is inaccurate and constitutes improper and illegal rulemaking. On the basis of this objection, BEPC respectfully requests that the Executive Director determine that fuel costs are to be included in any calculation of Production Costs in the calculation of NPVMP.

Subject to and without waiving these objections, BEPC is submitting a calculation utilizing the mandated inputs for the variables set forth in the Cost Analysis Procedure set forth in 30 TAC § 17.17(b). The mandated calculation results in a partial use determination of -382.13%. *See* Attachment J. Based on an informal review of similarly-situated parties, it is BEPC's conclusion that the calculation, using the specific inputs mandated by the Executive Director's staff, will in each and every case result in a negative use determination, based on a CAP calculation that will greatly exceed -100%. Such a result is no more appropriate than a situation in which a calculation consistently results in a use determination of greater than 100%. For further discussion, see Attachment I. Given this outcome, the Executive Director must revisit the mandated inputs and develop an approach that is consistent with the Legislature's mandate that HRSGs constitute pollution control equipment.

For purposes of facilitating a timely resolution of this matter, and without waiving its rights to pursue a partial use determination of 74.66%, BEPC is submitting alternatives for the Executive Director's consideration. These alternatives are as follows:

**(1) The Executive Director's 2008 Adopted Recommendation**

On December 3, 2008, the Executive Director affirmatively represented to the Commission that "The Executive Director *intends to apply the adopted recommendation to all subsequently filed similar use determination applications, and to those applications currently pending adjudication.*" Executive Director's December 3, 2008 Response Brief to Rusk County, et al., Appraisal Districts' Appeals of the Executive Director's Use Determinations, § IV, pp. 10-11 (emphasis added). That recommendation was based, among other things, on the Work Group's efforts and read as follows:

> The thermal efficiency increase or production gain derived from the installation of a HRSG is approximately 39%. Since this percentage represents the additional amount of electrical energy produced for a given heat input, it therefore represents the production value of the equipment. Based on this production value, the pollution control percentage of a HRSG installed at a combined-cycle facility is 61%. *Staff is therefore recommending the positive use determination of 61% for the installation of a HRSG in a combined-cycle facility.*

*Id.* at 11 (emphasis in original).

**(2) Avoided $NO_x$ Emissions**

The formula included for the calculations under the CAP focuses on the productivity aspects of a piece of equipment, rather than on the pollution control benefits derived from the use of that equipment. BEPC respectfully suggests that the calculation of the equipment should be focused on its pollution control benefits. One approach to doing so would be to calculate the amount of $NO_x$ emissions that are avoided by the use of the HRSG.

Step 1 of this approach converts the input-based emissions (those calculated based on the input to the process, specifically lb/MMBtu, the format reported to several agencies) to an output-based format (those based on the output of the process, specifically lb/MWh) using BEPC's heat rate (Btu/kW, an industry measure of efficiency comparing fuel consumed to produce a unit of power).

Step 2 multiplies this output-based emission rate by BEPC's capacity and annual capacity factor (a measure of actual plant output compared to the maximum) to calculate annual emissions.

Steps 3 and 4 mirror Steps 1 and 2 but are performed for a "Baseline" simple cycle plant using BEPC's heat rate for a six-unit simple cycle facility.

Step 4 uses BEPC's capacity and capacity factor to calculate the Baseline facility's emissions on an equal basis to BEPC.

Finally, Step 5 calculates the difference in emissions of BEPC and the Baseline facility and then divides by the lower BEPC emissions to arrive at an emissions difference 57.5%.

The inputs to BEPC's calculations under this approach are specified in Attachment K, which is incorporated herein for all purposes. This approach demonstrates that the Baseline facility, which does not utilize a HRSG, has 57.5% higher emissions than BEPC, which does utilize a HRSG and, thus, that the HRSG provides a 57.5% air pollution control benefit.

**(3) HRSG as Replacement for Piping**

TCEO has previously asserted, "When a piece of equipment is not replacing previous equipment, instead of zero, capital cost old is the cost of a comparable piece of equipment without the pollution control feature." 35 Tex. Reg. 10964. 10966 (Dec. 10. 2010). A HRSG is a piece of metal, the configuration of which allows for enhanced efficiency and an associated reduction in emissions that would otherwise be generated. Viewed in this context, the comparable piece of equipment without a pollution control feature is simply the piping necessary

to fill the gap that would otherwise exist between pieces of equipment if one were to remove the HRSG and its dedicated ancillary equipment.

The CAP calculation would then include the following inputs for the applicable variables:

PCF: the capacity of the existing equipment or process divided by the capacity of the new equipment or process

CCN: Cost of the HRSG and its dedicated ancillary equipment

CCO: Cost of the piping necessary to fill the gap created by the absence of the HRSG and its dedicated ancillary equipment

NPVMP: net present value of the marketable product recovered for the expected lifetime of the property.

Using this approach, the application of the CAP formula results in a positive used determination of 74.52%. The calculations for this approach are specified in Attachment L, which is incorporated herein for all purposes.

**(4) CCO and NPVMP as 0**

Application of the CAP formula as presented in TCEQ's Notice of Deficiency requires the applicant to hypothesize a plant configuration far different from reality. HRSGs must either exist and function in a complete, combined cycle design, or the subject plant must function pursuant to a completely different, simple-cycle design, without HRSGs. Application of the Tier III CAP formula as proposed by the Executive Director's staff presumes that HRSGs operate as a stand-alone revenue source and are able to 1) produce steam without a fuel input and 2) convert no-cost steam into electricity without the equipment required to make the conversion.

The CAP is intended to fit for "scrubber-like" equipment that is capable of being added to or removed from existing equipment without requiring any fundamental change in overall plant design or function. Such a scenario is not applicable to the fundamental design changes that HRSGs require when designing a combined cycle, as opposed to a simple-cycle, generating plant, or when converting the latter to the former. Applicants whose pollution control equipment does not fit the logical prerequisites to application of the CAP formula should be allowed the requisite freedom and creativity under the law to develop a calculation of a positive use determination which fits their individual circumstances.

With these caveats in mind, if one were to draw a box around just the HRSG and consider it as a "stand alone" entity and if one were to correct the logical inconsistencies of the CAP formula, the calculation would be as follows:

Production Capacity Factor. TCEQ's Notice of Deficiency directs that the PCF should be calculated "by dividing the capacity of the existing equipment or process by the capacity of the new equipment or process." Because steam turbines and ancillary equipment cannot be considered in any HRSG use determination, the additional electricity generation from that equipment likewise should not be considered when calculating PCF for the HRSG. Consequently, "Old" and "New" production capacity should be the same, making the PCF equal to 1.

Capital Cost New. The cost of the HRSG, and therefore the CCN, is $105,244,426.

Capital Cost Old. TCEQ's Notice of Deficiency directs that the CCO should be equal to the cost of a boiler(s) required to produce the same amount of steam produced by the HRSGs. Relying on TCEQ's traditional definition of CCO, there is not "comparable equipment . . . without the pollution control feature," and adhering to TCEQ's newly-proposed definition would effectively impose a whole plant design change (to simple cycle or boiler). In this case, there is no comparable equipment without the pollution control feature that can be used for CCO purposes and there is no "old" replacement equipment. Therefore, CCO equals $0.

Net Present Value of the Marketable Product and Production Costs. Calculation of NPVMP for the HRSG requires consideration of an energy input cost, i.e. BTUs in the form of heated air, because the HRSG produce steam only with the energy that is directed to it. This energy has value and, in the alternate reality of a stand-alone HRSG, it would require compensation to the provider of the energy. Without the inclusion of fuel, there is no steam, and without steam, there is no electricity. Without the inclusion of the steam turbines, there is no mechanism for the generation of the electricity from the steam. In the case of the Jack County facility, there is no separate market for the steam generated by the HRSG. Under all of these circumstances, the value of any marketable product from the HRSG is $0.

The foregoing inputs reduce the Tier III CAP formula to the following:

((1 x $105,244,426) – 0 – 0) / ($105,244,426)) x 100 =

($105,244,426) / ($105,244,426)) x 100 =

1 x 100 = 100

Given these parameters, BEPC's Jack County HRSGs would be entitled to a 100% Positive Use Determination.

BEPC appreciates the opportunity to provide the enclosed additional information for the Executive Director's consideration. BEPC understands that TCEQ will be receiving information regarding various approaches that might be utilized to resolve the pending HRSG applications. BEPC is willing and available to meet with the Executive Director and his staff to attempt to resolve these pending applications in an equitable manner. Please contact me if you have any questions or require any additional explanation or information in support of BEPC's Application No. 16413.

Sincerely yours,

Paul C. Sarahan

Attachment A

TCEQ's Notice of Technical Deficiency, dated February 21, 2013

Bryan W. Shaw, Ph.D., *Chairman*
Carlos Rubinstein, *Commissioner*
Toby Baker, *Commissioner*
Zak Covar, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

February 21, 2013

Mr. Jim Harris
Agent
H & H Associates
406 FM 3016
Grapeland, Texas 75844

Re: Notice of Technical Deficiency
Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
3844 Henderson Ranch Road
Bridgeport (Jack County)
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Application Number: 16413

Dear Mr. Harris:

This letter responds to Brazos Electric Power Cooperative, Inc.'s Application for Use Determination, received March 7, 2012 pursuant to the Texas Commission on Environmental Quality's (TCEQ) Tax Relief for Pollution Control Property Program for the Jack County Generation Facility.

The TCEQ has conducted further technical review and determined that additional information required by Title 30 Texas Administrative Code (TAC) §17.10 is warranted for application #16413 Please revise your application to include the following.

Issue 1: Please review the enclosed application to ensure that all information is still current.

Issue 2: Specify the subsections of Title 40 Code of Federal Regulations (CFR) §60 Subpart Da being met as a result of the installation and use of the heat recovery steam generators (HRSG) and explain how the HRSG use causes the facility to meet or exceed the rule.

Issue 3: Provide a copy of permit O-02169. Explain where in the permit HRSGs are required Best Available Control Technology.

Issue 4: Provide a list of the equipment included in the description "Dedicated Ancillary Systems." Does this listing include items that appear on either the Tier I Table located in 30 TAC §17.14(a) or the Expedited Review List located in 30 TAC §17.17(b)?

Issue 5: Please resubmit your partial calculation. We agree that the proper method for calculating a partial use determination is the Cost Analysis Procedure located

in 30 TAC §17.17. We do not agree with the method used to calculate the variables in your equation. The variables used in the CAP should be calculated as follows:

$$\frac{(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{NPVMP}}{\text{Capital Cost New}} \times 100$$

- Production Capacity Factor: calculated by dividing the capacity of the existing equipment or process by the capacity of the new equipment or process.
- Capital Cost New: Cost of HRSGs
- Capital Cost Old: Cost of a boiler(s) required to produce the same amount of steam produced by the HRSGs.
- Net Present Value of the Marketable Product: The net present value of the marketable product recovered for the expected lifetime of the property, calculated using the equation in §17.17(c)(2).

$$\text{NPVMP} = \sum_{t=1}^{n} \frac{(\text{Marketable Product Value} - \text{Production Cost})_t}{(1 + \text{Interest Rate})^t}$$

- Marketable Product:

  1. If steam is used to generate electricity that is sold to external parties or used on site, then the value of the marketable product is considered the value of electricity sold or used on site as a result of the steam generated by the HRSG.
  2. If steam is sold to an external party, then the value of the marketable product is considered to be the retail value of the steam sold.
  3. If steam is used on site, then the value of the marketable product is the value assigned to the steam for internal accounting purposes. It is the responsibility of the applicant to show that the internally assigned value is comparable to the value assigned by other similar producers of steam.

For 1 above, the thermal power of steam generated by the facility is converted into electrical power. Using steam tables and basic thermodynamic equations, the thermal power of the steam can be determined.

$W_{thermal} = (h_1 - h_0) \times m$

where $h_0$ is the initial specific enthalpy of the liquid (the HRSG feedwater) and $h_1$ is the final specific enthalpy of the steam at a given temperature and pressure exiting the HRSG. m is the mass flow rate of the steam. Use the steam tables to determine the specific enthalpy of the steam based on the required specifications (temperature and pressure) of the steam produced.

To determine the electrical power represented by $W_{thermal}$, $W_{thermal}$ must be converted to electrical power using the thermal efficiency ($\eta_{thermal}$) of the steam turbine(s). You may either use the rated efficiency of the actual steam turbine at the facility or assume $\eta_{thermal}$ of 36%, which is an average steam turbine thermal efficiency for non-nuclear applications.

$$W_{electrical} = W_{thermal} \times \eta_{thermal}$$

$W_{electrical}$ represents the electrical power generation associated with the HRSG. In order to determine the marketable product value, multiply this value by the number of hours the HRSG operated in each of the last three years while electricity was being generated for sale or use on site. This value should then be multiplied by the average retail rate of electricity sold during each of the last three years in order to determine the marketable product value of the steam used to generate electricity sold to external parties or used on site for the last three years. The marketable product values for the last three years should be added and the sum divided by three to obtain the average marketable product value over the last three years.

- Production Cost: Itemized costs directly attributed to the operation of the HRSG excluding non-cash costs, such as overhead and depreciation and excluding costs related to operating the gas turbine, associated duct burners, or the steam turbine including fuel costs.
- Interest Rate: 10%
- n: estimated useful life in years of the HRSG

The TCEQ appreciates your response in this matter. The revised application must be submitted by March 26, 2013 to the TCEQ Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087. Failure to submit a complete application, including the requested information, may result in your application being voided and the associated application fee being forfeited in accordance with 30 TAC §17.20(b).

If you have questions regarding this letter or need further assistance, please contact Ronald Hatlett of the Tax Relief for Pollution Control Property Program by telephone at (512) 239-6348, by e-mail at ronald.hatlett@tceq.texas.gov, or write to the Texas Commission on Environmental Quality, Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

cgoodin

Chance Goodin, Team Leader
Stationary Source Programs
Air Quality Division

CG/RH

Attachment B

BEPC's Discussion of the Environmental Rules Met or Exceeded by its HRSG and its Dedicated Ancillary Equipment

On May 1, 2008, the Executive Director issued six positive use determinations for HRSGs, each of which was premised on the HRSGs use to meet or exceed the requirements of 40 C.F.R. Part 60, Subpart Da. See Exhibit "1" to this Attachment. In the Technical Review Document that was provided for and in support of each positive use determination, the Executive Director expressly found, among other things, that "the appropriate [supporting] rule is: 40 CFR 60.44Da."

BEPC agrees that one "appropriate [supporting] rule is: 40 CFR 60.44Da" and so reiterates its reliance upon 40 C.F.R. § 60.44Da in support of the Application, as stated therein originally. This portion of 40 C.F.R. Part 60, Subpart Da establishes standards of performance for $NO_x$ emissions for electric utility steam generating units for which construction commenced after September 18, 1978. BEPC began construction of its electric utility steam generating unit long after that date. As described more particularly in the Application itself, BEPC's HRSG help and were acquired to help BEPC to meet or exceed 40 C.F.R. § 60.44Da's emissions standards primarily by reducing fossil fuel consumption and related $NO_x$ emissions. The use of BEPC's HRSG in the combined cycle configuration described in the Application results in significantly lower $NO_x$ emissions for the same electric power that could be generated by a simple cycle plant without pollution control equipment. A HRSG accomplishes this result by capturing/recycling and using heat generated by BEPC's combustion turbines to convert water into steam to power steam (rather than natural gas) turbines which produce additional power without use of additional fossil fuel or its associated, additional $NO_x$ emissions. Stated conversely, without its HRSGs, BEPC would be unable to produce the same amount of power without producing more $NO_x$ emissions and might well, in that instance, even exceed the environmental standards of 40 C.F.R. § 60.44Da.

The applicability of 40 C.F.R. Part 60, Subpart Da is premised on the definitions of "affected facility" and "electric utility steam generating unit". The "affected facility" to which 40 C.F.R. Part 60, Subpart Da applies is an electric utility combined cycle gas turbine other than an IGCC electric utility steam generating unit, as specified in 40 C.F.R. § 60.40Da(e)(1) through (3). 40 C.F.R. § 60.40Da(e). "Electric utility steam generating unit" is defined as:

... any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW net-electrical output to any utility power distribution system for sale.

40 C.F.R. § 60.41Da. The HRSGs that are the subject of Application No. 16413 are each an "affected facility" under 40 C.F.R. § 60.40Da. BEPC's citation of 40 C.F.R. § 60.44Da(a) complies with any requirement to identify an applicable EPA regulation that is met or exceeded through the use and installation of the HRSG.[3]

[3] EPA's recognition of the environmental benefits of combined-cycle units pre-dates its most recent consideration of the technology for purposes of reducing GHGs. In 2004, and again in 2006, EPA developed an economic impact analysis with respect to regulations it was developing under Section 111 of the Clean Air Act for new stationary combustion turbines. The proposed. and ultimately adopted, regulations were designed to reduce emissions of NOx and sulfur dioxide generated by the combustion of fossil fuels in new combustion turbines. *See* 40 C.F.R. Part 60, Subpart KKKK; 71 Fed. Reg. 38482

Further, in the permit issued by the Executive Director to BEPC, dated September 12, 2011, for the Plant that is the subject of Application No. 16413, the Executive Director asserted that the HRSGs are subject to Subpart Da. See Attachment C, Permit No. 52756 and PSDTX1026, Special Condition 1(A). BEPC's federal operating permit, No. O-02169, also recognizes that the HRSGs are subject to Subpart Da. See Attachment D, Applicable Requirements Summary. The Executive Director cannot assert that the HRSGs are subject to Subpart Da for purposes of TCEQ's permitting program and then deny that the HRSGs are used to meet Subpart Da for purposes of the Tax Relief for Pollution Control Property Program.

**Additional Regulatory Bases Supporting the Application**

Although it is sufficient to cite to solely one environmental rule that is met or exceeded with the use of a HRSG, BEPC has cited, in the Response to which this discussion is attached, several other regulations that are met or exceeded through the use of a HRSG. These include:

(1) CAIR; 30 TAC § 101.506;
(2) GHG;
(3) BACT; 30 TAC §§ 116.10(1), 116.111(a)(2)(C), 116.160(c)(1)(A); 40 CFR § 52.21(b)(12);
(4) 42 U.S.C. § 7401(c);
(5) 40 C.F.R. § 50.11 – establishing National Ambient Air Quality Standards ("NAAQS") for NOx. HRSGs also assist in meeting NAAQS for SO2 (40 C.F.R. § 50.17), PM10 (40 C.F.R. § 50.6) and CO (40 C.F.R. § 50.8).

**CAIR**

The facility's HRSGs also meet or exceed the requirements of the CAIR. CAIR was implemented by the EPA to reduce the interstate transport of pollutants, especially $NO_x$ and sulfur dioxide. 70 Fed. Reg. 25162 (May 12, 2005). Section 101.506 of TCEQ's rules implementing CAIR's $NO_x$ reductions in Texas directly relies upon increased fuel efficiency. *See* 30 TAC §101.506. The increased fuel efficiency resulting from the use of a HRSG meets or exceeds Section 101.506's requirement to reduce $NO_x$ emissions. These requirements are included as part of BEPC's federal operating permit, No. O-02169. *See* Attachment D, Special Terms and Conditions No. 15.

**GHG**

An additional set of regulations that makes it clear that HRSGs should qualify as pollution control property is the EPA's and, following the passage of HB 788, the TCEQ's regulation of Greenhouse Gases ("GHG"). Regardless of whether we or the TCEQ might dispute the legality of EPA's actions, EPA has already decided that GHGs must be regulated under the Clean Air Act and has started implementation of that regime through BACT reviews (in SIP-authorized states or via a FIP in Texas) and through the proposal of New Source Performance Standards that, once finalized, will effect an output-based emission limit on GHGs

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(Jul. 6, 2006). In support of its rulemaking, EPA cited the environmental efficiency gains achieved from combined-cycle combustion turbines. According to EPA. the use of such a turbine system "decreases NOx emissions by 14 percent over simple-cycle combustion turbines and 89 percent over existing_ coal electricity generation plants. In addition, CO2 emissions will be 5 percent lower than emissions from SCCTs and 64 percent lower than existing coal plants." EPA, Economic Impact Analysis of the Stationary Combustion Turbines NSPS: Final Report, Feb. 2006, at 2-3, 2-4.

that makes provides yet another regulatory basis for TCEQ's recognition that HRSGs are pollution control equipment.

Based on EPA's GHG BACT reviews to date, efficiency reflected through lower output-based emissions of GHGs is the most important factor in meeting the GHG BACT requirements. In its GHG BACT Guidance Document, the EPA states, "Considering the most energy efficient technologies in the BACT analysis helps reduce the products of combustion, which includes not only GHGs but other regulated NSR pollutants (e.g. $NO_x$, $SO_2$, $PM/PM_{10}/PM_{2.5}$, CO etc.) Thus, it is also important to emphasize that energy efficiency should be considered in BACT determinations for all regulated NSR pollutants (not just GHGs)." EPA, PSD and Title V Permitting Guidance for Greenhouse Gases, at 22 (Nov. 2010). The fact that output-based emission reductions have been expressly identified by the EPA as a preferred method of compliance with BACT for a wide range of pollutants should end any debate about whether a sufficient regulatory basis exists to conclude that HRSGs qualify as pollution control property.

**BACT**

In addition, TCEQ's BACT requirements are met or exceeded by the use of HRSGs. BACT is defined as the reduction in total emissions that can be achieved through the use of either (i) add-on pollution control equipment; or (ii) ***production processes***, systems, methods, or work practices. 30 TAC §116.10(1) (emphasis added). HRSGs serve as part of the production process and reduce the total NOx emissions from the facility.

BACT is an issue that is addressed through a permit application and TCEQ's processing of that permit application. The permit reflects the results of that analysis but does not identify specific equipment as being "required Best Available Control Technology." However, as a permit application's representations are considered conditions upon which the permit is issued, and are enforceable as such, BEPC is entitled to rely on these representations for purposes of establishing that the HRSG constituted BACT for the Plant, so as to establish that the HRSG meets or exceeds the requirements of 30 TAC §§ 116.111(a)(2)(C), 116.160(c)(1)(A); 40 C.F.R. § 52.21(b)(12).

**42 U.S.C. § 7401(c)**

Congress has established that a primary goal of the Federal Clean Air Act is to encourage or otherwise promote reasonable Federal, State and local government actions for pollution prevent, consistent with the provisions of the Federal Clean Air Act. 42 U.S.C. § 7401(c). BEPC's use of the HRSGs helps achieve this goal and, in doing so, meets or exceeds the requirements of the Federal Clean Air Act and the regulations promulgated thereunder.

**NAAQS**

To the extent that any additional regulatory support is needed for the Application, the following environmental rules and regulations also are met or exceeded by the installation of BEPC's HRSG: National Ambient Air Quality Standards ("NAAQS") for $NO_x$ (40 C.F.R. § 50.11), along with 30 TAC §§ 101.20 and 101.21 (incorporating federal standards). Use of HRSGs also assist in meeting NAAQS for $SO_2$ (40 C.F.R. § 50.17), $PM_{10}$ (40 C.F.R. § 50.6) and CO (40 C.F.R. § 50.8).

Attachment B – Exhibit 1

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 1, 2008

STATE OF TEXAS
COUNTY OF
OCT 10 2012

DUFF & PHELPS LLC
GREG MAXIM
919 CONGRESS #1450
AUSTIN, TX 78701

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11969 was completed. This application is for:

BRAZOS VALLEY ENERGY LP
BRAZOS VALLEY ENERGY
3440 LOCKWOOD RD
RICHMOND, TX 77469

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, **07-11969**, filed by:

**BRAZOS VALLEY ENERGY LP**
**BRAZOS VALLEY ENERGY**
**3440 LOCKWOOD RD**
**RICHMOND TX 77469**

The pollution control property/project listed in the Use Determination Application is:

**This facility has two thermally efficient heat recovery steam generators (HRSGs) and one steam turbine. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the two Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.**

Executive Director

May 1 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11969 Review Start Date: 4/8/2008

Company Name: BRAZOS VALLEY ENERGY LP
Facility Name: BRAZOS VALLEY ENERGY
County: FORT BEND Outstanding Fees: N
Batch/Voucher Number:B500156

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has two thermally efficient heat recovery steam generators (HRSGs) and one steam turbine. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

Since the property is listed on Part B of the Equipment & Categories List this property leaves the Decision Flow Chart at Box 6. It passes through Box 1 of the Part B Decision Flow Chart with a yes answer. The use of this property at a combined cycle plant, as opposed to having a simple

cycle plant, provides an environmental benefit of reduced NOx emissions at the site. So there is a Yes answer for Box 2, Since there is a reduction in NOx emissions there is an environmental rule which is being met so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has two thermally efficient heat recovery steam generators (HRSGs) and one steam

turbine. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the two Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** [signature] **Date Signed:** 5/1/08

**Peer Reviewed:** Gary McCrotkins **Date Signed:** 5-1-08

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 1, 2008

STATE OF TEXAS
COUNTY OF TRAVIS
OCT 10 2012

DUFF & PHELPS LLC
GREG MAXIM
919 CONGRESS #1450
AUSTIN, TX 78701

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11966 was completed. This application is for:

FREESTONE POWER GENERATION LP
FREESTONE ENERGY CENTER
13.6 MI N ON FM 488
FAIRFIELD, TX 75840

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11966, filed by:

**FREESTONE POWER GENERATION LP**
**FREESTONE ENERGY CENTER**
**13.6 MI N ON FM 488**
**FAIRFIELD TX 75840**

The pollution control property/project listed in the Use Determination Application is:

**This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the four Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the two steam turbines. The use of the steam turbines does not provide an environmental benefit at the site. The steam turbines are not considered to be pollution control equipment.**

Executive Director

May 1 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11966 Review Start Date: 4/8/2008

Company Name: FREESTONE POWER GENERATION LP
Facility Name: FREESTONE POWER GENERATION LP
County: FREESTONE Outstanding Fees: N
Batch/Voucher Number:B500156

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

Since the property is listed on Part B of the Equipment & Categories List this property leaves the Decision Flow Chart at Box 6. It passes through Box 1 of the Part B Decision Flow Chart with a yes answer. The use of this property at a combined cycle plant, as opposed to having a simple

cycle plant, provides an environmental benefit of reduced NOx emissions at the site. So there is a Yes answer for Box 2. Since there is a reduction in NOx emissions there is an environmental rule which is being met so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam

turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination:**

A positive use determination of 100% for the four Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** [signature] **Date Signed:** 5/1/08

**Peer Reviewed:** [signature] **Date Signed:** 5-1-08

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

STATE OF TEXAS
COUNTY OF TRAVIS
OCT 10 2012

May 1, 2008

DUFF & PHELPS LLC
GREG MAXIM
919 CONGRESS #1450
AUSTIN, TX 78701

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11926 was completed. This application is for:

NAVASOTA WHARTON ENERGY PARTNERS LP
COLORADO BEND
3821 S STATE HWY 60
WHARTON, TX 77488

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11926, filed by:

NAVASOTA WHARTON ENERGY PARTNERS LP
COLORADO BEND
3821 S STATE HWY 60
WHARTON TX 77488

The pollution control property/project listed in the Use Determination Application is:

**This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the four Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the two steam turbines. The use of the steam turbines does not provide an environmental benefit at the site. The steam turbines are not considered to be pollution control equipment.**

Executive Director

May 1 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11926 Review Start Date: 4/8/2008

Company Name: NAVASOTA WHARTON ENERGY PARTNERS LP
Facility Name: COLORADO BEND
County: WHARTON Outstanding Fees: N
Batch/Voucher Number:B500028

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

The Heat Recovery Steam Generators (HRSGs) are listed on Part B of the Equipment & Categories List as item B-8. As Part B equipment the HRSGs leave the Decision Flow Chart at Box 6 and pass through Box 1 of the Part B Decision Flow Chart with a yes answer. Since the use

of HRSGs provide an environmental benefit of reduced NOx emissions at the site there is a yes answer for Box 2. Since there is a reduction in NOx emissions there is an environmental rule which is being met, so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam

turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the four Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** Ronald Hall **Date Signed:** 5/1/08

**Peer Reviewed:** Gary McAuliffe **Date Signed:** 5-1-08

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

STATE OF TEXAS
COUNTY OF TRAVIS
OCT 10 2012

May 1, 2008

TENASKA INC
DAVID D JOHNSON
1044 N 115 ST #400
OMAHA, NE 68154 4446

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11914 was completed. This application is for:

TENASKA GATEWAY PARTNERS LTD
TENASKA GATEWAY GENERATION STATION
SH 315, PO BOX 697
MOUNT ENTERPRISE, TX 75681 0697

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11914, filed by:

TENSKA GATEWAY PARTNERS LTD
TENASKA GATEWAY GENERATION STATION
SH 315, PO BOX 697
MOUNT ENTERPRISE TX 75681

The pollution control property/project listed in the Use Determination Application is:

**This facility has three combustion turbine generators coupled with three thermally efficient heat recovery steam generators (HRSGs) and one enhanced steam turbine. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the three Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.**

Executive Director

May. 1. 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11914 Review Start Date: 4/8/2008

Company Name: TENSKA GATEWAY PARTNERS LTD
Facility Name: TENASKA GATEWAY GENERATION STATION
County: RUSK Outstanding Fees: N
Batch/Voucher Number:B99788

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
The rule listed in the application is: 40 CFR 60.44Da
The appropriate rule is: 40 CFR 60.44Da

Explain why this is the appropriate rule?

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
The property is described as:

This facility has three combustion turbine generators coupled with three thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the three HRSGs and the enhanced steam turbines. To generate the equivalent amount of power using combustion turbine they would have needed to install a Selective Catalytic Reduction System.The application requests a partial determination.

Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)
PART B DECISION FLOWCHART (17.15(b))
Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y

Describe how the property flowed through the Decision Flowchart:

The Heat Recovery Steam Generators (HRSGs) are listed on Part B of the Equipment &

Categories List as item B-8. As Part B equipment the HRSGs leave the Decision Flow Chart at Box 6 and pass through Box 1 of the Part B Decision Flow Chart with a yes answer. Since the use of HRSGs provide an environmental benefit of reduced NOx emissions at the site there is a yes answer for Box 2. Since there is a reduction in NOx emissions there is an environmental rule which is being met, so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has three combustion turbine generators coupled with three thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the three HRSGs and the enhanced steam turbines. To generate the equivalent amount of power using combustion turbine they would have needed to install a Selective Catalytic Reduction System.The application requests a partial determination.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the three Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** Ronald Hatcliffe **Date Signed:** 5/1/2008

**Peer Reviewed:** Gary McArthur **Date Signed:** 5/1/2008

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 1, 2008

STATE OF TEXAS
COUNTY OF
OCT 10 2012

DUFF & PHELPS LLC
DENNIS DEEGEAR
919 CONGRESS #1450
AUSTIN, TX 78701

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11971 was completed. This application is for:

BORGER ENERGY ASSOCIATES LP
BORGER ENERGY BLACKHAWK STATION
119 N. SPUR CO-GEN PLACE
BORGER, TX 79008

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11971, filed by:

BORGER ENERGY ASSOCIATES LP
BORGER ENERGY BLACKHAWK STATION
119 N. SPUR CO-GEN PLACE
BORGER TX 79008

The pollution control property/project listed in the Use Determination Application is:

**This facility has two thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the two HRSGs.**

The outcome of the review is:

**A 100% positive use determination for the two Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

Executive Director

May 1, 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11971 Review Start Date: 4/8/2008

Company Name: BORGER ENERGY ASSOCIATES LP
Facility Name: BORGER ENERGY BLACKHAWK STATION
County: HUTCHINSON Outstanding Fees: N
Batch/Voucher Number:B500156

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators, is item B8 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has two thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the two HRSGs.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

Since the property is listed on Part B of the Equipment & Categories List this property leaves the Decision Flow Chart at Box 6. It passes through Box 1 of the Part B Decision Flow Chart with a yes answer. The use of this property at a combined cycle plant, as opposed to having a simple cycle plant, provides an environmental benefit of reduced NOx emissions at the site. So there is a

Yes answer for Box 2, Since there is a reduction in NOx emissions there is an environmental rule which is being met so there is a yes answer to Box 3.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has two thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the two HRSGs.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director.

**Provide the language for the final determination.**

A positive use determination of 100% for the two Heat Recovery Steam Generators.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** Randall Hatch **Date Signed:** 5/1/08

**Peer Reviewed:** Gary McArthur **Date Signed:** 5-1-08

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

STATE OF TEXAS
OCT 10 2012

May 1, 2008

CALPINE/DOW
JUSTIN HYLAND/LEO SCHERRER
717 TEXAS AVE
HOUSTON, TX 77002

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11994 was completed. This application is for:

FREEPORT ENERGY CENTER LP
FREEPORT ENERGY CENTER LP
2301 N BRAZOSPORT BLVD
FREEPORT, TX 77451

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11994, filed by:

FREEPORT ENERGY CENTER LP
FREEPORT ENERGY CENTER LP
2301 N BRAZOSPORT BLVD
FREEPORT TX 77451

The pollution control property/project listed in the Use Determination Application is:

**This facility has thermally efficient heat recovery steam generators (HRSGs) and steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the steam turbines. The use of the steam turbines does not provide an environmental benefit at the site. The steam turbines are not considered to be pollution control equipment.**

Executive Director

May 1 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11994 Review Start Date: 4/8/2008

Company Name: FREEPORT ENERGY CENTER LP
Facility Name: FREEPORT ENERGY CENTER LP
County: BRAZORIA Outstanding Fees: N
Batch/Voucher Number:B500289

ADMINISTRATIVE REVIEW

**Administrative Complete Date:4/8/2008**

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has thermally efficient heat recovery steam generators (HRSGs) and steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

Since the property is listed on Part B of the Equipment & Categories List this property leaves the Decision Flow Chart at Box 6. It passes through Box 1 of the Part B Decision Flow Chart with a yes answer. The use of this property at a combined cycle plant, as opposed to having a simple

cycle plant, provides an environmental benefit of reduced NOx emissions at the site. So there is a Yes answer for Box 2, Since there is a reduction in NOx emissions there is an environmental rule which is being met so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has thermally efficient heat recovery steam generators (HRSGs) and steam turbines.

This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** [signature] **Date Signed:** 5/1/8

**Peer Reviewed:** [signature] **Date Signed:** 5-1-08

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Attachment C

Permit No. 52756 and PSDTX1026, Special Condition 1(A),
Issued September 12, 2011

# Section 1 - Document

September 12, 2011

MR MARK PAVELKA

MANAGER OF ENGINEERING SERVICES

BRAZOS ELECTRIC POWER COOPERATIVE INC

2404 LA SALLE AVE

WACO TX 76706-3928

Re: Permit Amendment Application

Permit Number: 52756/PSDTX1026

Jack County Generation Facility

Bridgeport, Jack County

Regulated Entity Number: RN100221985

Customer Reference Number: CN600128821

Account Number: JA-0068-E

Dear Mr. Pavelka:

This is in response to your letter received January 3, 2011 and your Form PI-1 (General Application for Air Preconstruction Permits and Amendments) concerning the proposed amendment to Permit Number 52756. We understand that you propose to amend your air quality permit to authorize planned maintenance, startup and shutdown activities at the Jack County Generation Facility.

As indicated in Title 30 Texas Administrative Code § 116.116(b) and § 116.160 [30 TAC § 116.116(b) and § 116.160], and based on our review, Permit Number 52756 is hereby amended. This information will be incorporated into the existing permit file. Enclosed are revised special conditions pages and a maximum allowable emission rates (MAERT) table to replace those currently attached to your permit. We appreciate your careful review of the special conditions of the permit and assuring that all requirements are consistently met.

Planned maintenance, startup, and shutdown for the sources identified on the MAERT have been reviewed

and included in the MAERT and specific maintenance activities are identified in the permit special conditions. Any other maintenance activities are not authorized by this permit and will need to obtain separate authorization.

As of July 1, 2008, all analytical data generated by a mobile or stationary laboratory in support of compliance with air permits must be obtained from a NELAC (National Environmental Laboratory Accreditation Conference) accredited laboratory under the Texas Laboratory Accreditation Program or meet one of several exemptions. Specific information concerning which laboratories must be accredited and which are exempt may be found in 30 TAC § 25.4 and § 25.6.

For additional information regarding the laboratory accreditation program and a list of accredited laboratories and their fields of accreditation, please see the following Web site:

www.tceq.texas.gov/compliance/compliance_support/qa/env_lab_accreditation.html

For questions regarding the accreditation program, you may contact the Texas Laboratory Accreditation Program at (512) 239-3754 or by e-mail at labprgms@tceq.texas.gov.

You may file a **motion to overturn** with the Chief Clerk. A motion to overturn is a request for the commission to review the executive director's decision. Any motion must explain why the commission should review the executive director's decision. According to 30 TAC § 50.139, an action by the executive director is not affected by a motion to overturn filed under this section unless expressly ordered by the commission.

A motion to overturn must be received by the Chief Clerk within 23 days after the date of this letter. An original and 11 copies of a motion must be filed with the Chief Clerk in person, or by mail to the Chief Clerk's address on the attached mailing list. On the same day the motion is transmitted to the Chief Clerk, please provide copies to the applicant, the executive director's attorney, and the Public Interest Counsel at the addresses listed on the attached mailing list. If a motion to overturn is not acted on by the commission within 45 days after the date of this letter, then the motion shall be deemed overruled.

You may also request **judicial review** of the executive director's approval. According to Texas Health and Safety Code § 382.032, a person affected by the executive director's approval must file a petition appealing the executive director's approval in Travis County district court within 30 days after the effective date of the approval. Even if you request judicial review, you still must exhaust your administrative remedies, which includes filing a motion to overturn in accordance with the previous paragraphs.

Your cooperation in this matter is appreciated. If you need further information or have any questions, please contact Mr. Marc Sturdivant at (512) 239-1313 or write to the Texas Commission on Environmental Quality, Office of Air, MC-163, P.O. Box 13087, Austin, Texas 78711-3087.

This action is taken under authority delegated by the Executive Director of the TCEQ.

Sincerely,

Mike Wilson, P.E., Director

Air Permits Division

Office of Air

Texas Commission on Environmental Quality

MW/MS/

Enclosures

cc: Air Section Manager, Region 3 - Abilene

Project Number: 162449

## Headers

Page

Re: Permit Number

Bryan W. Shaw, Ph.D., *Chairman*

Buddy Garcia, *Commissioner*

Carlos Rubinstein, *Commissioner*

Mark R. Vickery, P.G., *Executive Director*

# Texas Commission on Environmental Quality

*Protecting Texas by Reducing and Preventing Pollution*

Mr. Mark Pavelka

Page

September 12, 2011

Re: Permit Number: 52756/PSDTX1026

# Footers

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# Section 1 - Document

**TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

**AIR QUALITY PERMIT**

*A Permit Is Hereby Issued To*

**Brazos Electric Power Cooperative, Inc.**

*Authorizing the Continued Operation of*

**Electric Generating Plant**

*Located at* **Bridgeport, Jack County, Texas**

Latitude 33° 06′ 18″ Longitude 097° 57′ 34″

| | |
|---|---|
| Permits: 52756 and PSDTX1026 | |
| Issuance Date : January 28, 2013 | |
| Renewal Date: January 28, 2023 | —<br>For the Commission |

1. **Facilities** covered by this permit shall be constructed and operated as specified in the application for the permit. All representations regarding construction plans and operation procedures contained in the permit application shall be conditions upon which the permit is issued. Variations from these representations shall be unlawful unless the permit holder first makes application to the Texas Commission on Environmental Quality (commission) Executive Director to amend this permit in that regard and such amendment is approved. [Title 30 Texas Administrative Code 116.116 (30 TAC 116.116)]
2. **Voiding of Permit.** A permit or permit amendment is automatically void if the holder fails to begin construction within 18 months of the date of issuance, discontinues construction for more than 18 months prior to completion, or fails to complete construction within a reasonable time. Upon request, the executive director may grant an 18-month extension. Before the extension is granted the permit may be subject to revision based on best available control technology, lowest achievable emission rate, and netting or offsets as applicable. One additional extension of up to 18 months may be granted if the permit holder demonstrates that emissions from the facility will comply with all rules and regulations of the commission, the intent of the Texas Clean Air Act (TCAA), including protection of the public's health and physical property; and (b)(1)the permit holder is a party to litigation not of the permit holder's initiation regarding the issuance of the permit; or (b)

(2) the permit holder has spent, or committed to spend, at least 10 percent of the estimated total cost of the project up to a maximum of $5 million. A permit holder granted an extension under subsection (b)(1) of this section may receive one subsequent extension if the permit holder meets the conditions of subsection (b)(2) of this section. [30 TAC 116.120(a), (b) and (c)]

3. **Construction Progress.** Start of construction, construction interruptions exceeding 45 days, and completion of construction shall be reported to the appropriate regional office of the commission not later than 15 working days after occurrence of the event. [30 TAC 116.115(b)(2)(A)]
4. **Start-up Notification.** The appropriate air program regional office shall be notified prior to the commencement of operations of the facilities authorized by the permit in such a manner that a representative of the commission may be present. The permit holder shall provide a separate notification for the commencement of operations for each unit of phased construction, which may involve a series of units commencing operations at different times. Prior to operation of the facilities authorized by the permit, the permit holder shall identify the source or sources of allowances to be utilized for compliance with Chapter 101, Subchapter H, Division 3 of this title (relating to Mass Emissions Cap and Trade Program). [30 TAC 116.115(b)(2)(B)(iii)]
5. **Sampling Requirements.** If sampling is required, the permit holder shall contact the commission's Office of Compliance and Enforcement prior to sampling to obtain the proper data forms and procedures. All sampling and testing procedures must be approved by the executive director and coordinated with the regional representatives of the commission. The permit holder is also responsible for providing sampling facilities and conducting the sampling operations or contracting with an independent sampling consultant. [30 TAC 116.115(b)(2)(C)]
6. **Equivalency of Methods.** The permit holder must demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the conditions of the permit. Alternative methods shall be applied for in writing and must be reviewed and approved by the executive director prior to their use in fulfilling any requirements of the permit. [30 TAC 116.115(b)(2)(D)]
7. **Recordkeeping.** The permit holder shall maintain a copy of the permit along with records containing the information and data sufficient to demonstrate compliance with the permit, including production records and operating hours; keep all required records in a file at the plant site. If, however, the facility normally operates unattended, records shall be maintained at the nearest staffed location within Texas specified in the application; make the records available at the request of personnel from the commission or any air pollution control program having jurisdiction; comply with any additional recordkeeping requirements specified in special conditions attached to the permit; and retain information in the file for at least two years following the date that the information or data is obtained. [30 TAC 116.115(b)(2)(E)]
8. **Maximum Allowable Emission Rates.** The total emissions of air contaminants from any of the sources of emissions must not exceed the values stated on the table attached to the permit entitled "Emission Sources--Maximum Allowable Emission Rates." [30 TAC 116.115(b)(2)(F)]
9. **Maintenance of Emission Control.** The permitted facilities shall not be operated unless all air pollution emission capture and abatement equipment is maintained in good working order and operating properly during normal facility operations. The permit holder shall

provide notification for upsets and maintenance in accordance with 30 TAC 101.201, 101.211, and 101.221 of this title (relating to Emissions Event Reporting and Recordkeeping Requirements; Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping Requirements; and Operational Requirements). [30 TAC 116.115(b)(2)(G)]

10. **Compliance with Rules.** Acceptance of a permit by an applicant constitutes an acknowledgment and agreement that the permit holder will comply with all rules, regulations, and orders of the commission issued in conformity with the TCAA and the conditions precedent to the granting of the permit. If more than one state or federal rule or regulation or permit condition is applicable, the most stringent limit or condition shall govern and be the standard by which compliance shall be demonstrated. Acceptance includes consent to the entrance of commission employees and agents into the permitted premises at reasonable times to investigate conditions relating to the emission or concentration of air contaminants, including compliance with the permit. [30 TAC 116.115 (b)(2)(H)]
11. **This** permit may not be transferred, assigned, or conveyed by the holder except as provided by rule. [30 TAC 116.110(e)]
12. **There** may be additional special conditions attached to a permit upon issuance or modification of the permit. Such conditions in a permit may be more restrictive than the requirements of Title 30 of the Texas Administrative Code. [30 TAC 116.115(c)]
13. **Emissions** from this facility must not cause or contribute to a condition of "air pollution" as defined in Texas Health and Safety Code (THSC) 382.003(3) or violate THSC 382.085. If the executive director determines that such a condition or violation occurs, the holder shall implement additional abatement measures as necessary to control or prevent the condition or violation.
14. **The** permit holder shall comply with all the requirements of this permit. Emissions that exceed the limits of this permit are not authorized and are violations of this permit.

## Footers

Revised (10/12) 1

Revised (10/12) 2

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# Section 1 - Document

SPECIAL CONDITIONS

Permit Numbers 52756 and PSDTX1026

Federal Applicability

1. These facilities shall comply with applicable requirements of the U.S. Environmental Protection Agency (EPA) regulations on Standards of Performance for New Stationary Sources, Title 40 Code of Federal Regulations Part 60 (40 CFR Part 60), Subpart A, General Provisions and the following:

   A. Subpart Da, Electric Utility Steam Generating Units;

   B. Subpart Dc, Small Industrial-Commercial-Institutional Steam Generating Units; and

   C. Subpart GG, Stationary Gas Turbines.

   If any condition of this permit is more stringent than the regulations so incorporated, then for the purposes of complying with this permit, the permit shall govern and be the standard by which compliance shall be demonstrated.

Emission Standards and Operating Specifications

2. The two General Electric Model 7FA or equivalent combustion turbine generator (CTG) units shall normally operate between 85 and 170 megawatts (without duct burner firing). Reduced load operation is authorized to accommodate periods of reduced power demands provided the maximum pounds per hour (lbs/hr) emission rates specified in the attached table entitled AEmission Sources - Maximum Allowable Emissions Rates@ (MAERT) for Emission Point Nos. (EPNs) HRSG-1 or HRSG-2 are not exceeded.

3. The two heat recovery steam generating (HRSG) unit duct burners are each limited to a maximum heat input of 600 MMBtu/hr based on the higher heating value of the fuel.

4. Fuel-fired in the CTGs, duct burners, and auxiliary boiler is limited to pipeline quality natural gas containing no more than 2.0 grains total sulfur per 100 dscf.

5. Upon request by the Executive Director of the Texas Commission on Environmental Quality (TCEQ) or any local air pollution control program having jurisdiction, the holder of this permit shall provide a sample and/or an analysis of the fuel-fired in the CTGs and duct burners, or shall allow air pollution control agency representatives to obtain a sample for analysis. A custom fuel monitoring plan as required under 40 CFR Part 60 Subpart GG, and approved by the TCEQ Executive Director, shall be employed to monitor the sulfur content of the natural gas.

6. HRSG Stack Emission Limits: The limitations of this condition shall only apply when the CTG is operating in its normal operating range as specified in Special Condition No. 2. The limitations of this condition shall apply regardless of whether the duct burners are firing. Emissions from planned maintenance, start-up, and shutdown (MSS) activities and reduced load operations are exempt from the limitations of this condition. The concentration limits in this condition are based on a three-hour average.

   A. Emissions of nitrogen oxides ($NO_x$) shall not exceed 5 ppmvd at 15 percent oxygen ($O_2$).

   B. Emissions of carbon monoxide (CO) shall not exceed 26 ppmvd at 15 percent $O_2$.

   C. Emissions of volatile organic compounds (VOC), defined as total hydrocarbons minus methane and ethane, shall not exceed 10.0 ppmvd at 15 percent $O_2$.

   D. Emissions of ammonia ($NH_3$) shall not exceed 7 ppmvd at 15 percent $O_2$.

7. Except during MSS activities, the opacity shall not exceed five percent averaged over a six-minute period from each stack or vent. During MSS activities, the opacity shall not exceed 15 percent (or other applicable opacity limit specified in 30 TAC § 111.111(a)(1)(c)). Each determination shall be made by first observing for visible emissions while each facility is in operation. Observations shall be made at least 15 feet and no more than 0.25 miles from the emission point. If visible emissions are observed from an emission point, then the opacity shall be determined and documented within 24 hours for that emission point using Title 40 Code of Federal Regulations Part 60 (40 CFR Part 60), Appendix A, Test Method 9. Contributions from uncombined water shall not be included in determining compliance with this condition. Observations shall be performed and recorded quarterly. If the opacity exceeds five percent during normal operations or 15 percent during MSS activities, corrective action to eliminate the source of visible emissions shall be taken promptly and documented within one week of first observation. **(9/11)**

8. The ammonia stored and handled at the facility shall be in aqueous solution and shall contain no more than 30 percent ammonia by mass.

Initial Determination of Compliance

9. Sampling ports and platforms shall be incorporated into the design of the HRSG exhaust stacks according to the specifications set forth in the attachment entitled AChapter 2, Stack Sampling Facilities.@ Alternate sampling facility designs may be submitted for approval by the TCEQ Regional Director.

10. The holder of this permit shall perform stack sampling and other testing as required to establish the actual quantities of air contaminants being emitted into the atmosphere from EPNs HRSG-1 and HRSG-2, and to determine initial compliance with all emission limits established by this permit. Sampling shall be conducted in accordance with the appropriate procedures of the TCEQ Sampling Procedures Manual and in accordance with the appropriate EPA Reference Methods 201A and 202 or Reference Method 5, modified to include back-half condensibles, for the concentration of particulate matter less than 10 microns in diameter ($PM_{10}$); Reference Method 8 or Reference Methods 6 or 6c for sulfur dioxide ($SO_2$); Reference Method 9 for opacity (consisting of 30 six-minute readings as provided in 40 CFR ' 60.11[b]); Reference Method 10 for the concentration of CO; Reference Method 25A, modified to exclude methane and ethane, for the concentration of VOC (to measure total carbon as propane); and Reference Method 20 for the concentrations of $NO_x$ and $O_2$; or other equivalent methods approved by the TCEQ Regional Director.

Fuel sampling using the methods and procedures of 40 CFR ' 60.335(d) may be conducted in lieu of stack sampling for $SO_2$. If fuel sampling is used, compliance with New Source Performance Standards (NSPS), Subpart GG, $SO_2$ limits shall be based on 100 percent conversion of the sulfur in the fuel to $SO_2$. Any deviations from those procedures must be approved by the Executive Director of the TCEQ prior to sampling. The TCEQ Executive Director or a designated representative shall be afforded the opportunity to observe all such sampling. The holder of this permit is responsible for providing sampling and testing facilities and conducting the sampling and testing operations at his expense.

A. The TCEQ Abilene Regional Office shall be contacted as soon as testing is scheduled but not less than 45 days prior to sampling to schedule a pretest meeting.

The notice shall include:

1. Date for pretest meeting.
2. Date sampling will occur.
3. Name of firm conducting sampling.
4. Type of sampling equipment to be used.
5. Method or procedure to be used in sampling.

6. Procedure used to determine CTG loads during and after the sampling period.

The purpose of the pretest meeting is to review the necessary sampling and testing procedures, to provide the proper data forms for recording pertinent data, and to review the format procedures for submitting the test reports. A written proposed description of any deviation from sampling procedures specified in permit conditions, or TCEQ or EPA sampling procedures shall be made available to the TCEQ prior to the pretest meeting. The TCEQ Regional Director shall approve or disapprove of any deviation from specified sampling procedures. Requests to waive testing for any pollutant specified in this condition shall be submitted to the TCEQ Office of Air. Test waivers and alternate/equivalent procedure proposals for NSPS testing which must have EPA approval shall be submitted to the TCEQ Regional Office.

B. Air emissions from each HRSG exhaust stack shall be tested while firing the CTG and duct burner at a full load (approximately 310 MW) for the ambient conditions at the time of testing. Air emissions to be sampled and analyzed at this load include (but are not limited to) $NO_x$, $O_2$, CO, VOC, formaldehyde, $SO_2$, and $PM_{10}$. (Fuel sampling using the methods and procedures of 40 CFR ' 60.335[d] may be conducted in lieu of stack sampling for $SO_2$.)

C. Air emissions from each HRSG exhaust stack shall also be tested while firing the CTG only (without the duct burner) at a full load (approximately 170 MW) for the ambient conditions at the time of testing. Air emissions to be sampled and analyzed at this load include (but are not limited to) $NO_x$, $O_2$, CO, VOC, formaldehyde, $SO_2$, and $PM_{10}$. (Fuel sampling using the methods and procedures of 40 CFR ' 60.335[d] may be conducted in lieu of stack sampling for $SO_2$.)

D. Air emissions from each HRSG exhaust stack shall also be tested while firing the CTG only (without the duct burner) at a minimum load (approximately 85 MW). Air emissions to be sampled and analyzed at this load include (but are not limited to) VOC and $NH_3$.

E. Sampling of each CTG shall occur within 60 days after achieving the maximum production rate at which each CTG will be operated but no later than 180 days after initial start-up of each unit. Additional sampling shall occur as may be required by the TCEQ or EPA.

F. Within 60 days after the completion of the testing and sampling required herein, two copies of the sampling reports shall be distributed as follows:

One copy to the TCEQ Abilene Regional Office.

One copy to the EPA Region 6 Office, Dallas.

Continuous Determination of Compliance for CO and $NO_x$

11. The holder of this permit shall install, calibrate, maintain, and operate a continuous emission monitoring system (CEMS) to measure and record the concentrations of $NO_x$, CO, and $O_2$ from each HRSG Exhaust Stack (EPNs HRSG-1 and HRSG-2).

A. Monitored $NO_x$ and CO concentrations shall be corrected and reported in dimensional units corresponding to the emission rate and concentration limits specified in Special Condition No. 6.

B. The CEMS shall meet the design and performance specifications, pass the field tests, and meet the installation requirements and the data analysis and reporting requirements specified in the applicable Performance Specification Nos. 1 through 9, 40 CFR Part 60, Appendix B or an acceptable alternative. If there are no applicable performance specifications in 40 CFR Part 60, Appendix B, contact the TCEQ Office of Air in Austin for requirements to be met.

C. The CEMS shall meet the applicable quality-assurance requirements specified in 40 CFR Part 60, Appendix F, Procedure 1 or an acceptable alternative. All CEMS downtime of one hour or greater shall be recorded by the CEMS. Any relative accuracy exceedances, as specified in 40 CFR Part 60 Appendix F ' 5.2.3, shall be reported to the appropriate TCEQ Regional Director, and necessary corrective action shall be taken in accordance with 40 CFR Part 60, Appendix F ' 7.

D. The monitoring data shall be reduced to hourly average values at least once everyday, using a minimum of four equally-spaced data points from each one-hour period. Two valid data points shall be generated during the hourly period in which zero and span is performed.

E. The holder of this permit shall either measure or develop a program to calculate the total mass flow rate through each HRSG stack to ensure continuous compliance with the $NO_x$ and CO emission limitations specified in the MAERT. For each 24-hour period, the holder of this permit shall calculate hourly mass emissions in lbs/hr using the measured exhaust flow rate and the measured concentrations from the $NO_x$ and CO CEMS. Each month, the holder of this permit shall aggregate the hourly calculated values to tons per year on a rolling 12-month basis. These calculated values shall be stored on a computer hard drive and on individually stored disks or other TCEQ-accepted computer media. Records of this information will also be available in a form suitable for inspection.

F. The TCEQ Abilene Regional Office shall be notified at least 30 days prior to any required relative accuracy test audit in order to provide them the opportunity to observe the testing.

G. If applicable, the CEMS will be required to meet the design and performance specifications, pass the field tests, and meet the installation requirements and data analysis and reporting requirements specified in the applicable performance specifications in 40 CFR Part 75, Appendix A. 40 CFR Part 75 is deemed an acceptable alternative to the performance specifications and quality assurance requirements of 40 CFR Part 60.

Continuous Determination of Compliance for $NH_3$

12. The $NH_3$ concentration in each Exhaust Stack shall be tested or calculated according to one of the methods listed below and shall be tested or calculated according to frequency listed below. Testing for $NH_3$ slip is only required on days when the Selective Catalytic Reduction (SCR) unit is in operation.

A. The holder of this permit may install, calibrate, maintain, and operate a CEMS to measure and record the concentrations of $NH_3$. The $NH_3$ concentrations shall be corrected and reported in accordance with Special Condition No. 6D.

B. As an approved alternative, the $NH_3$ slip may be measured using a sorbent or stain tube device specific for $NH_3$ measurement in the 5 to 10 ppm range. The frequency of sorbent/stain tube testing shall be daily for the first 60 days of operation, after which, the frequency may be reduced to weekly testing if operating procedures have been developed to prevent excess amounts of $NH_3$ from being introduced in the SCR unit and when operation of the SCR unit has been proven successful with regard to controlling $NH_3$ slip. Daily sorbent or stain tube testing shall resume when the catalyst is within 30 days of its useful life expectancy. These results shall be recorded and used to determine compliance with Special Condition No. 6D.

C. As an approved alternative to sorbent/stain tube testing or an $NH_3$ CEMS, the permit holder may install and operate a second $NO_x$ CEMS probe located between the duct burners and the SCR, upstream of the stack $NO_x$ CEMS, which may be used in association with the SCR efficiency and $NH_3$ injection rate to estimate $NH_3$ slip. This condition shall not be construed to set a minimum $NO_x$ reduction efficiency on the SCR unit. These results shall be recorded and used to determine compliance with Special Condition No. 6D.

D. If the measured or calculated $NH_3$ slip concentration exceeds 6 ppm at any time, the permit holder shall begin $NH_3$ testing by either the Phenol-Nitroprusside Method, the Indophenol Method, or EPA Conditional Test Method (CTM) 27 on a quarterly basis, in addition to the weekly sorbent or stain tube testing. The quarterly testing shall continue until such time as the SCR unit catalyst is replaced; or if the quarterly testing indicates $NH_3$ slip is 5 ppm or less, the Phenol-Nitroprusside/Indophenol/CTM 27 tests may be suspended until sorbent/stain tube testing again

indicate 6 ppm $NH_3$ slip or greater. These results shall be recorded and used to determine compliance with Special Condition No. 6D.

E. As an approved alternative to sorbent or stain tube testing, $NH_3$ CEMS, or a second $NO_x$ CEMS, the permit holder may install and operate a dual stream system of $NO_x$ CEMS at the exit of the SCR. One of the exhaust streams would be routed, in an unconverted state, to one $NO_x$ CEMS and the other exhaust stream would be routed through a $NH_3$ converter to convert $NH_3$ to $NO_x$ and then to a second $NO_x$ CEMS. The $NH_3$ slip concentration shall be calculated from the difference between the two $NO_x$ CEMS readings (converted and unconverted).

F. Any other method used for measuring $NH_3$ slip shall require prior approval from the TCEQ Office of Air.

13. If any emission monitor fails to meet specified performance, it shall be repaired or replaced as soon as practical, but no later than seven days after it was first detected by any employee at the facility, unless written permission is obtained from the TCEQ which allows for a longer repair/replacement time. The holder of this permit shall develop an operation and maintenance program (including stocking necessary spare parts) to ensure that the continuous monitors are available as required.

14. The holder of this permit shall additionally install, calibrate, maintain, and operate continuous monitoring systems to monitor and record the average hourly natural gas consumption of the CTGs and the duct burners. The systems shall be accurate to " 5.0 percent of the units maximum flow.

15. The holder of this permit shall monitor the fuel fired in the CTGs and duct burners for fuel-bound sulfur as specified in 40 CFR ' 60.334(b). Any request for a custom monitoring schedule shall be made in writing and directed to the Executive Director of the TCEQ, although authority for granting such custom schedules remains with the EPA. Any custom schedule approved by EPA pursuant to 40 CFR ' 60.334(b) will be recognized as enforceable conditions of this permit provided that the holder of this permit demonstrates that the conditions of such custom schedule will be adequate to demonstrate continuous compliance with Special Condition No. 4.

Maintenance Startup and Shutdown (MSS)

16. This permit authorizes the emissions from the planned MSS activities listed in Attachment A or the MAERT attached to this permit. Attachment A identifies the inherently low emitting (ILE) planned maintenance activities that this permit authorizes to be performed. **(9/11)**

17. The holder of this permit shall minimize emissions during planned maintenance MSS activities by operating the facility and associated air pollution control equipment in accordance with good air pollution control practices, safe operating practices, and protection of the facility. **(9/11)**

18. Emissions during planned startup and shutdown activities will be minimized by limiting the duration of operation in planned startup and shutdown mode as follows: **(9/11)**

    A. A planned startup of the HRSG-1 and HRSG-2 with EPNs No. HRSG-1 and HRSG-2 is defined as the period that begins when fuel is first fed to the turbines and ends when the turbines reach Mode 6 operation. A planned startup for EPNs HRSG-1 and HRSG-2 shall not exceed seven hours for cold start-ups and shall not exceed five hours for a warm start-up. A cold start-up is defined as a start-up after a unit has received no fuel for a period of 24 hours or more. A warm start-up is defined as a start-up which is not a cold start-up.

    B. A planned shutdown of the EGF with EPN Nos. HRSG-1 and HRSG-2 is defined as the period that begins when the turbines drop below Mode 6 operation and ending when fuel is no longer fed to the turbines. A planned shutdown for EPNs HRSG-1 and HRSG-2 shall not exceed two hours.

19. Compliance with the emissions limits for planned MSS activities identified in the MAERT attached to this permit may be demonstrated as follows. **(9/11)**

    For each pollutant emitted during ILE planned maintenance activities, the permit holder shall annually confirm the continued validity of the estimated potential to emit represented in the permit application for all ILE planned maintenance activities. The total emissions from all ILE planned maintenance activities (See Attachment A) shall be considered to be no more than the estimated potential to emit for those activities that are represented in the permit application.

20. With the exception of the emission limits in the MAERT attached to this permit, the permit conditions relating to planned MSS activities do not become effective until 180 days after issuance of the permit amendment that added such conditions. **(9/11)**

Recordkeeping Requirements

21. The following records shall be kept at the plant for the life of the permit. All records required in this permit shall be made available at the request of personnel from the TCEQ, EPA, or any air pollution control agency with jurisdiction.

    A. A copy of this permit.

B. A complete copy of the testing reports and records of the initial performance testing completed pursuant to Special Condition No. 10 to demonstrate initial compliance.

C. Stack sampling results or other air emissions testing (other than CEMS data) that may be requested by the TCEQ Executive Director on units authorized under this permit.

22. The following information shall be maintained by the holder of this permit in a form suitable for inspection for a period of two years after collection and shall be made available as soon as practical upon request to representatives of the TCEQ, EPA, or any local air pollution control program having jurisdiction:

A. The CEMS data of $NO_x$, CO, and $O_2$ emissions from EPNs HRSG-1 and HRSG-2 to demonstrate compliance with the emission rates listed in the MAERT.

B. Raw data files of all CEMS data including calibration checks and adjustments and maintenance performed on these systems in a permanent form suitable for inspection.

C. Records of the hours of operation and average daily quantity of natural gas-fired in the CTGs, duct burners, and auxiliary boiler.

D. Records of $NH_3$ emissions sampling and calculations pursuant to Special Condition No. 12.

E. Field records of quarterly opacity observations as prescribed in 40 CFR 60, Appendix A, Test Method 9. **(9/11)**

F. A log of all startups and shutdowns and durations to demonstrate compliance with Special Condition No. 18. **(9/11)**

Reporting

23. Within 270 days after the start of operations, the holder of this permit shall submit to the TCEQ Office of Air a permit alteration request to adjust emission estimates for VOC in Special Condition No. 6 and the

MAERT if the emission rate of VOC as measured during the initial determination of compliance stack sampling is less than 90 percent of its emission estimate in the MAERT.

24. The holder of this permit shall submit to the TCEQ Abilene Regional Office and the Air Enforcement Branch of EPA in Dallas periodic reports as described in 40 CFR ' 60.7. Such reports are required for each emission unit which is required to be continuously monitored pursuant to this permit.

Dated September 12, 2011

Attachment A

Permit No. 52756 and PSDTX1026

Inherently Low Emitting (ILE) Planned Maintenance Activities

| | Emissions | | | | |
|---|---|---|---|---|---|
| Planned Maintenance Activity | $NH_3$/urea | VOC | $NO_x$ | CO | PM$SO_2$ |
| Gaseous Fuel Venting and Line Purging | | x | | | |
| Miscellaneous particulate filter maintenance[1] | | | | x | |
| CEMS Calibration | | | x | | |
| Small Equipment Maintenance - Ammonia | x | | | | |
| Tank Maintenance - Ammonia | x | | | | |
| Boiler Refractory Replacement[2] | | | | x | |
| Sludge Management [3] | | x | | | |
| Small Equipment Maintenance- Low Vapor Pressure VOC | | x | | | |

Notes:

1. Includes, but is not limited to, filters, process-related building air filters, and combustion turbine air intake filters.
2. Includes pre-heater basket handling and maintenance, refractory change-out, fan maintenance and balancing, damper, air heater, and soot blower maintenance, and any other general boiler maintenance that does not exceed the worst-case emissions representation in the application.
3. Includes, but is not limited to, management by vacuum truck/dewatering of materials in open pits and ponds, and sumps, tanks and other closed or open vessels. Materials managed include water and sludge mixtures containing miscellaneous VOCs such as diesel, lube oil, and other waste oils.

## Headers

SPECIAL CONDITIONS

Permit Numbers 52756 and PSDTX1026

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1. Top of document
2. EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES
3. AIR CONTAMINANTS DATA

# Section 1 - Document

## EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

Permit Numbers 52756 and PSDTX1026

This table lists the maximum allowable emission rates and all sources of air contaminants on the applicant's property covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities, sources, and related activities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

## AIR CONTAMINANTS DATA

| Emission Point No. (1) | Source Name (2) | Air Contaminant Name (3) | Emission Rates | |
|---|---|---|---|---|
| | | | lbs/hour | TPY (4) |
| HRSG-1 | Combustion Turbine with 550 MMBtu/hr Duct Burner | $NO_X$ | 45.3 | 187.0 |
| | | CO | 87.3 | 364.0 |
| | | VOC | 20.6 | 86.7 |
| | | $PM/PM_{10}$ | 34.7 | 149.0 |
| | | $SO_2$ | 14.5 | 58.7 |
| | | $NH_3$ | 23.4 | 96.8 |
| HRSG-1 | HRSG-1MSS | $NO_X$ | 420.0 | - |
| | | CO | 1800.0 | - |
| HRSG-2 | Combustion Turbine with 550 MMBtu/hr Duct Burner | $NO_X$ | 45.3 | 187.0 |
| | | CO | 87.3 | 364.0 |
| | | VOC | 20.6 | 86.7 |
| | | $PM/PM_{10}$ | 34.7 | 149.0 |
| | | $SO_2$ | 14.5 | 58.7 |
| | | $NH_3$ | 23.4 | 96.8 |
| HRSG-2 | HRSG-2MSS | $NO_X$ | 420.0 | - |
| | | CO | 1800.0 | - |
| CTVs 1 through 10 | Cooling Tower Vents (5) | PM | 3.0 | 13.1 |
| | | $PM/PM_{10}$ | 0.4 | 1.9 |
| FUG-1 | Power Block 1 | VOC | <0.01 | <0.02 |

| | | | | |
|---|---|---|---|---|
| | Fugitive Emissions (6) | | | |
| FUG-2 | Power Block 2<br>Fugitive Emissions (6) | VOC | <0.01 | <0.02 |
| FUG-3 | N.G. Meter Skid<br>Fugitive Emissions (6) | VOC | <0.01 | <0.01 |
| OWS-1 | Oil/Water Separator | VOC | 0.4 | 1.1 |
| FWP-TK | Fire Water Pump Storage Tank | VOC | <0.01 | <0.01 |
| B-1 | Auxiliary Boiler | $NO_X$ | 1.3 | 3.9 |
| | | CO | 1.4 | 4.1 |
| | | VOC | 0.6 | 1.8 |
| | | $PM/PM_{10}$ | 0.4 | 1.1 |
| | | $SO_2$ | 0.3 | 0.7 |
| FWP-1 | Firewater Pump Engine (7) | $NO_X$ | 6.2 | 1.6 |
| | | CO | 3.8 | 1.0 |
| | | VOC | 0.5 | 0.2 |
| | | $PM/PM_{10}$ | 0.5 | 0.2 |
| | | $SO_2$ | 0.5 | 0.1 |
| CVs 1 through 16 | Chiller Vents | PM | 0.8 | 3.5 |
| | | $PM/PM_{10}$ | 0.2 | 0.6 |
| DG-1 | Diesel Generator Engine (7) | $NO_X$ | 20.8 | 5.2 |
| | | CO | 12.6 | 3.2 |
| | | VOC | 1.7 | 0.5 |
| | | $PM/PM_{10}$ | 1.5 | 0.4 |
| | | $SO_2$ | 1.4 | 0.4 |
| DG-TK | Diesel Generator Engine<br>Storage Tank | VOC | 0.2 | <0.01 |
| ACID-TK | Acid Storage Tank | $H_2SO_4$ | 0.2 | <0.01 |
| NH3-Fugitives | Ammonia Storage Tank | $NH_3$ | <0.01 | <0.01 |
| MSSFUG | MSSFUG | VOC | 17.36 | 0.05 |
| | | $PM/PM_{10}/PM_{2.5}$ | 0.08 | <0.01 |
| | | $NO_X$ | <0.01 | <0.01 |
| | | $NH_3$ | 1.67 | 0.01 |

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.

(2) Specific point source name. For fugitive sources, use area name or fugitive source name.

(3) VOC - volatile organic compounds as defined in Title 30 Texas Administrative Code § 101.1

$NO_x$ - total oxides of nitrogen

$SO_2$ - sulfur dioxide

PM - total particulate matter, suspended in the atmosphere, including $PM_{10}$ and $PM_{2.5}$, as represented

$PM_{10}$ - total particulate matter equal to or less than 10 microns in diameter, including $PM_{2.5}$, as represented

$PM_{2.5}$ - total particulate matter equal to or less than 2.5 microns in diameter

CO - carbon monoxide

$H_2SO_4$ - sulfuric acid

$NH_3$ - ammonia

(4) Compliance with annual emission limits (tons per year) is based on a 12 month rolling period.

(5) Cooling tower PM and $PM_{10}$ emissions are an estimate only based on manufacturers' data. Cooling tower assembly has ten vent fan exhausts; emissions are sum-total of all ten exhausts.

(6) Fugitive emissions are an estimate based on component count and applicable fugitive emission factors.

(7) Emissions are based on non-emergency operation of 500 operating hours per year.

Date: September 12, 2011

## Headers

Permit Numbers 52756 and PSDTX1026

Page

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

## Footers

Project Number: 162449

Project Number: 162449

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Attachment D

Permit No. O-02169
Issued September 28, 2009

Bryan W. Shaw, Ph.D., *Commissioner*
Buddy Garcia, *Chairman*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

September 28, 2009

MR DAVID P MURPHY
VICE PRESIDENT GENERATION
BRAZOS ELECTRIC POWER COOPERATIVE INC
PO BOX 2585
WACO TX 76702-2585

BEPC
RECEIVED
SEP 30 2009
POWPROD

Re: Effective Permit Approval
Renewal
Permit Number: O2169
Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
Jacksboro, Jack County
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Account Number: JA-0068-E

Dear Mr. Murphy:

The effective federal operating permit (FOP) for Brazos Electric Power Cooperative, Inc., Jack County Generation Facility, is enclosed. This FOP constitutes authority to operate the emission units identified in the FOP application.

All site operating permits are subject to public petition for 60 days following the expiration of the 45-day U.S. Environmental Protection Agency (EPA) review. The public petition period for the FOP extends from September 5, 2009 until November 3, 2009. If the EPA receives a valid petition and objects to the above-referenced permit, you will be notified promptly by the Texas Commission on Environmental Quality (TCEQ).

It should be noted that from the date of this letter Brazos Electric Power Cooperative, Inc., Jack County Generation Facility, must operate in accordance with the requirements of Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122) and the FOP. Some of the terms and conditions contained in the FOP include recordkeeping conditions, reporting conditions (which includes deviation reporting), and compliance certification conditions. All reports, along with any questions regarding the reports, shall be forwarded to the TCEQ Abilene Regional Office, 1977 Industrial Boulevard, Abilene, Texas 79602-7833.

Consistent with 30 TAC Chapter 122, Subchapter C, the permit holder shall submit an application to the Air Permits Division (APD) for a revision to an FOP for those activities at a site which change, add, or remove one or more FOP terms or conditions. The permit holder shall also submit an application to the APD for a revision to a permit to address the following: the adoption of an applicable requirement previously designated as federally enforceable only; the promulgation of a new applicable requirement; the adoption of a new state-only requirement; or a change in a state-only designation.

Thank you again for your cooperation in this matter. If you have questions concerning the review or this notice, please contact Mr. Alfredo Mendoza, P.E., at (512) 239-1335.

This action is taken under authority delegated by the Executive Director of the TCEQ.

Sincerely,

Steve Hagle, P.E., Director
Air Permits Division
Office of Permitting and Registration
Texas Commission on Environmental Quality

SH/AM/pg

cc: Mr. Mike Meyers, Environmental Manager, Brazos Electric Power Cooperative, Inc., Waco
Air Section Manager, Region 3 - Abilene

Enclosure: Effective Permit

cc: Air Permit Section Chief, U.S. Environmental Protection Agency, Region 6, Dallas

Project Number: 13334

# FEDERAL OPERATING PERMIT

A FEDERAL OPERATING PERMIT IS HEREBY ISSUED TO

Brazos Electric Power Cooperative, Inc.

AUTHORIZING THE OPERATION OF

Jack County Generation Facility
Electric Services

LOCATED AT

Jack County, Texas

Latitude 33° 06' 11" Longitude 097° 57' 28"

Regulated Entity Number: RN100221985

This permit is issued in accordance with and subject to the Texas Clean Air Act (TCAA), Chapter 382 of the Texas Health and Safety Code and Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122), Federal Operating Permits. Under 30 TAC Chapter 122, this permit constitutes the permit holder's authority to operate the site, emission units, and affected sources listed in this permit. Operations of the site, emission units, and affected sources listed in this permit are subject to all additional rules or amended rules and orders of the Commission pursuant to the TCAA.

This permit does not relieve the permit holder from the responsibility of obtaining New Source Review authorization for new, modified, or existing facilities in accordance with 30 TAC Chapter 116, Control of Air Pollution by Permits for New Construction or Modification.

The site, emission units, and affected sources authorized by this permit shall be operated in accordance with 30 TAC Chapter 122, the general terms and conditions, special terms and conditions, and attachments contained herein.

This permit shall expire five years from the date of issuance. The renewal requirements specified in 30 TAC § 122.241 must be satisfied in order to renew the authorization to operate the site, emission units, and affected sources.

Permit No: O2169 Issuance Date: September 28, 2009

For the Commission

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## GENERAL TERMS AND CONDITIONS

The permit holder shall comply with all terms and conditions contained in 30 TAC § 122.143 (General Terms and Conditions), 30 TAC § 122.144 (Recordkeeping Terms and Conditions), 30 TAC § 122.145 (Reporting Terms and Conditions), and 30 TAC § 122.146 (Compliance Certification Terms and Conditions).

If the permit holder chooses to demonstrate that this permit is no longer required, a written request to void this permit shall be submitted to the Texas Commission on Environmental Quality (TCEQ) by the Responsible Official in accordance with 30 TAC § 122.161(e). The permit holder shall comply with the permit's requirements, including compliance certification and deviation reporting, until notified by the TCEQ that this permit is voided.

The permit holder shall comply with 30 TAC Chapter 116 by obtaining a New Source Review authorization prior to new construction or modification of emission units located in the area covered by this permit.

All reports required by this permit shall be forwarded as one original and one copy to the TCEQ Regional Office for your site. Reports submitted must include a cover letter which identifies the following information: company name, TCEQ regulated entity number, site name, area name (if applicable), and Air Permits Division permit number.

## SPECIAL TERMS AND CONDITIONS:

**Emission Limitations and Standards, Monitoring and Testing, and Recordkeeping and Reporting:**

1. Permit holder shall comply with the following requirements:

   A. Emission units (including groups and processes) in the Applicable Requirements Summary attachment shall meet the limitations, standards, equipment specifications, monitoring, recordkeeping, reporting, testing, and other requirements listed in the Applicable Requirements Summary attachment to assure compliance with the permit.

   B. The textual description in the column titled "Textual Description" in the Applicable Requirements Summary attachment is not enforceable and is not deemed as a substitute for the actual regulatory language. The Textual Description is provided for information purposes only.

   C. A citation listed on the Applicable Requirements Summary attachment, which has a notation [G] listed before it, shall include the referenced section and subsection for all commission rules, or paragraphs for all federal and state regulations and all subordinate paragraphs, subparagraphs and clauses, subclauses, and items contained within the referenced citation as applicable requirements.

2. The permit holder shall comply with the following sections of 30 TAC Chapter 101 (General Air Quality Rules):

   A. Title 30 TAC § 101.1 (relating to Definitions), insofar as the terms defined in this section are used to define the terms used in other applicable requirements

   B. Title 30 TAC § 101.3 (relating to Circumvention)

   C. Title 30 TAC § 101.8 (relating to Sampling), if such action has been requested by the TCEQ

   D. Title 30 TAC § 101.9 (relating to Sampling Ports), if such action has been requested by the TCEQ

   E. Title 30 TAC § 101.10 (relating to Emissions Inventory Requirements)

   F. Title 30 TAC § 101.201 (relating to Emission Event Reporting and Recordkeeping Requirements)

   G. Title 30 TAC § 101.211 (relating to Scheduled Maintenance, Start-up, and Shutdown Reporting and Recordkeeping Requirements)

   H. Title 30 TAC § 101.221 (relating to Operational Requirements)

   I. Title 30 TAC § 101.222 (relating to Demonstrations)

   J. Title 30 TAC § 101.223 (relating to Actions to Reduce Excessive Emissions)

3. Permit holder shall comply with the following requirements of 30 TAC Chapter 111:

   A. For stationary vents with a flow rate of less than 100,000 actual cubic feet per minute and constructed after January 31, 1972, that are not listed in the Applicable Requirements Summary attachment, the permit holder shall comply with the following requirements:

      (i) Title 30 TAC § 111.111(a)(1)(B) (relating to Requirements for Specified Sources)

      (ii) Title 30 TAC § 111.111(a)(1)(E)

      (iii) Title 30 TAC §§ 111.111(a)(1)(F)(i), (ii), (iii), or (iv)

      (iv) For emission units with vent emissions subject to 30 TAC § 111.111(a)(1)(B), complying with 30 TAC §§ 111.111(a)(1)(F)(ii), (iii), or (iv), and capable of producing visible emissions from (but not limited to) particulate matter, acid gases, and $NO_x$, the permit holder shall also comply with the following periodic monitoring requirements for the purpose of annual compliance certification under 30 TAC § 122.146.

These periodic monitoring requirements do not apply to vents that do not emit visible emissions such as vents that emit only VOC or vents that provide passive ventilation, such as plumbing vents; or vents that are subject to the emission limitation of 30 TAC § 111.111(a)(1)(B) and Compliance Assurance Monitoring, as specified in the attached "Applicable Requirements Summary" and "Additional Monitoring Requirements:"

1. An observation of stationary vents from emission units in operation shall be conducted at least once during each calendar quarter unless the emission unit is not operating for the entire quarter.

2. For stationary vents from a combustion source, if an alternative to the normally fired fuel is fired for a period greater than or equal to 24 consecutive hours, the permit holder shall conduct an observation of the stationary vent for each such period to determine if visible emissions are present. If such period is greater than three months, observations shall be conducted once during each quarter. Supplementing the normally fired fuel with natural gas or fuel gas to increase the net heating value to the minimum required value does not constitute creation of an alternative fuel.

3. Records of all observations shall be maintained.

4. Visible emissions observations of emission units operated during daylight hours shall be conducted no earlier than one hour after sunrise and no later than one hour before sunset. Visible emissions observations of emission units operated only at night must be made with additional lighting and the temporary installation of contrasting backgrounds. Visible emissions observations shall be made during times when the activities described in 30 TAC § 111.111(a)(1)(E) are not taking place. Visible emissions shall be determined with each stationary vent in clear view of the observer. The observer shall be at least 15 feet, but not more than 0.25 mile, away from each stationary vent during the observation. For outdoor locations, the observer shall select a position where the sun is not directly in the observer's eyes. When condensed water vapor is present within the plume, as it emerges from the emissions outlet, observations must be made beyond the point in the plume at which condensed water vapor is no longer visible. When water vapor within the plume condenses and becomes visible at a distance from the emissions outlet, the observation shall be evaluated at the outlet prior to condensation of water vapor. A certified opacity reader is not required for visible emissions observations.

5. Compliance Certification:

(a) If visible emissions are not present during the observation, the RO may certify that the source is in compliance with the applicable opacity requirement in 30 TAC §§ 111.111(a)(1) and (a)(1)(B).

(b) However, if visible emissions are present during the observation, the permit holder shall either list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2) or conduct the appropriate opacity test specified in 30 TAC § 111.111(a)(1)(F) to determine if the source is in compliance with the opacity requirements. If an opacity test is performed and the source is determined to be in compliance, the RO may certify that the source is in compliance with the applicable opacity requirement. However, if an opacity test is performed and the source is determined to be out of compliance, the permit holder shall list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2). The opacity test must be performed by a certified opacity reader.

(c) Some vents may be subject to multiple visible emission or monitoring requirements. All credible data must be considered when certifying compliance with this requirement even if the observation or monitoring was performed to demonstrate compliance with a different requirement.

B. For visible emissions from a building, enclosed facility, or other structure; the permit holder shall comply with the following requirements:

(i) Title 30 TAC § 111.111(a)(7)(A) (relating to Requirements for Specified Sources)

(ii) Title 30 TAC §§ 111.111(a)(7)(B)(i) or (ii)

(iii) For a building containing an air emission source, enclosed facility, or other structure containing or associated with an air emission source subject to 30 TAC § 111.111(a)(7)(A), complying with 30 TAC § 111.111(a)(7)(B)(i) or (ii), and capable of producing visible emissions from (but not limited to) particulate matter, acid gases, and $NO_x$, the permit holder shall also comply with the following periodic monitoring requirements for the purpose of annual compliance certification under 30 TAC § 122.146:

1. An observation of visible emissions from a building containing an air emission source, enclosed facility, or other structure containing or associated with an air emission source which is required to comply with 30 TAC § 111.111(a)(7)(A) shall be conducted at least once during each calendar quarter unless the air emission source or enclosed facility is not operating for the entire quarter.

2. Records of all observations shall be maintained.

3. Visible emissions observations of air emission sources or enclosed facilities operated during daylight hours shall be conducted no earlier than one hour after sunrise and no later than one hour before sunset. Visible emissions observations of air emission sources or enclosed facilities operated only at night must be made with additional lighting and the temporary installation of contrasting backgrounds. Visible emissions shall be determined with each emissions outlet in clear view of the observer. The observer shall be at least 15 feet, but not more than 0.25 mile, away from each emissions outlet during the observation. For outdoor locations, the observer shall select a position where the sun is not directly in the observer's eyes. When condensed water vapor is present within the plume, as it emerges from the emissions outlet, observations must be made beyond the point in the plume at which condensed water vapor is no longer visible. When water vapor within the plume condenses and becomes visible at a distance from the emissions outlet, the observation shall be evaluated at the outlet prior to condensation of water vapor. A certified opacity reader is not required for visible emissions observations.

4. Compliance Certification:

   (a) If visible emissions are not present during the observation, the RO may certify that the source is in compliance with the applicable opacity requirement in 30 TAC §§ 111.111(a)(7) and (a)(7)(A).

   (b) However, if visible emissions are present during the observation, the permit holder shall either list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2) or conduct the appropriate opacity test specified in 30 TAC § 111.111(a)(7)(B) to determine if the source is in compliance with the opacity requirements. If an opacity test is performed and the source is determined to be in compliance, the RO may certify that the source is in compliance with the applicable opacity requirement. However, if an opacity test is performed and the source is determined to be out of compliance, the permit holder shall

list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2). The opacity test must be performed by a certified opacity reader.

C. Certification of opacity readers determining opacities under Method 9 (as outlined in 40 CFR Part 60, Appendix A) to comply with opacity monitoring requirements shall be accomplished by completing the Visible Emissions Evaluators Course, or approved agency equivalent, no more than 180 days before the opacity reading.

D. For emission units with contributions from uncombined water, the permit holder shall comply with the requirements of 30 TAC § 111.111(b).

E. Emission limits on nonagricultural processes, except for the steam generators specified in 30 TAC § 111.153, shall comply with the following requirements:

(i) Emissions of PM from any source may not exceed the allowable rates as required in 30 TAC § 111.151(a) (relating to Allowable Emissions Limits)

(ii) Sources with an effective stack height ($h_e$) less than the standard effective stack height ($H_e$), must reduce the allowable emission level by multiplying it by $[h_e/H_e]^2$ as required in 30 TAC § 111.151(b)

(iii) Effective stack height shall be calculated by the equation specified in 30 TAC § 111.151(c)

F. Permit holder shall comply with the following requirements for steam generators:

(i) Emissions from any solid fuel-fired steam generator may not exceed 0.3 pound of TSP per MMBtu of heat input, averaged over a two-hour period, as required in 30 TAC § 111.153(b) (relating to Emissions Limits for Steam Generators)

4. The permit holder shall comply with the following requirements for units subject to any subpart of 40 CFR Part 60, unless otherwise stated in the applicable subpart:

A. Title 40 CFR § 60.7 (relating to Notification and Recordkeeping)

B. Title 40 CFR § 60.8 (relating to Performance Tests)

C. Title 40 CFR § 60.11 (relating to Compliance with Standards and Maintenance Requirements)

D. Title 40 CFR § 60.12 (relating to Circumvention)

E. Title 40 CFR § 60.13 (relating to Monitoring Requirements)

F. Title 40 CFR § 60.14 (relating to Modification)

G. Title 40 CFR § 60.15 (relating to Reconstruction)

H. Title 40 CFR § 60.19 (relating to General Notification and Reporting Requirements)

**Additional Monitoring Requirements**

5. Unless otherwise specified, the permit holder shall comply with the compliance assurance monitoring requirements as specified in the attached "CAM Summary" upon issuance of the permit. In addition, the permit holder shall comply with the following:

   A. The permit holder shall comply with the terms and conditions contained in 30 TAC § 122.147 (General Terms and Conditions for Compliance Assurance Monitoring).

   B. The permit holder shall report, consistent with the averaging time identified in the "CAM Summary," deviations as defined by the deviation limit in the "CAM Summary." Any monitoring data below a minimum limit or above a maximum limit, that is collected in accordance with the requirements specified in 40 CFR § 64.7(c), shall be reported as a deviation. Deviations shall be reported according to 30 TAC § 122.145 (Reporting Terms and Conditions).

   C. The permit holder may elect to collect monitoring data on a more frequent basis and average the data, consistent with the averaging time specified in the "CAM Summary," for purposes of determining whether a deviation has occurred. However, the additional data points must be collected on a regular basis. In no event shall data be collected and used in particular instances in order to avoid reporting deviations. All monitoring data shall be collected in accordance with the requirements specified in 40 CFR § 64.7(c).

   D. The permit holder shall operate the monitoring, identified in the attached "CAM Summary," in accordance with the provisions of 40 CFR § 64.7.

6. The permit holder shall comply with the periodic monitoring requirements as specified in the attached "Periodic Monitoring Summary" upon issuance of the permit. Except for, as applicable, monitoring malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments), the permit holder shall conduct all monitoring in continuous operation (or shall collect data at all required intervals) at all times that the pollutant-specific emissions unit is operating. The permit holder may elect to collect monitoring data on a more frequent basis and average the data, consistent with the averaging time specified in the "Periodic Monitoring Summary," for purposes of determining whether a deviation has occurred. However, the additional data points must be collected on a regular basis. In no event shall data be collected and used in particular instances to avoid reporting deviations. Deviations shall be reported according to 30 TAC § 122.145 (Reporting Terms and Conditions).

**New Source Review Authorization Requirements**

7. Permit holder shall comply with the requirements of New Source Review authorizations issued or claimed by the permit holder for the permitted area, including permits, permits by rule, standard permits, flexible permits, special permits, permits for existing facilities including Voluntary Emissions Reduction Permits and Electric Generating Facility Permits issued under 30 TAC Chapter 116, Subchapter I, or special exemptions referenced in the New Source Review Authorization References attachment. These requirements:

   A. Are incorporated by reference into this permit as applicable requirements

   B. Shall be located with this operating permit

   C. Are not eligible for a permit shield

8. The permit holder shall comply with the general requirements of 30 TAC Chapter 106, Subchapter A or the general requirements, if any, in effect at the time of the claim of any PBR.

**Compliance Requirements**

9. The permit holder shall certify compliance with all permit terms and conditions using, at a minimum (but not limited to) the continuous or intermittent compliance method data from monitoring, recordkeeping, reporting, or testing required by the permit and any other credible evidence or information. The certification period may not exceed 12 months and the certification must be submitted within 30 days after the end of the period being certified.

10. Use of Discrete Emission Credits to Comply with Applicable Requirements:

   A. Unless other wise prohibited, the permit holder may use discrete emission credits to comply with the following applicable requirements listed elsewhere in this permit:

      (i) Title 30 TAC Chapter 115

      (ii) Title 30 TAC Chapter 117

      (iii) If applicable, offsets for 30 TAC Chapter 116

      (iv) Temporarily exceed state NSR permit allowables

   B. The permit holder shall comply with the following requirements in order to use the credit to comply with the applicable requirements:

(i) The permit holder must notify the TCEQ according to 30 TAC § 101.376(d)

(ii) The discrete emission credits to be used must meet all the geographic, timeliness, applicable pollutant type, and availability requirements listed in 30 TAC Chapter 101, Subchapter H, Division 4

(iii) The executive director has approved the use of the discrete emission credits according to 30 TAC § 101.376(d)(1)(A)

(iv) The permit holder keeps records of the use of credits towards compliance with the applicable requirements in accordance with 30 TAC § 101.372(h) and 30 TAC Chapter 122

**Protection of Stratospheric Ozone**

11. Permit holders at a site subject to Title VI of the FCAA Amendments shall meet the following requirements for protection of stratospheric ozone:

A. Any on-site servicing, maintenance, and repair on refrigeration and nonmotor vehicle air-conditioning appliances using ozone-depleting refrigerants or non-exempt substitutes shall be conducted in accordance with 40 CFR Part 82, Subpart F. Permit holders shall ensure that repairs on or refrigerant removal from refrigeration and nonmotor vehicle air-conditioning appliances using ozone-depleting refrigerants are performed only by properly certified technicians using certified equipment. Records shall be maintained as required by 40 CFR Part 82, Subpart F.

**Permit Location**

12. The permit holder shall maintain a copy of this permit and records related to requirements listed in this permit on-site.

**Permit Shield (30 TAC § 122.148)**

13. A permit shield is granted for the emission units, groups, or processes specified in the attached "Permit Shield." Compliance with the conditions of the permit shall be deemed compliance with the specified potentially applicable requirements or specified potentially applicable state-only requirements listed in the attachment "Permit Shield." Permit shield provisions shall not be modified by the executive director until notification is provided to the permit holder. No later than 90 days after notification of a change in a determination made by the executive director, the permit holder shall apply for the appropriate permit revision to reflect the new determination. Provisional terms are not eligible for this permit shield. Any term or condition, under a permit shield, shall not be protected by the permit shield if it is replaced by a provisional term or condition or the basis of the term and condition changes.

**Acid Rain Permit Requirements**

14. For units CT-1, CT-2, CT-3, and CT-4 (identified in the Certificate of Representation as CT-1, CT-2, CT-3, and CT-4), located at the affected source identified by ORIS/Facility code 55230, the designated representative and the owner or operator, as applicable, shall comply with the following Acid Rain Permit requirements.

A. General Requirements

(i) Under 30 TAC § 122.12(1) and 40 CFR Part 72, the Acid Rain Permit requirements contained here are a separable portion of the Federal Operating Permit (FOP) and have an independent public comment process which may be separate from, or combined with the FOP.

(ii) The owner and operator shall comply with the requirements of 40 CFR Part 72 and 40 CFR Part 76. Any noncompliance with the Acid Rain Permit will be considered noncompliance with the FOP and may be subject to enforcement action.

(iii) The owners and operators of the affected source shall operate the source and the unit in compliance with the requirements of this Acid Rain Permit and all other applicable State and federal requirements.

(iv) The owners and operators of the affected source shall comply with the General Terms and Conditions of the FOP that incorporates this Acid Rain Permit.

(v) The term for the Acid Rain permit shall commence with the issuance of the FOP that incorporates the Acid Rain permit and shall be run concurrent with the remainder of the term of the FOP. Renewal of the Acid Rain permit shall coincide with the renewal of the FOP that incorporates the Acid Rain permit and subsequent terms shall be no more than five years from the date of renewal of the FOP and run concurrent with the permit term of the FOP.

B. Monitoring Requirements

(i) The owners and operators, and the designated representative, of the affected source and each affected unit at the source shall comply with the monitoring requirements contained 40 CFR Part 75.

(ii) The emissions measurements recorded and reported in accordance with 40 CFR Part 75 and any other credible evidence shall be used to determine compliance by the affected source with the acid rain emissions limitations and emissions reduction requirements for $SO_2$ and $NO_x$ under the ARP.

(iii) The requirements of 40 CFR Part 75 shall not affect the responsibility of the owners and operators to monitor emission of other pollutants or other emissions characteristics at the unit under other applicable requirements of the FCAA Amendments (42 U.S.C. 7401, as amended November 15, 1990) and other terms and conditions of the operating permit for the source.

C. $SO_2$ emissions requirements

(i) The owners and operators of each source and each affected unit at the source shall comply with the applicable acid rain emissions limitations for $SO_2$.

(ii) As of the allowance transfer deadline the owners and operators of the affected source and each affected unit at the source shall hold, in the units's compliance subaccount, allowances in an amount not less than the total annual emissions of $SO_2$ for the previous calendar year.

(iii) Each ton of $SO_2$ emitted in excess of the acid rain emissions limitations for $SO_2$ shall constitute a separate violation of the FCAA amendments.

(iv) An affected unit shall be subject to the requirements under (i) and (ii) of the $SO_2$ emissions requirements as follows:

1. Starting January 1, 2000, an affected unit under 40 CFR § 72.6(a)(2); or

2. Starting on the later of January 1, 2000, or the deadline for monitor certification under 40 CFR Part 75, an affected unit under 40 CFR § 72.6(a)(3).

(v) Allowances shall be held in, deducted from, or transferred into or among Allowance Tracking System accounts in accordance with the requirements of the ARP.

(vi) An allowance shall not be deducted, for compliance with the requirements of this permit, in a calendar year before the year for which the allowance was allocated.

(vii) An allowance allocated by the EPA Administrator or under the ARP is a limited authorization to emit $SO_2$ in accordance with the ARP. No provision of the ARP, Acid Rain permit application, this Acid Rain Permit, or an exemption under 40 CFR §§ 72.7 or 72.8 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.

(viii) An allowance allocated by the EPA Administrator under the ARP does not constitute a property right.

D. $NO_x$ Emission Requirements

(i) The owners and operators of the source and each affected unit at the source shall comply with the applicable acid rain emissions limitations for $NO_x$ under 40 CFR Part 76.

E. Excess emissions requirements for $SO_2$ and $NO_x$.

(i) The designated representative of an affected unit that has excess emissions in any calendar year shall submit a proposed offset plan, as required under 40 CFR Part 77.

(ii) If an affected source has excess emissions in any calendar year shall, as required by 40 CFR Part 77:

1. Pay, without demand, the penalty required and pay, upon demand, the interest on that penalty.

2. Comply with the terms of an approved offset plan.

F. Recordkeeping and Reporting Requirements

(i) Unless otherwise provided, the owners and operators of the affected source and each affected unit at the source shall keep on-site at the source each of the following documents for a period of five years from the date the document is created. This period may be extended for cause, at any time before the end of five years, in writing by the permitting authority or the EPA Administrator.

1. The certificate of representation for the designated representative for the source and each affected unit and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR § 72.24; provided that the certificate and documents shall be retained on-site at the source beyond such five-year period until such documents are superseded because of the submission of a new certificate of representation changing the designated representative.

2. All emissions monitoring information, in accordance with 40 CFR Part 75, provided that to the extent that 40 CFR Part 75 provides for a three-year period for recordkeeping (rather than a five-year period cited in 30 TAC § 122.144), the three-year period shall apply.

3. Copies of all reports, compliance certifications, and other submissions and all records made or required under the ARP or relied upon for compliance certification.

4. Copies of all documents used to complete a acid rain permit application and any other submission under the ARP or to demonstrate compliance with the requirements of the ARP.

(ii) The designated representative of an affected source and each affected unit at the source shall submit the reports required under the ARP including those under 40 CFR Part 72, Subpart I and 40 CFR Part 75.

G. Liability

(i) Any person who knowingly violates any requirement or prohibition of the ARP, a complete acid rain permit application, an acid rain permit, or a written exemption under 40 CFR §§ 72.7 or 72.8, including any requirement for the payment of any penalty owed to the United States, shall be subject to enforcement pursuant to FCAA § 113(c).

(ii) Any person who knowingly makes a false, material statement in any record, submission, or report under the ARP shall be subject to criminal enforcement pursuant to FCAA § 113(c) and 18 U.S.C. 1001.

(iii) No permit revision shall excuse any violation of the requirements of the ARP that occurs prior to the date that the revision takes effect.

(iv) The affected source and each affected unit shall meet the requirements of the ARP contained in 40 CFR Parts 72 through 78.

(v) Any provision of the ARP that applies to an affected source or the designated representative of an affected source shall also apply to the owners and operators of such source and of the affected units at the source.

(vi) Any provision of the ARP that applies to an affected unit (including a provision applicable to the DR of an affected unit) shall also apply to the owners and operators of such unit. Except as provided under 40 CFR § 72.44 (Phase II repowering extension plans) and 40 CFR § 76.11 ($NO_x$ averaging plans), and except with regard to the requirements applicable to units with a common stack under 40 CFR Part 75 (including 40 CFR §§ 75.16, 75.17, and 75.18), the owners and operators and the DR of one affected unit shall not be liable for any violation by any other affected unit of which they are not owners or operators or the DR and that is located at a source of which they are not owners or operators or the DR.

(vii) Each violation of a provision of 40 CFR Parts 72, 73, 74, 75, 76, 77, and 78 by an affected source or affected unit, or by an owner or operator or DR of such source or unit, shall be a separate violation of the FCAA Amendments.

H. Effect on other authorities. No provision of the ARP, an acid rain permit application, an acid rain permit, or an exemption under 40 CFR §§ 72.7 or 72.8 shall be construed as:

(i) Except as expressly provided in Title IV of the FCAA Amendments, exempting or excluding the owners and operators and, to the extent applicable, the DR of an affected source or affected unit from compliance with any other provision of the FCAA Amendments, including the provisions of Title I of the FCAA Amendments relating to applicable National Ambient Air Quality Standards or State Implementation Plans

(ii) Limiting the number of allowances a unit can hold; *provided*, that the number of allowances held by the unit shall not affect the source's obligation to comply with any other provisions of the FCAA Amendments

(iii) Requiring a change of any kind in any state law regulating electric utility rates and charges, affecting any state law regarding such state regulation, or limiting such state regulation, including any prudence review requirements under such state law

(iv) Modifying the Federal Power Act or affecting the authority of the Federal Energy Regulatory Commission under the Federal Power Act; or,

(v) Interfering with or impairing any program for competitive bidding for power supply in a state in which such program is established

I. The number of $SO_2$ allowances allocated by the EPA in 40 CFR Part 73 is enforceable only by the EPA Administrator.

**Clean Air Interstate Rule Permit Requirements**

15. For units CT-1, CT-2, CT-3, and CT-4 (identified in the Certificate of Representation as CT-1, CT-2, CT-3, and CT-4), located at the site identified by ORIS/Facility code 55230, the designated representative and the owner or operator, as applicable, shall comply with the following Clean Air Interstate Rule (CAIR) Permit requirements. Until approval of the Texas CAIR SIP by EPA, the permit holder shall comply with the equivalent requirements of 40 CFR Part 97 in place of the referenced 40 CFR Part 96 requirements in the Texas CAIR permit and 30 TAC Chapter 122 requirements.

A. General Requirements

(i) Under 30 TAC § 122.420(b) and 40 CFR §§ 96.120(b) and 96.220(b) the CAIR Permit requirements contained here are a separable portion of the Federal Operating Permit (FOP).

(ii) The owners and operators of the CAIR $NO_x$ and the CAIR $SO_2$ source shall operate the source and the unit in compliance with the requirements of this CAIR permit and all other applicable State and federal requirements.

(iii) The owners and operators of the CAIR $NO_x$ and the CAIR $SO_2$ source shall comply with the General Terms and Conditions of the FOP that incorporates this CAIR Permit.

(iv) The term for the initial CAIR permit shall commence with the issuance of the revision containing the CAIR permit and shall be the remaining term for the FOP that incorporates the CAIR permit. Renewal of the initial CAIR permit shall coincide with the renewal of the FOP that incorporates the CAIR permit and subsequent terms shall be no more than five years from the date of renewal of the FOP and run concurrent with the permit term of the FOP.

B. Monitoring and Reporting Requirements

(i) The owners and operators, and the CAIR designated representative, of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements contained 40 CFR Part 96, Subpart HH.

(ii) The owners and operators, and the CAIR designated representative, of the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements contained 40 CFR Part 96, Subpart HHH.

(iii) The emissions measurements recorded and reported in accordance with 40 CFR Part 96, Subpart HH and any other credible evidence shall be used to determine compliance by the CAIR $NO_x$ source with the CAIR $NO_x$ emissions limitation.

(iv) The emissions measurements recorded and reported in accordance with 40 CFR Part 96, Subpart HHH and any other credible evidence shall be used to determine compliance by the CAIR $SO_2$ source with the CAIR $SO_2$ emissions limitation.

C. $NO_x$ emissions requirements

(i) As of the allowance transfer deadline for a control period, the owners and operators of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source shall hold, in the source's compliance account, CAIR $NO_x$ allowances available for compliance deductions for the control period under 40 CFR § 96.154(a) in an amount not less than the tons of total nitrogen oxides emissions for the control period from all CAIR $NO_x$ units at the source, as determined in accordance the requirements 40 CFR Part 96, Subpart HH.

(ii) A CAIR $NO_x$ unit shall be subject to the requirements of paragraph C(i) of this CAIR Permit starting on the later of January 1, 2009, or the deadline for meeting the unit's monitor certification requirements under 40 CFR §§ 96.170(b)(1), (2), or (5).

(iii) A CAIR $NO_x$ allowance shall not be deducted, for compliance with the requirements of this permit, for a control period in a calendar year before the year for which the CAIR $NO_x$ allowance was allocated.

(iv) CAIR $NO_x$ allowances shall be held in, deducted from, or transferred into or among CAIR $NO_x$ Allowance Tracking System accounts in accordance with the requirements of 40 CFR Part 96, Subpart FF or Subpart GG.

(v) A CAIR $NO_x$ allowance is a limited authorization to emit one ton of nitrogen oxides in accordance with the CAIR $NO_x$ Annual Trading Program. No provision of the CAIR $NO_x$ Annual Trading Program, the CAIR permit application, the CAIR permit, or an exemption under 40 CFR § 96.105 and no provision of law shall be construed to limit the authority of the State or the United States to terminate or limit such authorization.

(vi) A CAIR $NO_x$ allowance does not constitute a property right.

(vii) Upon recordation by the Administrator under 40 CFR Part 96, Subpart FF or Subpart GG, every allocation, transfer, or deduction of a CAIR $NO_x$ allowance to or from a CAIR $NO_x$ unit's compliance account is incorporated automatically in this CAIR permit.

D. $NO_x$ excess emissions requirements

(i) If a CAIR $NO_x$ source emits nitrogen oxides during any control period in excess of the CAIR $NO_x$ emissions limitation, the owners and operators of the source and each CAIR $NO_x$ unit at the source shall surrender the CAIR $NO_x$ allowances required for deduction under 40 CFR § 96.154(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law.

(ii) Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 40 CFR Part 96, Subpart AA, the Clean Air Act, and applicable State law.

E. $SO_2$ emissions requirements

(i) As of the allowance transfer deadline for a control period, the owners and operators of the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall hold, in the source's compliance account, CAIR $SO_2$ allowances available for compliance deductions for the control period under 40 CFR § 96.254(a) and (b) in an amount not less than the tons of total sulfur dioxides emissions for the control period from all CAIR $SO_2$ units at the source, as determined in accordance the requirements 40 CFR Part 96, Subpart HHH.

(ii) A CAIR $SO_2$ unit shall be subject to the requirements of paragraph E(i) of this CAIR Permit starting on the later of January 1, 2010, or the deadline for meeting the unit's monitor certification requirements under 40 CFR § 96.270(b)(1), (2), or (5).

(iii) A CAIR $SO_2$ allowance shall not be deducted, for compliance with the requirements of this permit, for a control period in a calendar year before the year for which the CAIR $SO_2$ allowance was allocated.

(iv) CAIR $SO_2$ allowances shall be held in, deducted from, or transferred into or among CAIR $SO_2$ Allowance Tracking System accounts in accordance with the requirements of 40 CFR Part 96, Subpart FFF or Subpart GGG.

(v) A CAIR $SO_2$ allowance is a limited authorization to emit sulfur dioxide in accordance with the CAIR $SO_2$ Trading Program. No provision of the CAIR $SO_2$ Trading Program, the CAIR permit application, the CAIR permit, or an exemption under 40 CFR § 96.205 and no provision of law shall be construed to limit the authority of the State or the United States to terminate or limit such authorization.

(vi) A CAIR $SO_2$ allowance does not constitute a property right.

(vii) Upon recordation by the Administrator under 40 CFR Part 96, Subpart FFF or Subpart GGG, every allocation, transfer, or deduction of a CAIR $SO_2$ allowance to or from a CAIR $SO_2$ unit's compliance account is incorporated automatically in this CAIR permit.

F. $SO_2$ excess emissions requirements

(i) If a CAIR $SO_2$ source emits sulfur dioxides during any control period in excess of the CAIR $SO_2$ emissions limitation, the owners and operators of the source and each CAIR $SO_2$ unit at the source shall surrender the CAIR $SO_2$ allowances required for deduction under

40 CFR § 96.254(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law.

(ii) Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 40 CFR Part 96, Subpart AAA, the Clean Air Act, and applicable State law.

G. Recordkeeping and Reporting Requirements

(i) Unless otherwise provided, the owners and operators of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source and the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall keep on-site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time before the end of 5 years, in writing by the permitting authority or the Administrator.

1. The certificate of representation under 40 CFR §§ 96.113 and 96.213 for the CAIR $NO_x$ designated representative for the source and each CAIR $NO_x$ unit and the CAIR $SO_2$ designated representative for the source and each CAIR $SO_2$ unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation; provided that the certificate and documents shall be retained on-site at the source beyond such five-year period until such documents are superseded because of the submission of a new certificate of representation under 40 CFR §§ 96.113 and 96.213 changing the CAIR designated representative.

2. All emissions monitoring information, in accordance with 40 CFR Part 96, Subpart HH and Subpart HHH, provided that to the extent that these subparts provide for a three-year period for recordkeeping, the three-year period shall apply.

3. Copies of all reports, compliance certifications, and other submissions and all records made or required under the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program or relied upon for compliance determinations.

4. Copies of all documents used to complete a CAIR permit application and any other submission under the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program or to demonstrate compliance with the requirements of the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program.

(ii) The CAIR designated representative of a CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source and a CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall submit the reports required under the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program including those under 40 CFR Part 96, Subpart HH and Subpart HHH.

H. The CAIR $NO_x$ source and each CAIR $NO_x$ unit shall meet the requirements of the CAIR $NO_x$ Annual Trading Program contained in 40 CFR Part 96, Subparts AA through II.

I. The CAIR $SO_2$ source and each CAIR $SO_2$ unit shall meet the requirements of the CAIR $SO_2$ Trading Program contained in 40 CFR Part 96, Subparts AAA through III.

J. Any provision of the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program that applies to a CAIR $NO_x$ source or CAIR $SO_2$ source or the CAIR designated representative of a CAIR $NO_x$ source or CAIR $SO_2$ source shall also apply to the owners and operators of such source and the units at the source.

K. Any provision of the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program that applies to a CAIR $NO_x$ unit or CAIR $SO_2$ unit or the CAIR designated representative of a CAIR $NO_x$ unit or CAIR $SO_2$ unit shall also apply to the owners and operators of such unit.

L. No provision of the CAIR $NO_x$ Annual Trading Program, CAIR $SO_2$ Trading Program, a CAIR permit application, a CAIR permit, or an exemption under 40 CFR §§ 96.105 or 96.205 shall be construed as exempting or excluding the owners and operators, and the CAIR designated representative, of a CAIR $NO_x$ source or CAIR $NO_x$ unit or a CAIR $SO_2$ source or CAIR $SO_2$ unit from compliance with any other provision of the applicable, approved State implementation plan, a federally enforceable permit, or the Clean Air Act.

## ATTACHMENTS

**Applicable Requirements Summary**

**Additional Monitoring Requirements**

**Permit Shield**

**New Source Review Authorization References**

## Applicable Requirements Summary

**Unit Summary** ..... 22

**Applicable Requirements Summary** ..... 23

Note: A "none" entry may be noted for some emission sources in this permit's "Applicable Requirements Summary" under the heading of "Monitoring and Testing Requirements" and/or "Recordkeeping Requirements" and/or "Reporting Requirements." Such a notation indicates that there are no requirements for the indicated emission source as identified under the respective column heading(s) for the stated portion of the regulation when the emission source is operating under the conditions of the specified SOP Index Number. However, other relevant requirements pursuant to 30 TAC Chapter 122 including Recordkeeping Terms and Conditions (30 TAC § 122.144), Reporting Terms and Conditions (30 TAC § 122.145), and Compliance Certification Terms and Conditions (30 TAC § 122.146) continue to apply.

## Unit Summary

| Unit/Group/ Process ID No. | Unit Type | Group/Inclusive Units | SOP Index No. | Regulation | Requirement driver |
|---|---|---|---|---|---|
| B-1 | Boilers/Steam Generators/Steam Generating Units | N/A | 60Dc-1 | 40 CFR Part 60, Subpart Dc | No changing attributes. |
| B-2 | Boilers/Steam Generators/Steam Generating Units | N/A | 60Dc-2 | 40 CFR Part 60, Subpart Dc | No changing attributes. |
| DG-2 | Stationary Reciprocating Int. Comb. Engines | N/A | 60IIII-1 | 40 CFR Part 60, Subpart IIII | No changing attributes. |
| HRSG-1 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-1 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-1 | Stationary Turbines | N/A | 60GG-1 | 40 CFR Part 60, Subpart GG | No changing attributes. |
| HRSG-2 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-1 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-2 | Stationary Turbines | N/A | 60GG-1 | 40 CFR Part 60, Subpart GG | No changing attributes. |
| HRSG-3 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-2 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-3 | Stationary Turbines | N/A | 60KKKK-1 | 40 CFR Part 60, Subpart KKKK | No changing attributes. |
| HRSG-4 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-2 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-4 | Stationary Turbines | N/A | 60KKKK-1 | 40 CFR Part 60, Subpart KKKK | No changing attributes. |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements (30 TAC § 122.144) | Reporting Requirements (30 TAC § 122.145) |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | | |
| B-1 | EU | 60Dc-1 | $SO_2$ | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-1 | EU | 60Dc-1 | PM | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-1 | EU | 60Dc-1 | PM (Opacity) | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | $SO_2$ | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | PM | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | PM (Opacity) | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements (30 TAC § 122.144) | Reporting Requirements (30 TAC § 122.145) |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | | |
| HRSG-1 | EU | 60DA-1 | $NO_X$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-2 | EU | 60DA-1 | $NO_X$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-3 | EU | 60DA-2 | $NO_X$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-4 | EU | 60DA-2 | $NO_X$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements (30 TAC § 122.144) | Reporting Requirements (30 TAC § 122.145) |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | | |
| DG-2 | EU | 60IIII-1 | $NO_X$ | 40 CFR Part 60, Subpart IIII | § 60.4200(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart IIII |
| HRSG-1 | EU | 60GG-1 | $SO_2$ | 40 CFR Part 60, Subpart GG | § 60.333(a) | No stationary gas turbine shall cause to be discharged into the atmosphere any gases which contain sulfur dioxide in excess of 0.015% by volume at 15% $O_2$ dry basis. | § 60.334(h)<br>[G]§ 60.334(h)(3) | None | None |
| HRSG-1 | EU | 60GG-1 | $NO_X$ | 40 CFR Part 60, Subpart GG | § 60.332(a)(1)<br>§ 60.332(a)(3) | No owner or operator shall discharge into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of the amount as determined from the specified equation. | § 60.334(j)<br>§ 60.334(j)(1)<br>[G]§ 60.334(j)(1)(iii)<br>[G]§ 60.335(a)<br>§ 60.335(b)(2)<br>§ 60.335(b)(3)<br>** See CAM Summary | None | § 60.334(j)<br>§ 60.334(j)(5) |
| HRSG-2 | EU | 60GG-1 | $SO_2$ | 40 CFR Part 60, Subpart GG | § 60.333(a) | No stationary gas turbine shall cause to be discharged into the atmosphere any gases which contain sulfur dioxide in excess of 0.015% by volume at 15% $O_2$ dry basis. | § 60.334(h)<br>[G]§ 60.334(h)(3) | None | None |
| HRSG-2 | EU | 60GG-1 | $NO_X$ | 40 CFR Part 60, Subpart GG | § 60.332(a)(1)<br>§ 60.332(a)(3) | No owner or operator shall discharge into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of the amount as determined from the specified equation. | § 60.334(j)<br>§ 60.334(j)(1)<br>[G]§ 60.334(j)(1)(iii)<br>[G]§ 60.335(a)<br>§ 60.335(b)(2)<br>§ 60.335(b)(3)<br>** See CAM Summary | None | § 60.334(j)<br>§ 60.334(j)(5) |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements (30 TAC § 122.144) | Reporting Requirements (30 TAC § 122.145) |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | | |
| HRSG-3 | EU | 60KKKK-1 | $NO_x$ | 40 CFR Part 60, Subpart KKKK | § 60.4305 The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart KKKK |
| HRSG-4 | EU | 60KKKK-1 | $NO_x$ | 40 CFR Part 60, Subpart KKKK | § 60.4305 The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart KKKK |

## Additional Monitoring Requirements

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Periodic Monitoring Summary.....30

## CAM Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-1 | |
| Control Device ID No.: SCR1 | Control Device Type: Selective Catalytic Reduction (SCR) |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart GG | SOP Index No.: 60GG-1 |
| Pollutant: $NO_X$ | Main Standard: § 60.332(a)(1) |
| **MONITORING INFORMATION** | |
| Indicator: Nitrogen Oxides Concentration | |
| Minimum Frequency: four times per hour | |
| Averaging Period: one hour | |
| Deviation Limit: Maximum NOx concentration = 5 ppmvd (@ 15% oxygen) | |
| CAM Text: Use a continuous emission monitoring system (CEMS) to measure and record the concentration of nitrogen oxides and either oxygen or carbon dioxide in the exhaust stream of the control device. The CEMS shall be operated in accordance with the monitoring requirements of 40 CFR § 60.13 and the performance specifications of 40 CFR Part 60, Appendix B. NOx Emissions shall be corrected/calculated in units of the underlying applicable emission limitation (grams per horsepower-hour, pounds per MMBtu, pounds per hour). | |

## CAM Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-2 | |
| Control Device ID No.: SCR2 | Control Device Type: Selective Catalytic Reduction (SCR) |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart GG | SOP Index No.: 60GG-1 |
| Pollutant: $NO_X$ | Main Standard: § 60.332(a)(1) |
| **MONITORING INFORMATION** | |
| Indicator: Nitrogen Oxides Concentration | |
| Minimum Frequency: four times per hour | |
| Averaging Period: one hour | |
| Deviation Limit: Maximum NOx concentration = 5 ppmvd (@ 15% oxygen) | |
| CAM Text: Use a continuous emission monitoring system (CEMS) to measure and record the concentration of nitrogen oxides and either oxygen or carbon dioxide in the exhaust stream of the control device. The CEMS shall be operated in accordance with the monitoring requirements of 40 CFR § 60.13 and the performance specifications of 40 CFR Part 60, Appendix B. $NO_x$ Emissions shall be corrected/calculated in units of the underlying applicable emission limitation (grams per horsepower-hour, pounds per MMBtu, pounds per hour). | |

## Periodic Monitoring Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-1, HRSG-2, HRSG-3, HRSG-4 | |
| Control Device ID No.: N/A | Control Device Type: N/A |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart Da | SOP Index No.: 60DA-1, 60DA-2 |
| Pollutant: PM, PM(Opacity) | Main Standard: § 60.42Da(a)(1), § 60.42Da(b) |
| **MONITORING INFORMATION** | |
| Indicator: Fuel Type | |
| Minimum Frequency: N/A | |
| Averaging Period: N/A | |
| Deviation Limit: Fuel usage limited to pipeline-quality natural gas containing no more than 2.0 grains total sulfur per 100 dscf | |
| Periodic Monitoring Text: Record the type of fuel used by the unit. If an alternate fuel is fired, either alone or in combination with the specified gas, it shall be considered and reported as a deviation. | |

## Permit Shield

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## Permit Shield

The Executive Director of the TCEQ has determined that the permit holder is not required to comply with the specific regulation(s) identified for each emission unit, group, or process in this table.

| Unit/Group/Process | | Regulation | Basis of Determination |
|---|---|---|---|
| ID No. | Group/Inclusive Units | | |
| CP-2 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| CT-2 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| CV-1 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| DG-1 | N/A | 40 CFR Part 60, Subpart IIII | Generator engine constructed prior to 7/11/2005 |
| FWP-1 | N/A | 40 CFR Part 60, Subpart IIII | Fire water pump engine constructed prior to 7/11/2005 |
| GRP-CTV | CTV-1, CTV-10, CTV-2, CTV-3, CTV-4, CTV-5, CTV-6, CTV-7, CTV-8, CTV-9 | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| HRSG-1 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-1 | N/A | 40 CFR Part 60, Subpart Db | Facility is subject to NSPS Da and therefore is not subject to NSPS Db. |
| HRSG-1 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-1 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |
| HRSG-2 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-2 | N/A | 40 CFR Part 60, Subpart Db | Facility is subject to NSPS Da and therfore is not subject to NSPS Db. |
| HRSG-2 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-2 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |

## Permit Shield

The Executive Director of the TCEQ has determined that the permit holder is not required to comply with the specific regulation(s) identified for each emission unit, group, or process in this table.

| Unit/Group/Process | | Regulation | Basis of Determination |
|---|---|---|---|
| ID No. | Group/Inclusive Units | | |
| HRSG-3 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-3 | N/A | 40 CFR Part 60, Subpart Db | Source is subject to Subpart Da |
| HRSG-3 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-3 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |
| HRSG-4 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-4 | N/A | 40 CFR Part 60, Subpart Db | Source is subject to Subpart Da |
| HRSG-4 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-4 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |

## New Source Review Authorization References

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New Source Review Authorization References by Emission Unit ..... 36

## New Source Review Authorization References

The New Source Review authorizations listed in the table below are applicable requirements under 30 TAC Chapter 122 and enforceable under this operating permit.

| PSD Permits | NA Permits |
|---|---|
| PSD Permit No.: PSDTX1026 | NA Permit No.: N/A |
| PSD Permit No.: PSDTX1117 | NA Permit No.: N/A |
| **Title 30 TAC Chapter 116 Permits, Special Permits, and Other Authorizations (Other Than Permits By Rule, PSD Permits, or NA Permits) for the Application Area.** | |
| Authorization No.: 52756 | Authorization No.: 83801 |
| **Permits By Rule (30 TAC Chapter 106) for the Application Area** | |
| Number: 106.263 | Version No./Date: 11/01/2001 |
| **Municipal Solid Waste and Industrial Hazardous Waste Permits With an Air Addendum** | |
| Permit No.: N/A | Permit No.: N/A |

## New Source Review Authorization References by Emissions Unit

The following is a list of New Source Review (NSR) authorizations for emission units listed elsewhere in this operating permit. The NSR authorizations are applicable requirements under 30 TAC Chapter 122 and enforceable under this operating permit.

| Unit/Group/Process ID No. | Emission Unit Name /Description | New Source Review Authorization |
|---|---|---|
| B-1 | Aux Boiler 1 | 52756, PSDTX1026 |
| B-2 | Aux Boiler 2 | 83801, PSDTX1117 |
| CP-2 | Chiller No. 2 Cooling Tower Vents | 83801, PSDTX1117 |
| CT-2 | Cooling Tower No. 2 Vents | 83801, PSDTX1117 |
| CTV-10 | Cooling Tower Vent #10 | 52756, PSDTX1026 |
| CTV-1 | Cooling Tower Vent #1 | 52756, PSDTX1026 |
| CTV-2 | Cooling Tower Vent #2 | 52756, PSDTX1026 |
| CTV-3 | Cooling Tower Vent #3 | 52756, PSDTX1026 |
| CTV-4 | Cooling Tower Vent #4 | 52756, PSDTX1026 |
| CTV-5 | Cooling Tower Vent #5 | 52756, PSDTX1026 |
| CTV-6 | Cooling Tower Vent #6 | 52756, PSDTX1026 |
| CTV-7 | Cooling Tower Vent #7 | 52756, PSDTX1026 |
| CTV-8 | Cooling Tower Vent #8 | 52756, PSDTX1026 |
| CTV-9 | Cooling Tower Vent #9 | 52756, PSDTX1026 |
| CV-1 | Chiller Unit 1 | 52756, PSDTX1026 |
| DG-1 | Diesel Generator Engine 1 | 52756, PSDTX1026 |
| DG-2 | Emergency Diesel Generator Engine 2 | 83801, PSDTX1117 |
| FWP-1 | Diesel Fire Water Pump Engine | 52756, PSDTX1026 |
| HRSG-1 | Turbine/Duct Burner 1 | 52756, PSDTX1026 |
| HRSG-2 | Turbine/Duct Burner 2 | 52756, PSDTX1026 |
| HRSG-3 | Combined Cycle Turbine/Duct Burner 3 | 83801, PSDTX1117 |
| HRSG-4 | Combined Cycle Turbine/Duct Burner 4 | 83801, PSDTX1117 |

## APPENDIX A

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## Acronym List

The following abbreviations or acronyms may be used in this permit:

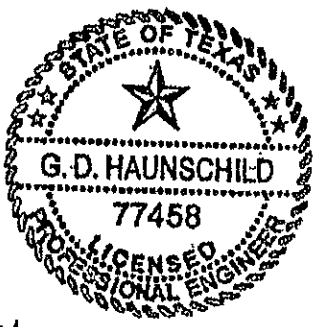
ACFM ..... actual cubic feet per minute
AMOC ..... alternate means of control
ARP ..... Acid Rain Program
ASTM ..... American Society of Testing and Materials
B/PA ..... Beaumont/Port Arthur (nonattainment area)
CAM ..... Compliance Assurance Monitoring
CD ..... control device
COMS ..... continuous opacity monitoring system
CVS ..... closed-vent system
D/FW ..... Dallas/Fort Worth (nonattainment area)
DR ..... Designated Representative
ElP ..... El Paso (nonattainment area)
EP ..... emission point
EPA ..... U.S. Environmental Protection Agency
EU ..... emission unit
FCAA Amendments ..... Federal Clean Air Act Amendments
FOP ..... federal operating permit
GF ..... grandfathered
gr/100 scf ..... grains per 100 standard cubic feet
HAP ..... hazardous air pollutant
H/G ..... Houston/Galveston (nonattainment area)
$H_2S$ ..... hydrogen sulfide
ID No. ..... identification number
lb/hr ..... pound(s) per hour
MMBtu/hr ..... Million British thermal units per hour
MRRT ..... monitoring, recordkeeping, reporting, and testing
NA ..... nonattainment
N/A ..... not applicable
NADB ..... National Allowance Data Base
$NO_x$ ..... nitrogen oxides
NSPS ..... New Source Performance Standard (40 CFR Part 60)
NSR ..... New Source Review
ORIS ..... Office of Regulatory Information Systems
Pb ..... lead
PBR ..... Permit By Rule
PM ..... particulate matter
ppmv ..... parts per million by volume
PSD ..... prevention of significant deterioration
RO ..... Responsible Official
$SO_2$ ..... sulfur dioxide
TSP ..... total suspended particulate
TVP ..... true vapor pressure
U.S.C. ..... United States Code
VOC ..... Volatile organic compound

Attachment E

BEPC's Application Submitted to Obtain TCEQ Permit No. 52756, PSDTX1026

# BRAZOS ELECTRIC POWER COOPERATIVE, INC
# JACK COUNTY GENERATION FACILITY
# JACKSBORO, TEXAS
# CN600128821
# RN100221985
# ACCOUNT NO. JA-0068-E

## POWER PLANT EXPANSION PROJECT
## PSD/NSR AIR PERMIT APPLICATION




*Prepared for:*
Brazos Electric Power Cooperative, Inc.
2404 LaSalle Avenue
Waco, Texas 76702-2585

Gregory D. Haunschild, Registration No. 77458
Professional Engineer Name, License Number, Signature, Seal

January 2008

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# 1 Introduction

Brazos Electric Power Cooperative, Inc. (BEC) is submitting a PSD air permit application to the Texas Commission of Environmental Quality (TCEQ) for a permit to expand the existing Jack County Generation Facility. The existing BEC facility is permitted by the TCEQ under Permit No. 52756 and PSD-TX-1026.

The existing Jack County Generation Facility is authorized to operate the following primary sources:

- Two GE Combustion Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-1 and HRSG-2);
- One Gas-Fired Auxiliary Steam Boiler (B-1);
- One Diesel Generator Engine (DG-1);
- One Diesel Fire Water Pump Engine (FWP-1);
- One Cooling Tower (CT-1);
- One Chiller (CV1-CV16)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

BEC is now proposing to expand the power plant by installing two additional gas-fired combined cycle combustion turbines with duct burners (HRSG-3 and HRSG-4). The GE turbines are equipped with DLN technology and an SCR unit to reduce NOx emissions. The turbine generators are capable of generating 171.7 MW ISO under base load conditions. The steam turbine generator is rated for nominal 320 MW. The plant expansion project power generating capacity is approximately 663 MW.

As part of this plant expansion BEC is installing the following new sources:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

The TCEQ is the regulatory authority responsible for reviewing the application and issuing the preconstruction air quality permit. The existing power plant is currently

authorized under PSD (PSD-TX-1026) and NSR 52756 air permits. BEC is requesting a new PSD permit for the plant expansion.

The principal contact and applicant for the proposed permit is:

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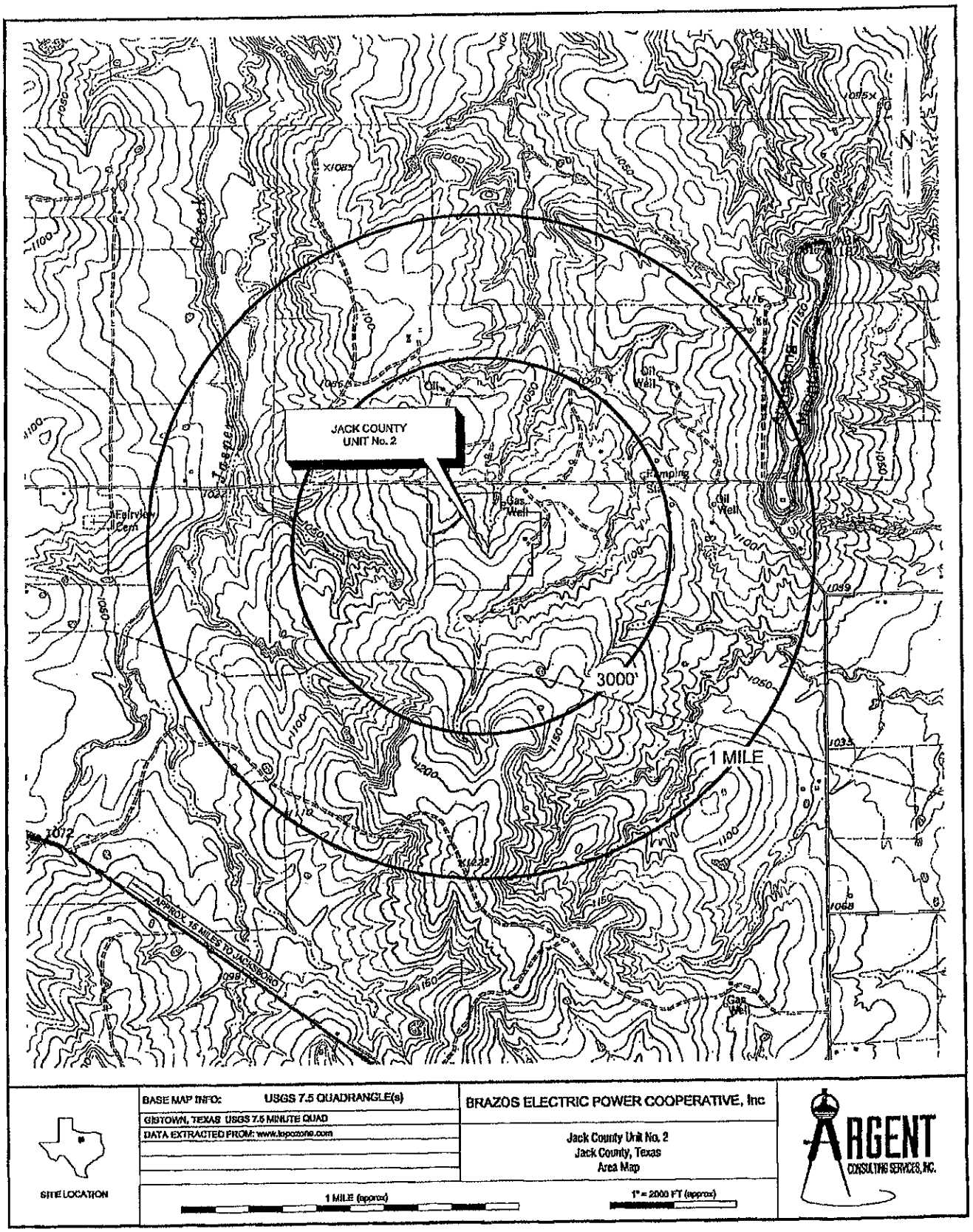
# 2 AREA MAPS AND PLOT PLAN

The following area maps, plot plans and diagrams show the location of the site and detail the layout of the site.

- Figure 2-1: Site Area Map
- Figure 2-2: Aerial Photograph of Site
- Figure 2-3: Facility Plot Plan
- Figure 2-4: Facility Process Flow Diagram

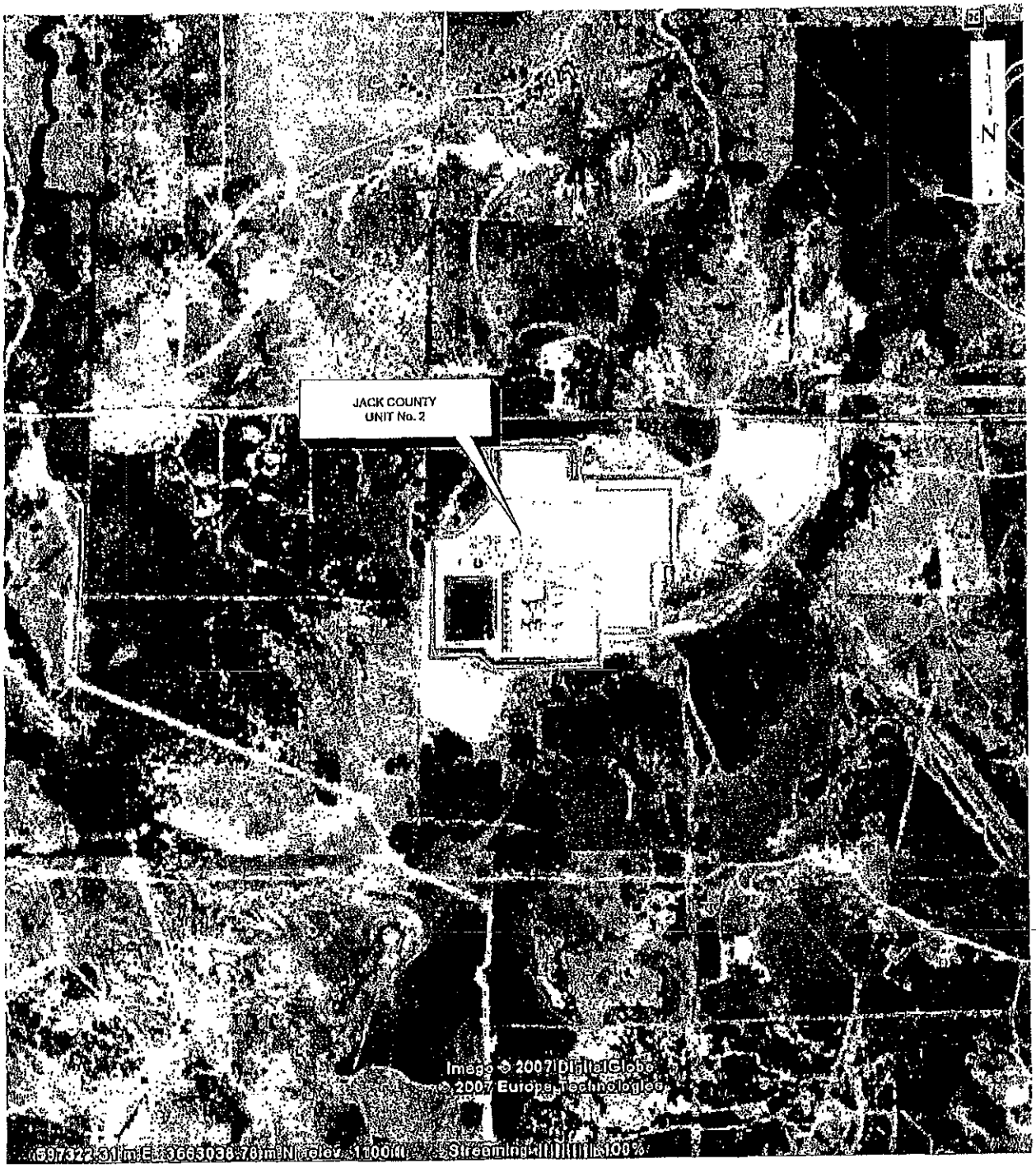
Figures 2-1 and 2-2 show the location of the facility in relation to the surrounding area. Figure 2-3 shows the entire facility, and identifies the key structures and emission sources at the proposed facility. Figure 2-4 provides a process flow diagram for the facility after the proposed expansion.




| | | |
|---|---|---|
| SITE LOCATION | BASE MAP INFO: USGS 7.5 QUADRANGLE(s)<br>GIBTOWN, TEXAS USGS 7.5 MINUTE QUAD<br>DATA EXTRACTED FROM: www.topozone.com | BRAZOS ELECTRIC POWER COOPERATIVE, Inc<br>Jack County Unit No. 2<br>Jack County, Texas<br>Area Map |
| | 1 MILE (approx) | 1" = 2000 FT (approx) |

ARGENT CONSULTING SERVICES, INC.

Figure 2-2: Aerial Photograph of Site




| | | |
|---|---|---|
| SITE LOCATION | AERIAL PHOTO INFO:<br>EXTRACTED FROM: Google Earth | BRAZOS ELECTRIC POWER COOPERATIVE, Inc<br>Jack County Unit No. 2<br>Jack County, Texas<br>Aerial Photo |
| 1/2 MILE (approx) | 1" = 1000 FT (approx) | AGENT CONSULTING SERVICES, INC. |

Figure 2-3: Facility Plot Plan

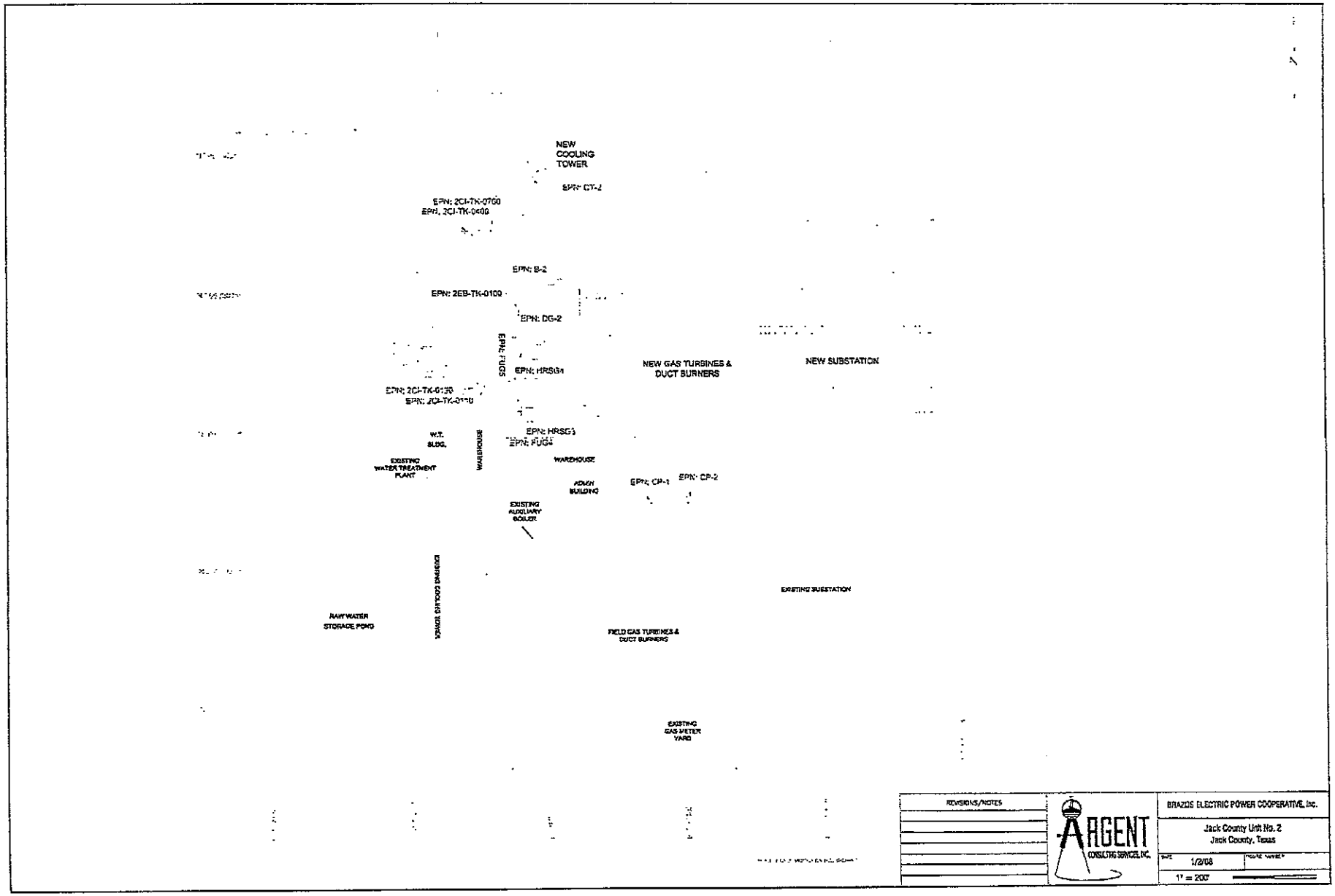
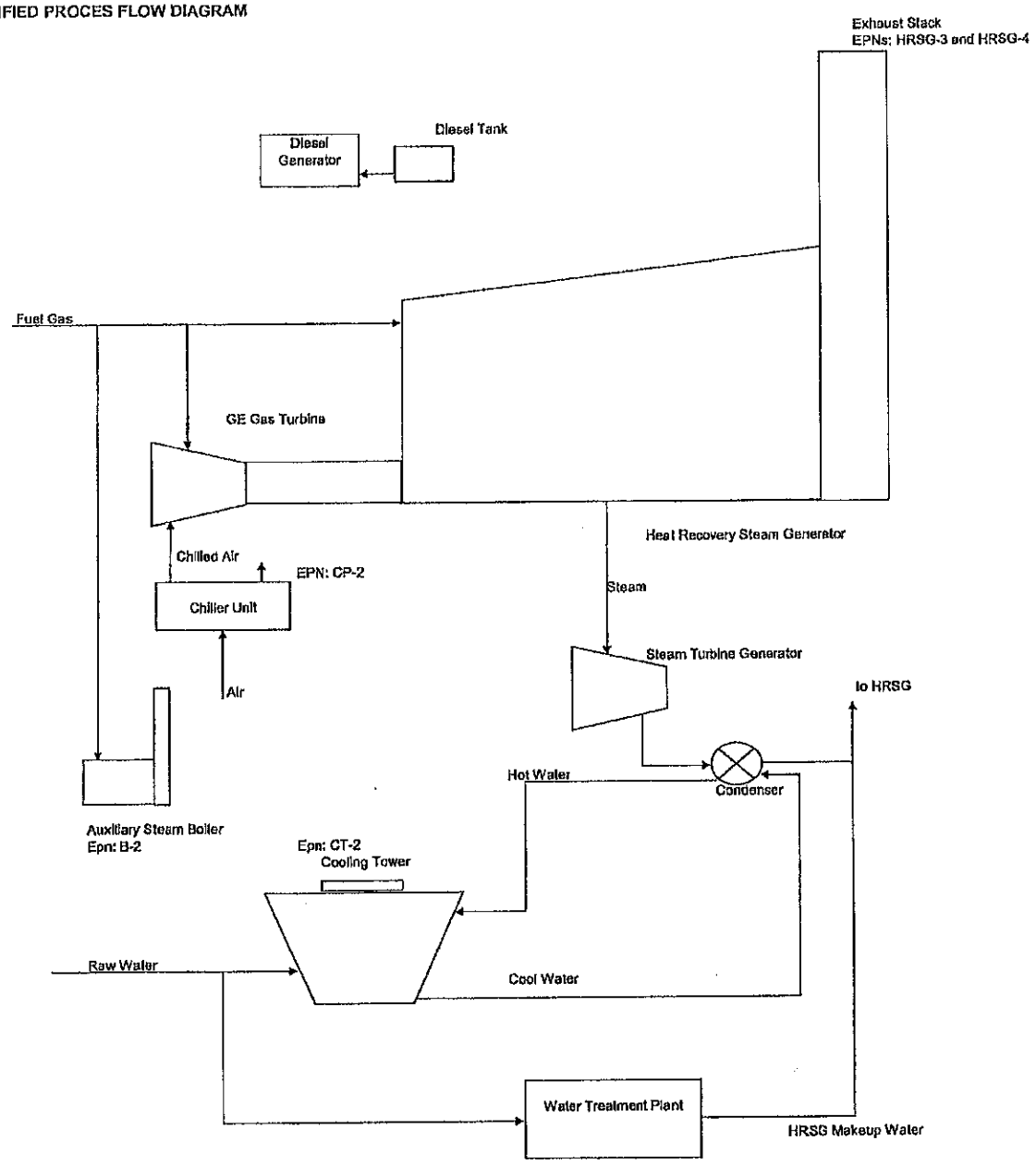

NEW
COOLING
TOWER
EPN: CT-2
EPN: 2CI-TK-0700
EPN: 2CI-TK-0400
EPN: B-2
EPN: 2EB-TK-0100
EPN: DG-2
EPN: FUG5
EPN: HRSG4
NEW GAS TURBINES &
DUCT BURNERS
NEW SUBSTATION
EPN: 2CI-TK-0130
EPN: 2CI-TK-0110
W.T.
BLDG.
WAREHOUSE
EPN: HRSG3
EPN: FUG4
EXISTING
WATER TREATMENT
PLANT
WAREHOUSE
ADMIN
BUILDING
EPN: CP-1
EPN: CP-2
EXISTING
AUXILIARY
BOILER
EXISTING SUBSTATION
RAW WATER
STORAGE POND
FIELD GAS TURBINES &
DUCT BURNERS
EXISTING
GAS METER
YARD
REVISIONS/NOTES
ARGENT
CONSULTING SERVICES, INC.
BRAZOS ELECTRIC POWER COOPERATIVE, Inc.
Jack County Unit No. 2
Jack County, Texas
DATE
1/2/08
1" = 200'

Figure 2-4: Facility Process Flow Diagram

BRAZOS ELECTRIC COOPERATIVE, INC.
JACK COUNTY GENERATION FACILITY
EXPANSION PROJECT

SIMPLIFIED PROCES FLOW DIAGRAM



# 3 PROJECT OVERVIEW

## 3.1 Facility Location and Regional Attainment Status

The Jack County Generation Facility is located in Jack County approximately 15 miles southeast of Jacksboro. Currently, Jack County is classified as an attainment area for all criteria pollutants [sulfur oxides, measured as sulfur dioxide ($SO_2$); particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers ($PM_{10}$); particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$); carbon monoxide (CO); ozone ($O_3$); nitrogen dioxide ($NO_2$); and lead (Pb)].

## 3.2 Process Description

The Jack County Generation Facility is an existing 620 MW combined cycle power plant equipped with gas turbines, duct burners, and steam generator. BEC is proposing to expand the power plant by installing an additional nominal 663.4 MW of generating capacity.

The plant expansion will include two 171.7 MW General Electric 7FA-class natural gas fired combustion turbines (CTG) operating in combined-cycle mode with two supplementary fired heat recovery steam generators (HRSGs) and a reheat condensing steam turbine generator (STG). Steam generation in the HRSGs is augmented steam with supplementary natural gas-firing using duct burners. Each HRSG will produce high pressure steam for introduction into a steam turbine. The steam turbine will drive generators to increase the total plant output to approximately 510 MW without duct firing, or 663 MW with duct firing and inlet air chilling.

BEC will use combined cycle power generation technology to maximize generation efficiency and minimize fuel use. Efficient natural gas combustion combined with dry low-NOx technology and selective catalytic reduction (SCR) will minimize air pollutant emissions. Combined cycle technology is 50% more thermally efficient that vintage steam-electric plants. Since combined cycle plants burn less fossil fuel to generate an equivalent amount of power, they also emit substantially less air pollutants, including CO2.

Like the existing plant the expansion project will combine the Brayton and Rankine cycles to maximize thermal efficiency. Natural gas will be combusted in two Brayton cycle turbines, which will generate most of the electrical output. Instead of being discarded to the environment, the exhaust heat will be recovered in a Rankine cycle HRSG/steam turbine, and the heat will be extracted until the exhaust temperature is about 200 °F before being discarded through the stacks. This high-efficiency technology

combined with clean natural gas and BACT will yield a small fraction of air emissions compared to a conventional power plant.

Under the existing air permit BEC is authorized to operate the following equipment and emission sources:

- Two GE Combustion Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-1 and HRSG-2);
- One Gas-Fired Auxiliary Steam Boiler (B-1);
- One Diesel Generator Engine (DG-1);
- One Diesel Fire Water Pump Engine (FWP-1);
- One Cooling Tower (CT-1);
- One Chiller (CV1-CV16)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

The proposed expansion project will consist of the following new sources:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

### 3.2.1 Gas Turbine/HRSG Power Generators

BEC is proposing to install two 171.7 MW ISO General Electric 7FA gas turbines in combined cycle mode with duct-fired HRSGs and a common steam turbine generator (total 663 MW). The fuel will be exclusively pipeline quality natural gas. Each gas turbine power block will include an advanced combustion turbine, including an air compressor section, gas combustion system (utilizing advanced DLN combustors), power turbine, and a 60-hertz, 18 kilovolt (kV) generator.

Exhaust gas exiting the power turbine at approximately 1,100°F is ducted to a fired boiler commonly known as a heat recovery steam generator where steam is produced to generate additional electricity in a steam turbine generator. Natural gas fired duct burners located within the HRSGs are used for supplementary firing to increase steam output.

The combustion turbines are designed to operate in the dry low-NOx mode at loads from 50% up to base load rating and will normally be taken out of service only for scheduled maintenance, or as dictated by economic or electrical demand conditions.

A horizontal, natural circulation, three-pressure HRSG system will extract heat from the exhaust of each gas turbine. Exhaust gas entering the HRSG at approximately 1100°F will be cooled to approximately 200°F by the time it leaves the HRSG exhaust stack. Steam production in the HRSGs will be augmented using "low-NOx" duct burners that will be natural gas fired. The steam produced is used in the combined cycle plant for additional power and natural gas/feedwater heating. Each HRSG will include a high-pressure superheater, high-pressure evaporator, high-pressure economizer, reheat section, intermediate pressure superheater, intermediate pressure evaporator, intermediate pressure economizer, low pressure superheater, low pressure evaporator, and condensate/feedwater preheater. The surface condenser uses cooling tower water to condense the steam exhausting from the steam turbine.

### 3.2.2 Auxiliary Steam Boiler

A 36.6 MMBtu/hr nominally rated (at 105% load) package boiler will be located on site to supply heating steam for the steam turbine seals and for sparging of the HRSG steam drums during down periods. The boiler will be a fire-tube type and combust natural gas only. Make-up water will be received from the demineralizer system that feeds the auxiliary boiler deaerator.

The primary use of the auxiliary boiler will be to provide heat such that temperatures are elevated within the HRSG and steam turbine while the combustion turbines are off-line. By maintaining elevated temperatures in the turbine seals, piping, and HRSGs, the CTGs will be able to minimize the amount of startup time required to come back on line after a shut down. The steam from the auxiliary boiler will not be used to augment power generation of the CTGs or the steam turbine. BEC is proposing to limit the auxiliary boiler annual capacity factor to 20%. This limit effectively caps annual operating hours to no more than 1,752 hours per year if the boiler is operated at maximum capacity. By limiting the annual capacity factor rather than operating hours BEC can operate the boiler at lower loads while still establishing an emission cap based on an equivalent 1,752 hours/year.

### 3.2.3 Standby Generator Engine

A small 400 kW (600-hp) back-up diesel generator will be located on site. The back-up generator will provide power for turning gears, lube oil pumps and auxiliary cooling water pumps. BEC is proposing to limit operating hours to no more than 150 hours/year of non-emergency operations.

The final diesel engine selection has not been finalized but current plans are for a Cummins model or equivalent. BEC will insure that the final engine selection meets the emission requirements of 40 CFR 60 Subpart IIII for Tier 2 or Tier 3 engines.

### 3.2.4 Storage Tanks

BEC will install storage tanks for diesel fuel and for water treatment chemicals (caustics, acids, etc.). The only new volatile organic liquid tank is the diesel tank supporting the emergency generator engine.

### 3.2.5 Fuel Gas System

Pipeline quality natural gas will be delivered to the plant boundary at a pressure sufficient for use in the combustion turbines without additional fuel compression. The gas will be heated, if necessary, using hot water from the HRSGs.

Natural gas enters the plant through an existing meter skid that is already sized to handle the additional gas flow. The gas passes through a knockout drum for removal of any liquid which may have been carried through the pipeline. The gas is split into streams to supply each CTG/HRSG unit. The gas then passes through a series of filters and separator to remove particulate matter and entrained liquids.

### 3.2.6 Cooling Tower

A new cooling tower will be installed as part of the planned electric generating facility. The majority of the cooling water will be used in the surface condenser to absorb the heat rejected from the combined cycle. Water from the cooling tower is commonly referred to as "main" cooling water. A dedicated set of cooling water pumps is provided for this service. Additional cooling water will be required for auxiliary plant cooling. Cooling tower water is not used for direct cooling of plant auxiliaries; a closed loop auxiliary cooling system consisting of pumps, expansion tank, and heat exchangers is provided. Cooling tower water is circulated through a set of plate and frame heat exchangers to cool the closed loop coolant, usually a glycol/water mix. This is commonly referred to as "auxiliary" cooling water.

The cooling tower is designed to evaporate clean water, which is the mechanism that provides cooling. Some small droplets (referred to as drift) escape from the top of the tower and may liberate dissolved solids as they evaporate in the atmosphere.

### 3.2.7 Chillers

The turbines will employ an inlet chilling system to enhance the overall power output that would normally be lost due to lower air density at higher ambient temperatures. The process of cooling takes place at the cooling coils where inlet air is cooled before entering the CTG compressor. At lower temperatures, the air becomes denser and therefore more mass flows through the CTGs. The net increase in mass flow results in higher gross output for each of the CTGs. In addition to the output enhancement from the CTGs, the additional mass flow also increases output of the STG.

### 3.2.8 Buildings and Infrastructure

The following buildings will be constructed on site:

- Warehouse/Maintenance Building;
- Turbine Enclosures;
- Electrical Substation Buildings; and
- Standby Generator Shelter.

Access roads will be provided for operation, maintenance, and fire and emergency vehicles.

## 3.3 Emission Generating Equipment

Emission generating equipment at the expanded facility will consist of:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

### 3.3.1 Gas Turbine/HRSG Power Generators

The primary emissions sources for this project will be the two combustion turbines. The manufacturer (General Electric) provided hourly emission rates of criteria pollutants from the combustion turbines. Stack concentrations that result from these emission rates when combined with duct burning were determined by the project contractor with input from GE and the HRSG manufacturer. The NOx emissions were adjusted to account for the control effectiveness of the SCR system. Emissions of SO2 were calculated using expected turbine operational data and the maximum assumed sulfur content (2 gr/100 scf) of the pipeline quality natural gas.

Maximum hourly emission rates for each pollutant were established after reviewing the provided vendor data over the range of potential ambient temperatures and proposed operating loads. Annual emissions were based on the highest hourly emission rate over the proposed operating range and assuming both turbines would be operated continuously. These emissions do not include start-up and shut-down operations. BEC is proposing the following emissions rates for the CTG/HRSG units:

| Pollutant | lb/hr | tpy | Project (tpy) |
|---|---|---|---|
| NOx | 43.61 | 191.01 | 382.02 |
| CO | 58.72 | 257.19 | 514.39 |
| TSP/PM10 | 13.65 | 59.79 | 119.57 |
| SO2 | 13.01 | 14.25 | 28.50 |
| VOC | 5.36 | 23.48 | 46.95 |
| NH3 | 22.60 | 98.99 | 197.98 |

BEC is permitting these units as based load generators, not peaking units. BEC intends to normally operate the CTG/HRSG units no lower than a 50% load factor. However, there may be short periods when an extended down turn below 50% is necessary due to factors beyond the control of BEC. BEC proposes to include the following permit condition:

- Reduced load operation below 50 percent of base load not associated with start-up, shutdown, upset, or maintenance is authorized, provided that the $NO_x$ and CO maximum pounds per hour (lb/hr) emission rates for $NO_x$ and CO specified in the MAERT are not exceeded.

This condition will allow for low load (<50%) operations for short periods without having to shutdown the units for economic dispatch. The proposed permit condition insures that the mass emission rates for these contaminants are not exceeded while allowing BEC the flexibility to respond to market conditions in a cost efficient manner.

### 3.3.2 Auxiliary Steam Boiler

The project will utilize a 36.6 MMBtu/hr (HHV at 105% load) gas-fired auxiliary boiler to maintain minimal steam flow when the turbines are not in operation. Maximum emission rate factors for the boiler unit were provided by the manufacturer. The auxiliary boiler does not operate continuously. However, to maintain maximum flexibility BEC proposes to limit the annual capacity factor rather than a specific hourly limit in the permit.

| | |
|---|---|
| Max Rating: | 36.6 MMBtu/hr |
| Fuel Heat: | 1,020 Btu/scf (HHV) |
| Max Fuel Consumption: | 314.33 MMscf/yr |
| Limited Fuel Consumption: | 62.87 MMscf/yr |
| Annual Capacity Factor: | 20% |

BEC proposes to limit the annual capacity factor of the auxiliary boiler to 20%. This allows for approximately 1752 hours of operation annually at full load. Detailed emission calculations are included in this application.

### 3.3.3 Standby Diesel Generator

The plant expansion will include a single 400 kW diesel engine backup generator engine. New compression ignition engines are subject to the recently promulgated NSPS Subpart IIII regulation which cites Tier 2 and Tier 3 emission limits. The emission rates represented in this application are the Tier 3 limits. BEC is proposing to limit annual operating hours to 150 hours per year which will allow for up to 100 hours for maintenance and testing, plus an additional 50 hours for other operational requirements.

### 3.3.4 Storage Tanks

There are three (3) storage tanks included in the expansion project which store VOC or a regulated pollutant. These include a small diesel tank for the generator, an aqueous ammonia tank for the SCR system, and a sulfuric acid tank for the water treatment plant. The ammonia tank is pressurized with the only associated emissions resulting from fugitives.

EPA's Tank 4.1 was used to estimate emissions from the diesel tank and the sulfuric acid tank. Emissions from two additional inorganic liquids tanks are also included.

### 3.3.5 Fuel Gas System (Fugitives)

The main fugitive emission source is equipment (valves, flanges, etc.) leaks from the fuel handling system, a potential source of VOC. Emissions from these sources were estimated using TCEQ approved Oil and Gas factors and an estimated component count.

Fugitive emissions from the ammonia handling system were calculated in the same manner as VOC except that TCEQ approved SOCMI w/o ethylene factors were used.

### 3.3.6 Cooling Tower

The process cooling tower will be a source of $PM_{10}$ emissions. The emissions from the cooling tower are dependent upon several factors: (1) the dissolved solids content of the circulating water, and (2) the amount of drift that leaves the tower. The dissolved solids content of the circulating water is dependent on the quality of the makeup water and the average number of cycles the water is allowed to circulate before being discharge through the blowdown system. The amount of drift is dependent on the tower design.

The method used to estimate particulate matter emissions is based on the approach presented by the EPA AP-42 Section 13. Using the cooling tower preliminary design characteristics and a drift rate of 0.001%, the total particulate emissions from the tower can be calculated. Once the total PM is calculated it is necessary to estimate the portion of total PM that is $PM_{10}$.

**$PM_{10}$ Estimation Methodology**

The EPA AP-42 Section 13 contains a factor for estimating $PM_{10}$ emissions as a portion of total PM. However, the EPA indicates that this factor is overly conservative which results in an overestimation of $PM_{10}$. Therefore, BEC is utilizing a more detailed method for estimating these emissions. The method and support data is contained in a paper entitled, "Calculating PM10 Emissions from Cooling Towers." The paper is included in the cooling tower emission calculation section of this application.

*Basis*

Each water droplet that leaves the cooling tower can be assumed to liberate solid particulate upon evaporation of the water in the droplet. Based on this assumption, the mass of solids (dissolved and suspended) in the droplet must equal the mass of solids in the final particle.

From the reference paper the following formula can be used to calculate the diameter of the final particle upon evaporation of the water:

$$D_p = D_d \times [(P_d/P_p) \times (Solids \times C) / 1{,}000{,}000]^{1/3}$$

Where

| | |
|---|---|
| $D_p$ = | diameter of final particulate |
| $P_p$ = | density of the final particle |
| $D_d$ = | diameter of the droplet |
| $P_d$ = | density of the droplet |
| Solids = | total solids (suspended and dissolved) |
| C = | cycles of concentration |

The mass fraction of droplets that will form particulates 10 microns (PM10) and smaller can be estimated for a given droplet size distribution using the above approach. Specifically, the particle size ($D_p$) is calculated using the above equation for each droplet size for a given distribution. The mass fraction of droplets corresponding to 10 micron particles and small is then summed.

Detailed cooling tower emissions are included in this application.

### 3.3.7 Chillers

The turbine inlet chillers will be a source of $PM_{10}$ emissions. The operating principle behind the chiller units is similar to the cooling tower. Therefore, the emission calculation methodology described for the cooling tower are used for the chillers and adjusted only for the smaller water recirculation rates.

Detailed chiller emissions are included in this application.

# 4 REGULATORY OVERVIEW

The Jack County Generation Facility is subject to federal, state, and local regulations governing the construction of new facilities. The lead agency for all air permitting in Texas is the TCEQ, which implements all of its own regulations and incorporates United States Environmental Protection Agency (EPA) regulatory requirements into its own program.

For regulatory review purposes, emission sources associated with the proposed Jack County Generation Facility expansion will include the following:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

BEC will comply with all federal, state and local air quality control requirements. The following sections describe the applicable federal and state air quality control regulations associated with the construction and operation of the expanded Jack County Generation Facility. No local regulations were identified.

## 4.1 Federal Air Quality Regulations

The Clean Air Act (CAA) of 1970, 42 USC 7401 et seq. amended in 1977 and 1990 and 40 CFR Parts 50-99 are the basic federal statutes and regulations governing air pollution. The following federal requirements have been reviewed to determine their applicability to the proposed Jack County Generation Facility expansion.

### 4.1.1 New Source Review (NSR)

Separate pre-construction review procedures have been established for projects that are proposed to be built in attainment areas versus nonattainment areas. The pre-construction review process for new or modified major sources located in attainment areas is called New Source Review, and may include a Prevention of Significant Deterioration (PSD) review. This review process is intended to keep new air emission sources from causing existing air quality to deteriorate beyond acceptable levels codified in the Federal regulations.

#### 4.1.1.1 Prevention of Significant Deterioration (PSD)

The emission threshold for "major stationary sources" varies under PSD according to the type of facility. As defined by 40 CFR Part 52.21(b)(1)(i), a facility is considered major under PSD if it has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. The Jack County Generation Facility process was permitted to authorize fossil fuel fired boilers totaling more than 250 MMBtu/hr, which are a specified source category. Therefore, the PSD threshold for this facility is 100 tpy. The proposed facility expansion emissions will be above the PSD thresholds for three criteria air pollutants: NOx, CO, and $PM_{10}$. Therefore, the facility expansion must be authorized under the PSD permitting requirements.

For new major sources, PSD applicability is based upon the definition of "major" as found in the PSD rules at 40 CFR §§51.165(v), 51.166(2), and 52.21. A PSD looks at proposed increases in emissions of more pollutants (all criteria pollutants and some others) but the increase resulting from the project must be more than an allowable level of increase called "PSD significance levels". The definition is limited in that a "major" source must lead to a net increase in air emissions above PSD significance levels.

**PSD SIGNIFICANCE LEVELS**

| Pollutant | Rate (tpy) |
|---|---|
| PM10 | 15 |
| TSP | 25 |
| SO2 | 40 |
| NOX | 40 |
| VOC (ozone) | 40 |
| CO | 100 |
| Pb | 0.6 |

The proposed expansion project will result in the PSD significance levels being exceeded for NOx, CO, VOC and $PM_{10}$.

One of the factors considered in the PSD permit review process is potential impacts on protected Class I airsheds located throughout the country. Class-I areas are specifically designated as pristine wilderness areas. The Project will not be located in a Class I area, nor will it be located within 100 kilometers of a Class I area, therefore a full Class I analysis will not be required to be included in the permit application. The closest Class I area to the project site is the Caney Creek Wilderness Area located approximately 300 kilometers east of the Project site.

Another factor considered in the PSD permit review is the potential impact of facility emissions on soil and vegetation and visibility. An additional impacts analysis addressing these factors will be submitted under separate cover as a part of the ambient air quality dispersion modeling impacts analysis.

#### 4.1.1.2 Nonattainment New Source Review (NNSR)

The federal pre-construction review for a new or modified major source located in a nonattainment area is commonly called Nonattainment New Source Review (NNSR). NNSR only applies to major sources of the pollutants that are classified as nonattainment; therefore a new facility could potentially undergo both types of review, depending on the emissions of the various pollutants and their respective attainment status. Jack County is classified as an attainment area for all criteria pollutants; therefore, the facility will not be subject to NNSR requirements.

### 4.1.2 Title V Operating Permit

The Title V Permit program, as described in 40 CFR Part 70, requires major sources of air emissions to obtain federal operating permits. In Texas, authority to issue Title V operating permits has been delegated, by the United States Environmental Protection Agency (EPA), to the TCEQ. The major source threshold levels for determining the need for a Title V operating permit are: 100 tpy of any criteria air pollutant, 10 tpy of any individual hazardous air pollutant (HAP) or 25 tpy of any combination of HAPs. Emissions of several criteria pollutants from the facility exceed 100 tpy; therefore, a Title V Operating Permit is required for this facility. The existing Jack County Generation Facility is operating under a Title V permit – BEC will modify the operating permit to include the new applicable requirements for the expanded facility by the deadline stipulated in 30 TAC 122.

### 4.1.3 New Source Performance Standards (NSPS)

40 CFR Part 60 establishes new source performance standards (NSPS) for specific emission sources. The following NSPS requirements were identified as potentially applicable to the specified sources at the facility.

40 CFR Part 60 Subpart Db: Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. Subpart Db lists affected emission sources as fuel fired steam-generating units with a heat input capacity of 100 MMBTU/hr to 250 MMBTU/hr. The definition of an applicable unit includes sources that produce steam or that heat water or any other heat transfer medium. The HRSG units are each rated in excess of 250 MMBtu/hr, therefore, these units are potentially subject to the requirements of Subpart Db. However, the new NSPS Subpart KKKK standard affects duct burners used in combined cycle systems. Therefore, the duct burners will comply with these standards.

40 CFR Part 60 Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. Subpart Dc lists affected emission sources is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr). The auxiliary boiler is rated in excess of 10 MMBtu/hr and is subject to the requirements of Subpart

Dc. Since this source will fire natural gas exclusively only recordkeeping and reporting requirements will apply.

40 CFR Part 60 Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels. Subpart Kb lists affected emission sources as storage vessels containing volatile organic liquids with regulatory applicability being dependent on the construction date of the storage vessel, the capacity, and the material stored. The expanded facility will have a single diesel fuel tank to support the generator engine. The diesel tank will not exceed 75 m3 (19,815 gallons) and are therefore not subject to this rule. This rule does not apply to inorganic storage tanks.

40 CFR 60 Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) as specified in the regulation. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. The expanded Jack County Generation Facility will be equipped with an additional diesel engine to drive a standby generator. BEC will insure that this source complies with all applicable requirements of this regulation.

40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines. Subpart KKKK establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that have a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel and that commenced construction, modification or reconstruction after February 18, 2005. The expanded Jack County Generation Facility will be equipped with two gas turbines that meet this qualification criteria. This subpart also applies to emissions from any associated HRSG and duct burners.

### 4.1.4 National Emissions Standards for Hazardous Air Pollutants (NESHAP)

40 CFR Part 61 contains the Federal emission standards that have been developed to address certain individual HAPs. The individual HAP rules are typically referred to as the national emission standards for hazardous air pollutants or NESHAP. The Jack County Generation Facility will not emit any of the individual HAPs included in the NESHAP rules; therefore the NESHAP regulations do not apply to this facility.

### 4.1.5 Maximum Achievable Control Technology (MACT) Standards

40 CFR Part 63, as incorporated by reference in TAC 113, contains the Federal emission standards that have been developed to address HAP emissions from a variety of source categories. The source category rules, commonly referred to as the MACT standards, apply to facilities that are classified as major sources of HAPs, and operate affected equipment as listed in each standard. A facility is a major source of HAPs if it emits any individual HAP in excess of 10 tpy or a combination of HAPs in excess of 25 tpy. The facility will not be a major source of HAPs, therefore the MACT standards do not apply.

### 4.1.6 Acid Rain Standards

40 CFR Part 70-75 contains the Federal emission standards that have been developed to address acid rain emissions from specified sources. BEC already complies with the acid rain program for the existing power generating facility. The expanded portion of the plant will be incorporated into the acid program as well. BEC will file the proper documents with the EPA and acquire an acid rain permit through the Texas federal operating permit program.

### 4.1.7 Clean Air Interstate Rule (CAIR)

40 CFR Part 96 contains the Federal emission standards that have been developed to address NOx and SO2 emissions from specified sources in the electric power generation category. BEC already complies with the CAIR program for the existing power generating facility. The expanded portion of the plant will be incorporated into the CAIR program as well. BEC will file the proper documents with the EPA and acquire a CAIR permit through the Texas federal operating permit program.

### 4.1.8 Risk Management Program

40 CFR Part 68, Chemical Accident Prevention Provisions, is a federal regulation designed to prevent the release of hazardous materials in the event of an accident and minimize impacts when releases do occur. The regulation contains a list of substances and threshold quantities for determining applicability of the rule to a facility. If a facility stores, handles, or processes one or more substances on this list and at a quantity equal to or greater than specified in the regulation, the facility must prepare and submit a risk management plan (RMP).

If a facility does not have a listed substance on site, or the quantity of a listed substance is below the applicability threshold, the facility does not have to prepare an RMP. However, it must still comply with requirements of the general duty provisions in Section 112(r)(1) of the 1990 Clean Air Act Amendments if it has any regulated substance or other extremely hazardous substance on-site.

The general duty provision is as follows:

*"The owners and operators of stationary sources producing, processing, handling and storing such substances have a general duty ... to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur."*

With the exception of natural gas constituents (e.g., methane, ethane, propane, etc.), no regulated substance will be handled or stored in quantities greater than the applicability threshold. Natural gas pipelines are not covered if the U.S. Department of Transportation (DOT) or an equivalent state natural gas program certified by DOT in accordance with 49 CFR §6010.5 regulates the pipeline.

The Jack County Generation Facility will not have on site any flammable or toxic materials that trigger the RMP rule. BEC will only store aqueous ammonia in solutions less than 20%.

## 4.2 State Air Quality Regulations

The TCEQ air permitting requirements are codified in the Texas Administrative Code (TAC) Title 30, Part I. These rules incorporate the federal program requirements listed in 40 CFR Parts 50-99, and establish permit review procedures for all facilities that can emit pollutants to the ambient air. All new facilities are required to obtain an air quality permit prior to initiating construction. Facilities can trigger additional review by EPA if emissions exceed the major source thresholds listed in 40 CFR §52.21. The proposed project will exceed these thresholds; therefore, EPA will be reviewing the permit application and TCEQ's proposed permit to ensure all federal program requirements are met.

The TCEQ has codified the federal PSD requirements in TAC 116.160. As indicated the emission threshold for a "major stationary source" varies under PSD according to the type of facility. As defined in 40 CFR 52, a facility is considered major under PSD if it emits or has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. There is more than 250 MMBtu/hr of fossil fuel fired boilers on-site; therefore, the PSD threshold for this facility is 100 tpy. The permitted facility emissions will exceed the 100 tpy threshold for NOx, CO and PM10; therefore the facility is a PSD major source and must be permitted under the PSD requirements.

The remainder of this section provides the information necessary to show the Jack County Generation Facility will comply with the requirements in TAC 30:I. The emissions and plant operations from the proposed new facility will comply with all rules and regulations of TCEQ and with the intent of the Texas Clean Air Act (TCAA), including the protection of the health and physical property of the people. A summary discussion on compliance with each applicable rule is included below.

### 4.2.1 Chapter 101 – General Air Quality Rules

Chapter 101 includes the general rules that are applicable to all sources. BEC will comply with the applicable requirements of this chapter. Some of the potentially applicable sections within this chapter are:

**§101.10 – Emission Inventory**
Specified sources are required to submit an annual emissions inventory to TCEQ. BEC will comply with this requirement.

**§101.24 – Inspection Fee**
Specified sources are required to submit an annual inspection fee to the TCEQ. BEC will comply with this requirement.

**§101.27 – Emissions Fee**
Specified sources are required to submit an annual emissions fee to the TCEQ. BEC will comply with this requirement.

**§101.201 – Emission Events**
This rule defines procedures to use in the event of an emission event resulting in an unauthorized emission. BEC will comply with these requirements.

**§101.211 – Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping Requirements**
This rule defines procedures to use in the event of a scheduled MSS event resulting in an unauthorized emission. BEC will comply with these requirements.

BEC will comply with all applicable requirements of this chapter.

### 4.2.2 Chapter 111 – Control of Visible Emissions and Particulate Matter

The potentially applicable sections within this chapter are:

**§111.111 – Requirements for Specified Sources**
This rule defines visible emission standards for specified sources. BEC will comply with these standards.

**§111.115 – Allowable Emission Limits**
This rule defines particulate matter emission standards for specified sources. BEC will comply with these standards.

### 4.2.3 Chapter 112 – Control of Emissions of Sulfur Compounds

The potentially applicable sections within this chapter are:

**§112.3 – Net Ground Level Concentrations**
The will not cause ground level concentrations of SO2 to exceed 0.4 ppmv averaged over any 30-minute period. The primary sources will fire sweet natural gas exclusively. Therefore, this standard will not be exceeded.

### 4.2.4 Chapter 113 – Standards of Performance for HAP (MACT)

This rule incorporates by reference applicable MACT regulations for which the EPA has delegated authority to the TCEQ. The Jack County Generation Facility will not be a major source of HAP emissions. Therefore, none of the potentially applicable MACT standards are applicable to this project.

### 4.2.5 Chapter 115 – Emission Standards for VOC

This rule establishes standards for a variety of VOC sources in specific geographic locations (i.e. nonattainment and covered attainment areas). Jack County is not a nonattainment area or a covered attainment area. Therefore, no Chapter 115 standards are currently applicable to sources at this account.

### 4.2.6 Chapter 117 – Control of Emissions of NOx

This rule establishes standards for a variety of NOx sources in specific geographic locations. Jack County is not a nonattainment area. Therefore, the requirements of Subchapter C are not applicable to sources at this account. Jack County is not located in the geographic area defined as East and Central Texas. Therefore, the requirements of Subchapter E are not applicable to sources at this account

### 4.2.7 Chapter 118 – Episodes

If the TCEQ declares a Level 1 or 2 emission episode that encompasses the Jack County Generation Facility BEC will strive to reduce emissions for the duration of the episode. An emission reduction plan is not required for sources located in Jack County.

### 4.2.8 Chapter 122 – Federal Operating Permits

The TCEQ implements the requirements of 40 CFR 70 through this chapter. The existing Jack County Generation Facility is already authorized by a FOP. BEC will revise this permit to include the applicable requirements for the expanded plant as well as obtaining both Acid Rain and CAIR permits.

# 5 EMISSIONS INVENTORY

This section provides a summary of emission rates for the proposed Jack County Generation Facility after completion of the proposed expansion project.

## 5.1 Operating Scenarios

Potential operations include both CTG/HRSG units operating 100% of the time, for 8760 hours per year. BEC will operate these sources from base load down to 50% load. BEC is seeking authorization to operate at lower loads (<50%) for short periods but will meet the short-term (lb/hr) mass emission rate limits of the permit. Potential operations for the standby diesel generator engine will be limited to 150 hours per year. The auxiliary steam boiler will operate with a limited annual capacity factor of 20%.

## 5.2 Criteria Pollutant Emissions

The following section summarizes the methodology used to determine potential emissions from the proposed Jack County Generation Facility, and estimates for criteria pollutants emitted from all operations.

### 5.2.1 Determination of Potential Emissions

#### 5.2.1.1 Turbine Generator/HRSG

The engineering contractor provided operating parameters and emission rates for the CTG/HRSG under different operating loads over a wide ambient temperature range. As would be expected worst-case emissions occur at lower ambient conditions.

Emissions of formaldehyde from the gas turbine were estimated using a factor obtained from the EPA MACT website. This factor represents the maximum formaldehyde emission rate records for a GE 7F unit. Recent formaldehyde testing by BEC for the existing GE turbines indicated formaldehyde emissions were below detectible limits.

Emissions of SO2 from the combined CTG/HRSG were estimated based on maximum fuel flow and a range of fuel gas sulfur content. Maximum short-term SO2 emissions were based on 2 grains total sulfur per 100 scf. Annual SO2 emissions were based on 0.5 grains total sulfur per 100 scf.

Emissions of H2SO4 were estimated assuming 10% of the SO2 emitted was actually H2SO4. BEC did not reduce the estimated SO2 emissions by 10% to be conservative. The 10% assumption was obtained from GE information.

Potential CTG/HRSG emission calculations are included in Appendix A.

# APPENDIX A – TCEQ FORMS

# Texas Commission on Environmental Quality
# Form PI-1 General Application for
# Air Preconstruction Permit and Amendments

**Update:** The TCEQ requires that a Core Data Form be submitted on all incoming applications unless a Regulated Entity and Customer Reference Number has been issued by the TCEQ and no core data information has changed. For more information regarding the Core Data Form, call (512) 239-5175 or go to the TCEQ Web site at www.tceq.state.tx.us/permitting/central_registry/guidance.html.

| | | |
|---|---|---|
| **I. APPLICANT INFORMATION** | | |
| A. Company or Other Legal Name: Brazos Electric Power Cooperative, Inc. | | |
| Texas Secretary of State Charter/Registration Number (If Applicable): 17405247291 | | |
| B. Company Official Contact Name: David Murphy, PE | | Title: Vice President Generation |
| Mailing Address: P.O. Box 2585 | | |
| City: Waco | State: TX | Zip Code: 76702-2585 |
| Telephone No: 254 750 6213 | Fax No.: 254 750 6292 | E-mail Address: dmurphy@brazoselectric.com |
| C. Technical Contact Name: Troy Cannon | | Title: Operations Superintendent |
| Mailing Address: 3844 Henderson Ranch Road | | |
| City: Bridgeport | State: TX | Zip Code: 76426 |
| Telephone No.: 940 374 3022 | Fax No.: 940 374 3145 | E-mail Address: tcannon@brazoselectric.com |
| D. Facility Location Information: | | |
| Street Address: 3844 Henderson Ranch Road | | |
| If no street address, provide clear driving directions to the site in writing: | | |
| | | |
| City: Bridgeport | County: Jack | Zip Code: 76426 |
| E. TCEQ Account Identification Number (leave blank if new site or facility): | | |
| F. Is a TCEQ Core Data Form (TCEQ Form #10400) attached? | | ☐ YES ☑ NO |
| G. TCEQ Customer Reference Number *(leave blank if unknown)*: CN600128821 | | |
| H. TCEQ Regulated Entity Number *(leave blank if unknown)*: RN100221985 | | |
| **II. IMPORTANT GENERAL INFORMATION** | | |
| A. Is confidential information submitted with this application? | | ☐ YES ☑ NO |
| If "YES," is each "confidential" page marked "CONFIDENTIAL" in large red letters? | | ☐ YES ☐ NO |
| B. Is this application in response to a TCEQ investigation or enforcement action? | | ☐ YES ☑ NO |
| If "YES", attach a copy of any correspondence from the TCEQ | | |
| C. Number of New Jobs: 0 | | |
| D. Names of the State Senator and district number for this facility site: Craig Estes: District 30 | | |
| Names of State Representative and district number for this facility site: Rick Hardcastle: District 68 | | |
| E. For Concrete Batch Plants, name of the County Judge for this facility site: | | |
| Mailing Address: | | |
| City: | State: | Zip Code: |
| F. For Concrete Batch Plants, is the facility located in a municipality or an extraterritorial jurisdiction of a municipality? If "YES," list the name(s) of the Presiding Officer(s) for this facility site: | | ☐ YES ☐ NO |
| Mailing Address: | | |
| City: | State: | Zip Code: |

# Texas Commission on Environmental Quality
# Form PI-1 General Application for
# Air Preconstruction Permit and Amendments

| | | |
|---|---|---|
| **III. FACILITY AND SOURCE INFORMATION** | | |
| A. Site Name: Jack County Generation Facility II | | |
| B. Area Name/Type of Facility: Electric Power Plant | | ☑ PERMANENT ☐ PORTABLE |
| C. Principal Company Product or Business: Electric Power | Primary Standard Industrial Classification Code: 4911 | |
| D. Projected Start of Construction Date: January 2009 | Projected Start of Operation Date: April 2010 | |
| **IV. TYPE OF PERMIT ACTION REQUESTED** | | |
| A. Permit Number *(if existing)*: | | |
| B. Is this an initial permit application? | | ☑ YES ☐ NO |
| If "YES," check the type of permit requested *(check all that apply)*: | | |
| ☐ State Permit | ☐ Nonattainment Federal Permit | |
| ☐ Flexible Permit | ☑ Prevention of Significant Deterioration Federal Permit | |
| ☐ Multiple Plant Permit | ☐ Hazardous Air Pollutants Permit Federal Clean Air Act § 112(g) | |
| Other: | | |
| C. Is this a permit amendment? | | ☐ YES ☑ NO |
| If "YES," check the type of permit requested *(check all that apply)*: | | |
| ☐ State Permit Amendment | ☐ Nonattainment Major Modification | |
| ☐ Flexible Permit Amendment | ☐ Prevention of Significant Deterioration Major Modification | |
| ☐ Multiple Plant Permit Amendment | ☐ Hazardous Air Pollutants Permit Federal Clean Air Act § 112(g) Modification | |
| Other: | | |
| Is a permit renewal application being submitted in conjunction with this amendment in accordance with Senate Bill 1673? [THSC 382.055(a)(2)](80th Leg) | | ☐ YES ☑ NO |
| D. Is this application for a change in location of previously permitted facilities? If "YES," answer D. 1. and D. 2. | | ☐ YES ☑ NO |
| 1. Current location of facility. | | |
| Street Address *(If no street address, provide clear driving directions to the site in writing.)*: | | |
| City: | County: | Zip Code: |
| 2. Will the proposed facility, site and plot plan meet all current technical requirements of the permit special conditions? | | ☐ YES ☐ NO |
| If "NO," attach detailed information. | | |
| E. Are there any standard permits, exemptions or permits by rule to be consolidated into this permit? | | ☐ YES ☑ NO |
| F. Are you permitting a facility or group of facilities that have planned maintenance, startup and shutdown emissions that cannot be authorized by a permit by rule or standard permit or that are authorized by a permit by rule or standard permit and are being rolled into this permit If "YES," attach information on any changes to emissions under this application as specified in Section VIII. And Section IXX. If "YES," answer F. 1 through F. 3. | | ☑ YES ☐ NO |

# Texas Commission on Environmental Quality
# Form PI-1 General Application for
# Air Preconstruction Permit and Amendments

| | |
|---|---|
| **IV. TYPE OF PERMIT ACTION REQUESTED *(continued)*** | |
| 1. Are the activities to be included in this permit covered by any previously existing MSS authorizations? If "YES," provide a listing of all other authorizations (permit by rule or standard permit and the associated registration number if any). | ☐ YES ☑ NO |
| 2. Have the emissions been previously submitted as part of an emissions inventory? | ☐ YES ☑ NO |
| 3. List which years the MSS activities were included in emissions inventory submittals: | |
| G. Is this facility located at a site required to obtain a federal operating permit under 30 TAC Chapter 122? If "NO," go to Section V. | ☑ YES ☐ NO |
| 1. Is a site operating permit (SOP) or general operating permit (GOP) review pending for this source, area, or site? | ☐ YES ☑ NO |
| 2. Is and SOP or GOP issued for this source, area, or site? | ☑ YES ☐ NO |
| 3. List SOP or GOP number(s): O-2169 | |
| **V. PERMIT FEE INFORMATION** | |
| A. Fee paid for this application: | $ 75,000 |
| B. Is a copy of the check or money order attached to the original submittal of this application? | ☑ YES ☐ NO ☐ N/A |
| C. Is a Table 30 entitled, "Certification of estimated Capital Cost and Fee Verification," attached? | ☑ YES ☐ NO |
| **VI. PUBLIC NOTICE APPLICABILITY** | |
| A. Is this a new permit application? | ☑ YES ☐ NO |
| B. Is this an application for a major modification of a PSD, NA or 30 TAC § 112(g) permit? | ☑ YES ☐ NO |
| C. Is this a state permit amendment application? If "YES," answer C. 1. through C. 3. | ☐ YES ☑ NO |
| 1a. Is there any change in character of emissions in this application? | ☐ YES ☐ NO |
| 1b. Is there a new air contaminant in this application? | ☐ YES ☐ NO |
| 2. Do the facilities handle, load, unload, dry, manufacture, or process grain, seed, legumes, or vegetables fibers (agricultural facilities)? | ☐ YES ☑ NO |
| 3. List the total annual emission increases associated with the application (*list all that apply*): Volatile Organic Compounds (VOC): 47.83 tpy; Particulate Matter (PM): 125.29 tpy; Sulfur Dioxide ($SO_2$): 29.26 tpy; Lead (Pb): 0 tpy; Carbon Monoxide (CO): 514.65 tpy; Nitrogen oxides ($NO_x$): 382.32 tpy; Other air contaminants not listed above: _____ tpy; List: Ammonia 197.99 tpy | |
| D. Is this a change of location application? If "YES," answer D. 1. through D. 3. | ☐ YES ☑ NO |
| 1. Is the new facility site located in or contiguous to the right-of-way of a public works project? | ☐ YES ☐ NO |
| 2. Is there a permitted facility occupying the new site? | ☐ YES ☐ NO |
| If "YES," please list the permit number: | |
| 3. Have portable facilities occupied the new site at any time in the last two years? | ☐ YES ☐ NO |

**Texas Commission on Environmental Quality**
**Form PI-1 General Application for**
**Air Preconstruction Permit and Amendments**

| | | | |
|---|---|---|---|
| **VII. PUBLIC NOTICE INFORMATION** *(complete if applicable)* | | | |
| A. Responsible Person: | | | |
| Name: David Murphy, PE | | Title: Vice President Generation | |
| Mailing Address: P.O. Box 2585 | | | |
| City: Waco | State: TX | | Zip Code: 76702-2585 |
| Telephone No.: 254 750 6213 | Fax No.: 254 750 6292 | E-mail Address: dmurphy@brazoselectric.com | |
| B. Technical Contact: | | | |
| Name: Troy Cannon | | Title: Operations Superintendent | |
| Mailing Address: 3844 Henderson Ranch Road | | | |
| City: Bridgeport | State: | | Zip Code: 76426 |
| Telephone No.: 940 374 3022 | Fax No.: 940 374 3145 | E-mail Address: tcannon@brazoselectric.com | |
| C. Application in Public Place: | | | |
| Name of Public Place: Jack County Court House | | | |
| Physical Address: 100 North Main Street | City: Jacksboro | | County: Jack |
| The public place has granted authorization to place the application for public viewing and copying? | | | ☑ YES ☐ NO |
| D. Small Business Classification: | | | |
| 1. Does this company (including parent companies and subsidiary companies) have fewer than 100 employees or less than $6 million in annual gross receipts? | | | ☐ YES ☑ NO |
| 2. Is the site a major source under 30 TAC Chapter 122, Federal Operating Permit Program? | | | ☑ YES ☐ NO |
| 3. Are the site emissions of any individual air contaminant greater than 50 tpy? | | | ☑ YES ☐ NO |
| 4. Are the site emissions of all air contaminants combined greater than 75 tpy? | | | ☑ YES ☐ NO |
| E. Bilingual notice confirmation: | | | |
| Is a bilingual program required by the Texas Education Code in the School District? | | | ☑ YES ☐ NO |
| Are the children who attend either the elementary school or the middle school closest to your facility eligible to be enrolled in a bilingual program provided by the district? | | | ☑ YES ☐ NO |
| If yes, which language is required by the bilingual program? Spanish | | | |
| **VIII. TECHNICAL INFORMATION** | | | |
| A. Is a current area map attached? | | | ☑ YES ☐ NO |
| Are any schools located within 3,000 feet of this facility? | | | ☐ YES ☑ NO |
| B. Is a plot plan of the plant property attached? | | | ☑ YES ☐ NO |
| C. Is a process flow diagram and a process description attached? | | | ☑ YES ☐ NO |
| D. Maximum Operating Schedule: ____ Hours/Day 24 Days/Week 7 Weeks/Year 52 | | | |
| Seasonal Operation? If "YES," please describe: | | | ☐ YES ☑ NO |
| E. Are worst-case emissions data and calculations attached? | | | ☑ YES ☐ NO |
| 1. Is a Table 1(a) entitled, "Emission Point Summary Table," attached? | | | ☑ YES ☐ NO |
| 2. Is a Table 2 entitled, "Material Balance Table," attached? | | | ☐ YES ☑ NO |
| 3. Are equipment, process or control device tables attached? | | | ☑ YES ☐ NO |
| F. Are actual emissions for the last two years (determination federal applicability) attached? | | | ☐ YES ☑ NO |

| | |
|---|---|
| **IX. STATE REGULATORY REQUIREMENTS**<br>Applicants must be in compliance with all applicable state regulations to obtain a permit or amendment | |
| A. The emissions from the proposed facility will comply with all rules and regulations of the TCEQ and details are attached? | ☑ YES ☐ NO |
| B. The proposed facility will be able to measure emissions of significant air contaminants and details are attached? | ☑ YES ☐ NO |
| C. A demonstration of Best Available Control Technology (BACT) is attached? | ☑ YES ☐ NO |
| D. The proposed facilities will achieve the performance in the permit application and compliance demonstration or record keeping information is attached? | ☑ YES ☐ NO |
| E. Is atmospheric dispersion modeling attached? | ☐ YES ☑ NO |
| F. Does this application involve any air contaminants for which a "disaster review" is required? | ☐ YES ☑ NO |
| If "YES," details must be attached.<br>*Note: For a list of air contaminants for which a "disaster review" will be required, refer to the NSRPD Disaster Review Guidance Document at www.tceq.state.tx.us/permitting/air/rules/federal/63/63hmpg.html.* | |
| G. Is this facility or group of facilities located at a site within the Houston/Galveston nonattainment area? (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, or Waller Counties) | ☐ YES ☑ NO |
| Does the facility or group of facilities located at this site have an uncontrolled design capacity to emit 10 tpy or more of $NO_X$? | ☐ YES ☑ NO |
| Is this site subject to 30 TAC Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade)? | ☐ YES ☑ NO |
| Does this action make the site subject to 30 TAC Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade)? | ☐ YES ☑ NO |
| Does this action require the site to obtain additional emission allowances? | ☐ YES ☑ NO |
| **X. FEDERAL REGULATORY REQUIREMENTS**<br>**Applicants must be in compliance with all applicable federal regulations to obtain a permit or amendment.** ***If any of the following questions is answered "YES,, the application must contain detailed attachments addressing applicability, identify federal regulation Subparts, show how requirements are met, and include compliance information.*** | |
| A. Does a Title 40 Code of Federal Regulations Part 60, (40 CFR Part 60) New Source Performance Standard (NSPS) apply to a facility in this application? | ☑ YES ☐ NO |
| B. Does 40 CFR Part 61, National Emissions Standard for Hazardous Air Pollutants (NESHAP) apply to a facility in this application? | ☐ YES ☑ NO |
| C. Does a 40 CFR Part 63, Maximum Achievable Control Technology (MACT) standard apply to a facility in this application? | ☐ YES ☑ NO |
| D. Does nonattainment permitting requirements apply to this application? | ☐ YES ☑ NO |
| E. Does prevention of significant deterioration permitting requirements apply to this application? | ☑ YES ☐ NO |
| F. Does Hazardous Air Pollutant Major Source [FAA § 112(g)] requirements apply to this application? | ☐ YES ☑ NO |
| **XI. COPIES OF THIS APPLICATION** | |
| A. Has the required fee been sent separately with a copy of this Form PI-1 to the TCEQ Revenue Section? *(MC 214, P.O. Box 13088, Austin, Texas 78711).* | ☑ YES ☐ NO ☐ NA |
| B. Are the Core Data Form, Form PI-1, and all attachments being sent to the TCEQ in Austin? | ☑ YES ☐ NO |
| OPTIONAL: Has an extra copy of the Core Data Form, Form PI-1 and all attachments been sent to the TCEQ in Austin?<br>If "YES," please mark this application as "COPY". | ☑ YES ☐ NO |

| | |
|---|---|
| **XI. COPIES OF THIS APPLICATION *(continued)*** | |
| C. Is a copy of the Core Data Form, the Form PI-1, and all attachments being sent to the appropriate TCEQ regional office | ☑ YES ☐ NO |
| D. Is a copy of the Core Data Form, the Form PI-1, and all attachments being sent to each appropriate local air pollution control program(s)? | ☐ YES ☑ NO |
| List all local air pollution control program(s): None<br>None | |
| E. Is a copy of the Core Data Form, Form PI-1, and all attachments (without confidential information) being sent to the EPA Region 6 office in Dallas, Texas? (federal applications only) | ☑ YES ☐ NO |
| F. This facility is located within 100 kilometers of the Rio Grande River and a copy of the application was sent to the International Boundary Water Commission (IBWC): | ☐ YES ☑ NO |
| G. This facility is located within 100 kilometers of a federally-designated Class I area and a copy of the application was sent to the appropriate Federal Land Manager: | ☐ YES ☑ NO |
| **XII. PROFESSIONAL ENGINEER (P.E.) SEAL** | |
| Is the estimated capital cost of the project greater than $2 million dollars?<br>If "YES," the application must be submitted under the seal of a Texas licensed Professional Engineer (P.E.). | ☑ YES ☐ NO |
| **XIII. DELINQUENT FEES AND PENALTIES** | |
| Notice: This form will not be processed until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the "Delinquent Fee and Penalty Protocol." For more information regarding Delinquent Fees and Penalties, go to the TCEQ Web site at: www.tceq.state.tx.us/agency/delin/index.html. | |
| **XIV. SIGNATURE** | |
| The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7, Texas Clean Air Act (TCAA), as amended, or any of the air quality rules and regulations of the Texas Commission on Environmental Quality or any local governmental ordinance or resolution enacted pursuant to the TCAA. I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. I further state that I have read and understand TWC §§ 7.177-7.183, which defines CRIMINAL OFFENSES for certain violations, including intentionally or knowingly making or causing to be made false material statements or representations in this application, and TWC § 7.187, pertaining to CRIMINAL PENALTIES. | |
| **NAME:** David Murphy, PE **SIGNATURE:** _____ **DATE:** _____<br>Original Signature Required | |

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| B-2 | B-2 | Auxiliary Boiler 2 | NOx | 1.28 | 1.12 |
| | | | CO | 1.35 | 1.19 |
| | | | VOC | 0.59 | 0.51 |
| | | | PM10 | 0.37 | 0.32 |
| | | | SO2 | 0.20 | 0.04 |
| DG-2 | DG-2 | Diesel Generator Engine | NOx | 4.00 | 0.30 |
| | | | CO | 3.48 | 0.26 |
| | | | VOC | 4.00 | 0.30 |
| | | | PM10 | 0.20 | 0.02 |
| | | | SO2 | 0.80 | 0.06 |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| 2EBTK0100 | 2EBTK0100 | Diesel Tank | VOC | 0.01 | 0.02 |
| CT-2 | CT-2 | Cooling Tower 2 | TSP/PM10 | 2.67/1.26 | 11.71/5.50 |
| CP-2 | CP-2 | Chiller Package 2 | TSP/PM10 | 0.06/0.05 | 0.25/0.21 |
| FUG4 | FUG4 | Power Block 3 Fugitives | VOC | 0.07 | 0.29 |
| FUG5 | FUG5 | Power Block 4 Fugitives | VOC | 0.07 | 0.29 |
| 2CITK0700 | 2CITK0700 | Aqueous Ammonia Fugitives | NH3 | 0.01 | 0.01 |
| 2CITK0120 | 2CITK0120 | Sulfuric Acid Tank | H2SO4 | 0.01 | 0.01 |
| 2CITK0110 | 2CITK0110 | NaOH Tank | NaOH | 0.01 | 0.01 |
| 2CITK0400 | 2CITK0400 | Sodium Hypochlorite Tank | Sodium Hypochlorite | 1.56 | 0.08 |
| | | | | | |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| HRSG-3 | CTG3 | Gas turbine and HRSG 3 | NOx | 43.61 | 191.01 |
| | HRSG3 | | CO | 58.72 | 257.19 |
| HRSG-4 | CTG4 | Gas turbine and HRSG 4 | VOC | 5.36 | 23.48 |
| | HRSG4 | | PM10 | 13.65 | 59.79 |
| | | (emissions are per unit) | SO2 | 13.31 | 14.58 |
| | | | H2S04 | 1.33 | 1.46 |
| | | | Formaldehyde | 0.16 | 0.69 |
| | | | NH3 | 22.60 | 98.99 |
| | | | | | |
| | | | | | |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

Attachment F

TCEQ Permit Application Review Documents related to
TCEQ Permit No. 52756, PSDTX1026

# Section 1 - Document

Mr. Tim Goldman

Production Engineer

Brazos Electric Power Cooperative, Inc.

P.O. Box 2585

Waco, Texas 76702-2585

Re: Permit Numbers: 52756 and PSD-TX-1026

Electric Generating Facility

Jacksboro, Jack County

Regulated Entity Number: RN100221985

Customer Reference Number: CN600128821

Dear Mr. Goldman:

This is in response to your letter dated September 15, 2003 providing updated representations regarding the above-referenced site. We now understand that the cooling tower will be constructed at a different location inside the plant boundaries. As indicated in Title 30 Texas Administrative Code § 116.116(c) [30 TAC § 116.116(c)], and based on our review, your request is hereby approved.

Please reference the regulated entity number (RN), customer reference number (CN), and permit number noted in this document in all your future correspondence for the referenced facility or site. The RN replaces the former TCEQ account number for the facility (if portable) or site (if permanent). The CN is a unique number assigned to the company or corporation and applies to all facilities and sites owned or operated by this company or corporation.

Your cooperation in this matter is appreciated. If you need further information or have any questions, please contact Mr. Aaron Moon at (512) 239-1093 or write to the Texas Commission on Environmental Quality, Office of Permitting, Remediation, and Registration, Air Permits Division (MC-163), P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

Margaret Hoffman

Executive Director

MH/ATM/jls

cc: Mr. David Neleigh, Chief, New Source Review, Section (6PD-R), Environmental Protection Agency, Region 6, Dallas

Mr. Mike Burch, Air Section Manager, Region 3 - Abilene

Project Number: 101260

**Air Permits Division (MC-163)**

MR TIM GOLDMAN

PRODUCTION ENGINEER

BRAZOS ELECTRIC POWER COOP INC

PO BOX 2585

WACO TX 76702-2585

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Published by GroupWise

# Section 1 - Document

## Permit Amendment

## Source Analysis & Technical Review

| | | | |
|---|---|---|---|
| Company | **Brazos Electric Power Cooperative, Inc.** | Permit Number | **52756** |
| City | **Bridgeport** | Project Number | **162449** |
| County | **Jack** | Account Number | **JA-0068-E** |
| Project Type | **Amend** | Regulated Entity Number | **RN100221985** |
| Project Reviewer | **Mr. Marc Sturdivant** | Customer Reference Number | **CN600128821** |
| Site Name | **Jack County Generation Facility** | | |

### Project Overview

The Jack County Generation Facility is an electric generating station located at 3844 Henderson Ranch Road, Bridgeport, TX 76426, in Jack County and is owned and operated by Brazos Electric Power Cooperative, Inc. (BEPC). The plant has four combustion turbines, each equipped with heat recovery steam generators (HRSGs). Two of the units are authorized by Permit No. 52756/PSDTX1026. These Units are Emission Point Nos. (EPNs) HRSG-1 and HRSG-2. BEPC wishes to amend their permit to authorize emissions from planned maintenance, startup and shutdown (MSS) activities. BEPC would like special conditions added to the permit to reflect startup as beginning when fuel is first fed to the turbine and ending when the turbine reaches Mode 6 and shutdown as beginning when the turbines drop below Mode 6 and ends when fuel is no longer being fed. MSS emissions from the EPNs HRSG-1 and HRSG-2 will be added to the MAERT as well as a new EPN MSSFUG.

### Emission Summary

| Air Contaminant | Current Allowable Emission Rates (tpy) | Proposed Allowable Emission Rates (tpy) | Change in Allowable Emission Rates (tpy) |
|---|---|---|---|
| PM | 318.8 | 318.81 | 0.01 |
| $PM_{10}$ | 302.2 | 302.21 | 0.01 |
| $PM_{2.5}$ | 0.0* | <0.01 | <0.01 |
| $NH_3$ | 193.61 | 193.62 | 0.01 |
| VOC | 177.07 | 177.12 | 0.05 |
| $NO_X$ | 384.7 | 384.7 | 0.0 |
| CO | 736.3 | 736.3 | 0.0 |
| $SO_2$ | 118.6 | 118.6 | 0.0 |
| $H_2SO_4$ | <0.01 | <0.01 | 0.0 |

*Not previously represented on MAERT

### Compliance History Evaluation - 30 TAC Chapter 60 Rules

| | |
|---|---|
| A compliance history report was reviewed on: | **April 27, 2011** |
| Compliance period: | **April 27, 2006-April 27, 2011** |
| Site rating & classification: | **2.69, Average** |

| | |
|---|---|
| Company rating & classification: | 0.19, Average |
| If the rating is 40<RATING<45, what was the outcome, if any, based on the findings in the formal report: | |
| Has the permit changed on the basis of the compliance history or rating? | No |

## Public Notice Information - 30 TAC Chapter 39 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 39.403 | Is Public Notice Required? | No |
| | If no, give reason: | There is no proposed change in character of emissions or the release of any new air contaminant. The emissions increases from all sources are less than the public notice de minimis levels of 30 TAC 39.402 (a)(3). |

## Construction Permit & Amendment Requirements - 30 TAC Chapter 116 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 116.111(a)(2)(G) | Is the facility expected to perform as represented in the application? | Yes |
| 116.111(a)(2)(A)(i) | Are emissions from this facility expected to comply with all TCEQ air quality Rules & Regulations, and the intent of the Texas Clean Air Act? | Yes |
| 116.111(a)(2)(B) | Emissions will be measured using the following method: | $NO_x$ and CO CEMs and $NH_3$ monitoring |
| | Comments on emission verification: | |
| 116.111(a)(2)(D) | Subject to NSPS? | Yes |
| | Subparts Da, Dc & GG | |
| 116.111(a)(2)(E) | Subject to NESHAP? | No |
| | Subparts & | |
| 116.111(a)(2)(F) | Subject to NESHAP (MACT) for source categories? | Yes |
| | Subparts ZZZZ & | |
| 116.111(a)(2)(H) | Is nonattainment review required? | No |
| | Is the site located in a nonattainment area? | No |
| | Is the site a federal major source for a nonattainment pollutant? | No |
| | Is the project a federal major source for a nonattainment pollutant by itself? | No |
| | Is the project a federal major modification for a nonattainment pollutant? | No |
| | Did the project emission increases for nonattainment pollutant minus the two-year average actual emissions trigger netting? | No |
| | If yes, attach Table 1N & 9N. If no, explain: | |
| | Is the contemporaneous increase significant? | N/A |
| | If the contemporaneous increase is significant a nonattainment review is required. | |
| 116.111(a)(2)(I) | Is PSD applicable? | Yes |
| | Is the site a federal major source (100/250 tons/yr)? | Yes |
| | Is the project a federal major source by itself? | No |
| | Is the project a federal major modification? | No |
| | Did project emission increases, without decreases, for pollutant of concern, minus the two- | No |

| | | | |
|---|---|---|---|
| | year average actual emissions trigger netting? | | |
| | Was the contemporaneous increase significant? | | N/A |
| | If yes, explain: | | |
| | Is the change excluded by 40 CFR 52.21(b)(2)(iii)? | | No |
| | If yes, explain: | | |
| 116.111(a)(2)(L) | Is Mass Emissions Cap and Trade applicable to the new or modified facilities? | | No |
| | If yes, did the proposed facility, group of facilities, or account obtain allowances to operate: | | |
| 116.140 - 141 | Permit Fee: $ 900.00 | Fee certification: | R111779 |

## Title V Applicability - 30 TAC Chapter 122 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 122.10 (13)(A) | Is the site a major source under FCAA Section 112(b)? | No |
| | Does the site emit 10 tons or more of any single HAP? | No |
| | Does the site emit 25 tons or more of a combination? | No |
| 122.10 (13)(C) | Does the site emit 100 tons or more of any air pollutant? | Yes |
| 122.10 (13)(D) | Is the site a non-attainment major source? | No |
| 122.602 | **Periodic Monitoring (PM) applicability:** Periodic monitoring is applicable because this site is subject to 30 TAC Chapter 122. Periodic monitoring of planned MSS activities in the form of recordkeeping is used for the ILE activities listed in Attachment A consisting of an annual confirmation of the estimated PTE represented for those ILE activities. Recordkeeping and CEMS are used for periodic monitoring of all other planned MSS activities in which emissions are determined based on the duration of each event and compared to the MAERT on a rolling 12 month basis. | |
| | | |
| 122.604 | **Compliance Assurance Monitoring (CAM) applicability:** The site is a major source; however there are no control devices in use during MSS. Therefore, CAM is not applicable. | |
| | | |

## Request for Comments

| Received From | Program/Area Name | Reviewed By | Comments |
|---|---|---|---|
| Region: | 3 | Charles Smith | No Comments |
| City: | Bridgeport | N/A | |
| County: | Jack | N/A | |
| Toxicology: | | | |
| Compliance: | | | |
| Legal: | | | |
| Comment resolution and/or unresolved issues: | | | |

## Process/Project Description

The plant is an electric generating facility which has four permitted General Electric (GE) 7FA combustion turbines, each equipped with a 550-600 MMBtu/hr HRSG. HRSG units 1 and 2 are authorized under Permit No. 52756. The gas turbines burn natural gas to produce electricity and hot exhaust, and the temperature of the turbine exhaust is further elevated with duct burning. The HRSG then captures the heat from the exhaust to produce steam, which is converted to electricity in a steam turbine.

Startups and shutdowns are regular and planned operations and during these periods, emissions of $NO_x$ and CO can exceed the lb/hr limits of the permit. Startup and shutdown are currently reflected in the MAERT for all combustion units with the exception of HRSG-1 and HRSG 2. BEPC is requesting an amendment to authorize the emissions of $NO_x$ and CO from HRSG-1 and HRSG-2 during these startup and shutdown periods.

Some of the site wide maintenance activities BEPC is requesting authorization for can be characterized as inherently low emitting (ILE) activities. These ILE activities and operations will be included in the permit under attachment A. A new EPN will also be added to the MAERT (EPN MSSFUG).

Some MSS- related maintenance activities with emissions that are too large to be considered ILE will also be considered in the amendment application. BEPC states that the emissions from these activities will not exceed emission limits now established under the current permit. No separate emission allowables for these activities are being proposed. Such activities include, but are not limited to, online turbine optimization activities and online SCR system maintenance.

## Pollution Prevention, Sources, Controls and BACT- [30 TAC 116.111(a)(2)(C)]

Emission sources are the turbine exhaust stacks and fugitive emissions associated with planned MSS. Controls consist of low sulfur fuels for $SO_2$, combustor design for CO, dry low $NO_x$ combustors for $NO_x$ and an aqueous ammonia-based selective catalytic reduction system. The CEMS will give a direct report of $NO_X$ and CO concentrations. During planned MSS when control devices or process equipment are operating outside the design optimal mode and it is technically infeasible to meet the primary BACT emission rates, secondary BACT limits are necessary. These secondary BACT limits are designed to limit emissions during planned MSS activities. Secondary BACT limits are identified in Special Condition Nos. 16 thru 20. These limitations include work practices limiting the duration of startup and shutdown for combustion equipment, minimizes the amount of time combustion equipment is outside the optimal performance mode (in which the process units and controls were designed to work most effectively). The specific maintenance activities identified in the application have been listed as ILE activities in Attachment A of the permit.

## Impacts Evaluation - 30 TAC 116.111(a)(2)(J)

| | | | |
|---|---|---|---|
| Was modeling conducted? | Yes | Type of Modeling: | Screen3 |
| Will GLC of any air contaminant cause violation of NAAQS? | | No | |
| Is this a sensitive location with respect to nuisance? | | No | |
| [§116.111(a)(2)(A)(ii)] Is the site within 3000 feet of any school? | | No | |
| Additional site/land use information: Land surrounding the facility is undeveloped. The closest residence is less than 1 mile northwest from the property line and another residence is less than 1 mile west of the property line. | | | |
| | | | |

## Summary of Modeling Results

Emissions from $NO_x$ were modeled using all $NO_x$ sources on site plus background concentrations. The concentrations from the site were predicted to be 118.55 $\mu g/m^3$ and the background was 68.7 $\mu g/m^3$. When added together, the total concentration was below the NAAQS of 188 $\mu g/m^3$. Modeled concentrations of all other pollutants (CO, $PM_{2.5}$, $SO_2$ and $NH_3$) for the project only fell below the SIL and/or ESL. Therefore emissions from the facility are not expected to have an impact on health or the environment. No further modeling required.

| Pollutant | Averaging Time | Predicted Concentration ($\mu g/m^3$) | SIL ($\mu g/m^3$) | SIL | Background ($\mu g/m^3$) | Total Conc ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) | NAAQS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $NO_x$ | 1-hr | 118.547 | 7.5 | No | 68.7 | 187.247 | 188 | Yes |
| $NO_x$ | Annual | 9.48376 | 1 | No | 68.7 | 78.18376 | 100 | Yes |
| CO | 1-hr | 468 | 500 | Yes | | | | |
| CO | 8-hr | 327.6 | 2000 | Yes | | | | |
| $PM_{10}$ | 24-hr | 0.00416 | 5 | Yes | | | | |
| $PM_{2.5}$ | 24-hr | 0.00416 | 1.2 | Yes | | | | |
| $PM_{2.5}$ | Annual | 0.000832 | 0.3 | Yes | | | | |
| $SO_2$ | 1-hr | 3.809 | 7.8 | Yes | | | | |
| $SO_2$ | 3-hr | 3.4281 | 25 | Yes | | | | |
| $SO_2$ | 24-hr | 1.5236 | 5 | Yes | | | | |
| $SO_2$ | Annual | 0.30472 | 1 | Yes | | | | |
| | | | | | | | | |
| | | $GLC_{max}$ ($\mu g/m^3$) | ESL | | | | | |
| $NH_3$ | | 0.2171 | 170 | Yes | | | | |

**Permit Concurrence and Related Authorization Actions**

| | |
|---|---|
| Is the applicant in agreement with special conditions? | **Yes** |
| Company representative(s): | **David Cabe and Mark Pavelka** |
| Contacted Via: | **Email** |
| Date of contact: | **August 15, 2011** |
| Other permit(s) or permits by rule affected by this action: | **No** |
| List permit and/or PBR number(s) and actions required or taken: | **N/A** |

| | | | |
|---|---|---|---|
| Project Reviewer | Date | Team Leader/Section Manager/Backup | Date |

## Headers

***Permit Amendment***

***Source Analysis & Technical Review***

Permit No. 52756 Regulated Entity No. RN100221985

Page

## Footers

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# Section 1 - Document

## Permit Amendment

## Source Analysis & Technical Review

| | | | |
|---|---|---|---|
| Company | **Brazos Electric Power Cooperative, Inc.** | Permit Number | **52756** |
| City | **Bridgeport** | Project Number | **162449** |
| County | **Jack** | Account Number | **JA-0068-E** |
| Project Type | **Amend** | Regulated Entity Number | **RN100221985** |
| Project Reviewer | **Mr. Marc Sturdivant** | Customer Reference Number | **CN600128821** |
| Site Name | **Jack County Generation Facility** | | |

### Project Overview

The Jack County Generation Facility is an electric generating station located at 3844 Henderson Ranch Road, Bridgeport, TX 76426, in Jack County and is owned and operated by Brazos Electric Power Cooperative, Inc. (BEPC). The plant has four combustion turbines, each equipped with heat recovery steam generators (HRSGs). Two of the units are authorized by Permit No. 52756/PSDTX1026. These Units are Emission Point Nos. (EPN) HRSG-1 and HRSG-2. BEPC wishes to amend their permit to authorize emissions from planned maintenance, startup and shutdown (MSS) activities. BEPC would like special conditions added to the permit to reflect startup as beginning when fuel is first feed to the turbine and ending when the turbine reaches Mode 6, and shutdown as beginning when the turbines drop below Mode 6 and ends when fuel is no longer being feed. MSS emissions from the EPNs HRSG-1 and HRSG-2 will be added to the MAERT as well as a new EPN MSSFUG.

### Emission Summary

| Air Contaminant | Current Allowable Emission Rates (tpy) | Proposed Allowable Emission Rates (tpy) | Change in Allowable Emission Rates (tpy) |
|---|---|---|---|
| PM | 16.1 | - | - |
| $PM_{10}$ | 302.2 | - | - |
| $NH_3$ | 193.61 | 193.62 | 0.01 |
| VOC | 177.07 | 177.12 | 0.05 |
| $NO_X$ | 384.7 | - | - |
| CO | 736.3 | - | - |
| $SO_2$ | 118.6 | - | - |
| $H_2SO_4$ | <0.01 | - | - |

### Compliance History Evaluation - 30 TAC Chapter 60 Rules

| | |
|---|---|
| A compliance history report was reviewed on: | **April 27, 2011** |
| Compliance period: | **April 27, 2006-April 27, 2011** |
| Site rating & classification: | **2.69, Average** |
| Company rating & classification: | **.019, Average** |
| | |

| | |
|---|---|
| If the rating is 40<RATING<45, what was the outcome, if any, based on the findings in the formal report: | |
| Has the permit changed on the basis of the compliance history or rating? | No |

## Public Notice Information - 30 TAC Chapter 39 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 39.403 | Is Public Notice Required? | No |
| | If no, give reason: | There is no proposed change in character of emissions or the release of any new air contaminant. The emissions increases from all sources are less than the public notice de minimis levels of 30 TAC 39.402 (a)(3). |

## Construction Permit & Amendment Requirements - 30 TAC Chapter 116 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 116.111(a)(2)(G) | Is the facility expected to perform as represented in the application? | Yes |
| 116.111(a)(2)(A)(i) | Are emissions from this facility expected to comply with all TCEQ air quality Rules & Regulations, and the intent of the Texas Clean Air Act? | Yes |
| 116.111(a)(2)(B) | Emissions will be measured using the following method: | $NO_x$ and CO CEMs and $NH_3$ monitoring |
| | Comments on emission verification: | |
| 116.111(a)(2)(D) | Subject to NSPS? | Yes |
| | Subparts Da, Dc & GG | |
| 116.111(a)(2)(E) | Subject to NESHAP? | No |
| | Subparts & | |
| 116.111(a)(2)(F) | Subject to NESHAP (MACT) for source categories? | Yes |
| | Subparts ZZZZ & | |
| 116.111(a)(2)(H) | Is nonattainment review required? | No |
| | Is the site located in a nonattainment area? | No |
| | Is the site a federal major source for a nonattainment pollutant? | No |
| | Is the project a federal major source for a nonattainment pollutant by itself? | No |
| | Is the project a federal major modification for a nonattainment pollutant? | No |
| | Did the project emission increases for nonattainment pollutant minus the two-year average actual emissions trigger netting? | No |
| | If yes, attach Table 1N & 9N. If no, explain: | |
| | Is the contemporaneous increase significant? | No |
| | If the contemporaneous increase is significant a nonattainment review is required. | |
| 116.111(a)(2)(I) | Is PSD applicable? | Yes |
| | Is the site a federal major source (100/250 tons/yr)? | Yes |
| | Is the project a federal major source by itself? | No |
| | Is the project a federal major modification? | No |
| | Did project emission increases, without decreases, for pollutant of concern, minus the two-year average actual emissions trigger netting? | No |

| | | | |
|---|---|---|---|
| | Was the contemporaneous increase significant? | | No |
| | If yes, explain: | | |
| | Is the change excluded by 40 CFR 52.21(b)(2)(iii)? | | No |
| | If yes, explain: | | |
| 116.111(a)(2)(L) | Is Mass Emissions Cap and Trade applicable to the new or modified facilities? | | No |
| | If yes, did the proposed facility, group of facilities, or account obtain allowances to operate: | | |
| 116.140 - 141 | Permit Fee: $ 900.00 | Fee certification: | R111779 |

## Title V Applicability - 30 TAC Chapter 122 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 122.10(13)(A) | Is the site a major source under FCAA Section 112(b)? | Yes |
| | Does the site emit 10 tons or more of any single HAP? | No |
| | Does the site emit 25 tons or more of a combination? | No |
| 122.10(13)(C) | Does the site emit 100 tons or more of any air pollutant? | Yes |
| 122.10(13)(D) | Is the site a non-attainment major source? | No |
| 122.602 | **Periodic Monitoring (PM) applicability:** | |
| | | |
| 122.604 | **Compliance Assurance Monitoring (CAM) applicability:** | |
| | | |

## Request for Comments

| Received From | Program/Area Name | Reviewed By | Comments |
|---|---|---|---|
| Region: | 3 | | |
| City: | Bridgeport | | |
| County: | Jack | | |
| Toxicology: | | | |
| Compliance: | | | |
| Legal: | | | |
| Comment resolution and/or unresolved issues: | | | |

## Process/Project Description

The plant is an electric generating facility which has four permitted General Electric (GE) 7FA combustion turbines, each equipped with a 550-600 MMBtu/hr HRSG. HRSG units 1 and 2 are authorized under Permit No. 52756. The gas turbines burn natural gas to produce electricity and hot exhaust, and the temperature of the turbine exhaust is further elevated with duct burning. The HRSG then captures the heat from the exhaust to produce steam, which is converted to electricity in a steam turbine.

Startups and shutdowns are regular and planned operations and during these periods, emissions of $NO_x$ and CO can exceed the lb/hr limits of the permit. Startup and shutdown are currently reflected in the MAERT for all combustion units with the exception of HRSG-1 and HRSG 2. BEPC is requesting an amendment to authorize to emissions of $NO_x$ and CO from HRSG-1 and HRSG-2 during these startup and shutdown periods.

Some of the site wide maintenance activities BEPC is requesting authorization for can be characterized as inherently low emitting (ILE) activities. These ILE activities and operations will be included in the permit under attachment A.

Some MSS- related maintenance activities with emissions that are too large to be considered ILE will also be considered in the amendment application. BEPC states that the emissions from these activities will not exceed emission limits now established under the current permit. No separate emission allowables for these activities are being proposed.

**Pollution Prevention, Sources, Controls and BACT- [30 TAC 116.111(a)(2)(C)]**

**Impacts Evaluation - 30 TAC 116.111(a)(2)(J)**

| | | | |
|---|---|---|---|
| Was modeling conducted? | | Type of Modeling: | |
| Will GLC of any air contaminant cause violation of NAAQS? | | No | |
| Is this a sensitive location with respect to nuisance? | | No | |
| [§116.111(a)(2)(A)(ii)] Is the site within 3000 feet of any school? | | No | |
| Additional site/land use information: | | | |
| | | | |

**Summary of Modeling Results**

**Permit Concurrence and Related Authorization Actions**

| | |
|---|---|
| Is the applicant in agreement with special conditions? | |
| Company representative(s): | |
| Contacted Via: | |
| Date of contact: | |
| Other permit(s) or permits by rule affected by this action: | |
| List permit and/or PBR number(s) and actions required or taken: | |

| | | | |
|---|---|---|---|
| | | | |
| Project Reviewer | Date | Team Leader/Section Manager/Backup | Date |

Headers

*Permit Amendment*

*Source Analysis & Technical Review*

Permit No. 52756 Regulated Entity No. RN100221985

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Attachment G

List of Equipment for which BEPC Claims a Positive Use Determination

| Plant Area | System | Startup System | Description | Subsystem Total |
|---|---|---|---|---|
| HRSG # 3 | | | | |
| HRSG # 3 | Boiler Blowdown | | | |
| HRSG # 3 | | *2BB-11* | Boiler Blowdown Train #1 | 533,835.01 |
| HRSG # 3 | | | | |
| HRSG # 3 | Boiler Steam | | | |
| HRSG # 3 | | *2BS-11* | Boiler Steam System Train #1 | 2,669,175.04 |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | Chemical Injection | | | |
| HRSG # 3 | | *2CI-11* | Chemical Injection (BFW Train #1) | 1,067,670.02 |
| HRSG # 3 | | | | |
| HRSG # 3 | Feedwater | | | |
| HRSG # 3 | | *2FW-11* | Feedwater Pumps & Dist. HRSG #1 | 9,007,525.12 |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | *2FW-12* | Feedwater (Fuel Gas Heating Train #1) | 1,067,670.02 |
| HRSG # 3 | Fuel Gas | | | |
| HRSG # 3 | | *2FG-12* | Fuel Gas HRSG #1 Duct Burners | 1,868,422.53 |
| HRSG # 3 | | | | |
| HRSG # 3 | Heat Recovery | | | |
| HRSG # 3 | | *2HR-11* | HRSG #1 Exhaust Gas Path | 19,744,370.18 |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | | | |
| HRSG # 3 | | *2HR-12* | HRSG #1 CEMS Unit | 6,939,855.10 |

| | | | | |
|---|---|---|---|---|
| HRSG # 3 | | | | |
| HRSG # 3 | | *2HR-13* | HRSG #1 Cooling Air | 11,744,370.18 |
| HRSG # 3 | | | | |
| HRSG # 3 | Nitrogen | | | |
| HRSG # 3 | | *2NI-11* | Nitrogen HSRG #1 | 533,835.01 |
| HRSG # 3 | Sample Panel | | | |
| HRSG # 3 | | *2SP-11* | HRSG #1 Sample Lines | 533,835.01 |
| HRSG # 3 | | | | |
| HRSG # 3 | Condensate | | | |
| HRSG # 3 | | *2CO-11* | Condensate HRSG #1 | 4,351,505.02 |
| HRSG # 3 | | | | |
| **HRSG # 3 Total** | | | | 53,122,213.12 |
| HRSG # 4 | | | | |
| HRSG # 4 | Boiler Blowdown | | | |
| HRSG # 4 | | *2BB-21* | Boiler Blowdown Train #2 | 533,835.01 |
| HRSG # 4 | | | | |
| HRSG # 4 | Boiler Steam | | | |
| HRSG # 4 | | *2BS-21* | Boiler Steam System Train #2 | 2,669,175.04 |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | Chemical Injection | | | |
| HRSG # 4 | | *2CI-21* | Chemical Injection (BFW Train #2) | 1,067,670.02 |
| HRSG # 4 | | | | |
| HRSG # 4 | Feedwater | | | |
| HRSG # 4 | | *2FW-21* | Feedwater Pumps & Dist. HRSG #2 | 8,007,525.12 |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | *2FW-22* | Feedwater (Fuel Gas Heating Train #2) | 1,067,670.02 |

| | | | | |
|---|---|---|---|---|
| HRSG # 4 | Fuel Gas | | | |
| HRSG # 4 | | *2FG-22* | Fuel Gas HRSG #2 Duct Burners | 1,868,422.53 |
| HRSG # 4 | Heat Recovery | | | |
| HRSG # 4 | | *2HR-21* | HRSG #2 Exhaust Gas Path | 19,744,370.18 |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | | | |
| HRSG # 4 | | *2HR-22* | HRSG #2 CEMS Unit | 6,939,855.10 |
| HRSG # 4 | | | | |
| HRSG # 4 | | *2HR-23* | HRSG #2 Cooling Air | 11,744,370.18 |
| HRSG # 4 | | | | |
| HRSG # 4 | Nitrogen | | | |
| HRSG # 4 | | *2NI-21* | Nitrogen HRSG #2 | 533,835.01 |
| HRSG # 4 | Sample Panel | | | |
| HRSG # 4 | | *2SP-21* | HRSG #2 Sample Lines | 533,835.01 |
| HRSG # 4 | | | | |
| HRSG # 4 | Condensate | | | |
| HRSG # 4 | | *2CO-21* | Condensate HRSG #2 | 4,351,505.02 |
| HRSG # 4 | | | | |
| **HRSG # 4 Total** | | | | 52,122,213.12 |
| Grand Total | | | | 105,244,426.23 |

Attachment H

Resubmission of Partial Use Calculation Previously Included in Application No. 16413, with Supporting Documentation

# Attachment H, Partial Use Calculation Previously Submitted by BEPC

TCEQ Use Determ' 'on Application Section 11 use:
Company: Electric Power Cooperative, Inc.
Plant: Ja.. .ounty Generation Facility
Unit: Jack 2 - 600 MW 2 x 1 Configuration Combined Cycle Power Plant (2011)
Address: Bridgeport, Texas
Project: Tier III Cost Analysis Procedure
Date: 10-Feb-12

I. Assumptions (HRSG Only) Jack 2 HRSG Only

| Pollution Control Property (PC) | Input Variable | Source | Conversion Factors | |
|---|---|---|---|---|
| Property Cost (CCN): | $105,244,426.00 | BEC Accting | hr/yr | 8,760 |
| Capital Cost ($/KW): | 375.87 | PC/TC | kW/MW | 1,000 |
| Total Capacity (MW): | 600 | ∑ (CT1,CT2,ST) | lb/kg | 2.2 |
| CT1 Capacity (MW): | 160 | BEC 2010 RUS Form 12 | s/hr | 3,600 |
| CT2 Capacity (MW): | 160 | BEC 2010 RUS Form 12 | Btu/MMBtu | 1,000,000 |
| ST Capacity (MW): | 280 | BEC 2010 RUS Form 12 | | |
| 2010 Net Annual ST Energy Production (kWh): | 1,308,271,000 | BEC 2010 RUS Form 12 | | |
| 2010 Net Annual ST Energy Production (MWh): | 1,308,271 | BEC 2010 RUS Form 12 | | |
| 2010 ST Capacity Factor: | 53.3379% | Energy/(TC * 8760) | | |
| 2010 Net Plant Heat Rate (Btu/kWh): | 6,900 | Design | | |
| 2010 Net Plant Heat Rate (MMBtu/kWh): | 0.006900 | NPHR/1E06 | | |
| 2010 Operating Hours | 7,643 | BEC 2010 RUS Form 12 | | |
| CaCapital Cost Old (CCO): | 0 | | | |
| Comparable Technology Cost: | 0 | | | |
| Comparable Technology: | 0 | | | |
| Design Capacity Factor: | 0 | | | |
| Capacity (MW): | 1 | | | |

| Economic Assumptions | Input Variable | Source |
|---|---|---|
| Discount Rate (%) | 10.00% | Standard project rate |
| Periods | 30 | RUS depreciation |
| PC Property Fixed O&M Cost ($) | $8,805,034.00 | BEC 2010 RUS Form 12 |
| CT1 Fixed O&M Costs ($) | $2,348,009.07 | Formula |
| CT2 Fixed O&M Costs ($) | $2,348,009.07 | Formula |
| ST Fixed O&M Costs ($) | $4,109,015.87 | Formula |
| Fuel Cost ($/MMBTU) | $4.07 | Note 1 |
| PC property Variable Cost ($/MWh) | $5.00 | Check with QSE |
| PC property Variable Cost ($/kWh) | $0.0050 | Formula |
| ERCOT N. Zone Price ($/MWh) | $41.92 | Note 2 |
| Interest Rate (%) | 10.00% | |

Note 1: Average cost for fuel (2009 - 2011) weighted by monthly steam turbine generation

Note 2: Average Settlement Point price for resource weighted by hourly steam turbine generation, reflected by North Load Zone Market Clearing Price for Energy (MCPE) for Jan 1, 2009 - Nov 30, 2010 and Real-time Resource Settlement Point Price (Nodal) for Dec 1, 2010 - Dec 31, 2011.

II. Cost Analysis Procedure

A. $$\frac{[(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{Marketable Product}]}{\text{Capital Cost New}}$$

| Levelized Cost of Energy (LCOE) Model Outputs | |
|---|---|
| Capitol Recovery Factor (%) | 10.61% |
| LCOE ($/KWh) | $0.03976 |

B. Cost Analysis Procedure Formulas (TCEQ)

Partial Use Determination

$$\frac{[(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{Marketable Product Value}]}{\text{Capital Cost New}}$$

where: $\text{Marketable Product Value} = \sum_{t=1}^{n} \frac{\text{Marketable Product Value} - \text{Production Cost}}{(1 + \text{Interest Rate})^n}$

n = estimated useful life in years of years equipment
t = year one
Interest Rate = 10%

C. Cost Analysis Procedure for Pollution Control Property

Marketable Product Value = Electricity Price ($/MWh) x MWh per Year
Direct Cost of Production = Levelized Cost of Energy x KWh per Year

$$\text{LCOE (\$/KWh)} = \frac{(\text{Capital Cost} \times \text{Capital Recovery Factor}) + \text{Fixed O\&M Costs}}{\text{Hours per Year} \times \text{Capcity Factor}} + (\text{Fuel Cost} \times \text{Heat Rate})$$

Capital Recovery Factor (CRF) $\frac{i \times (1+i)^n}{(1+i)^n - 1}$

| (PC) | (CRF) | | (Annual cost to carry) | | (FOM) | (Total Annual FC) | |
|---|---|---|---|---|---|---|---|
| $105,244,426.00 | 10.61% | = | $11,164,249.59 | + | $4,109,015.87 | $15,273,265.46 | |
| | | | | | | $0.0117 | /kWh |
| | | | | | (Fuel x NPHR) | $0.0281 | |
| | | | | | LCOE: | $0.03976 | ($/kWh) |

III. Cost Analysis - ...ture Calculations For Jack County (Jack 2) HRSG3 and HRSG4

Formula: $\frac{(PCF \times CCN) - CCO - NPVMP}{CCN}$

A. Marketable Product Value (MPV)

Electricity Price $ / Plant MWh = ($) MPV

| | | | | |
|---|---|---|---|---|
| $41.92 | x | 1,308,271 | = | $54,842,720.32 |
| | | | NPVMP | |

B. Production Cost (PC)

Levelized Cost Of Energy (LCOE) $ / Plant MWh = ($) PC

| | | | | |
|---|---|---|---|---|
| $0.03976 | x | 1,308,271,000 | = | $52,013,439.95 |

Net Present Value Marketable Product (NPVMP) Calculation

$$\sum_{t=1}^{n} \frac{\text{Product Value - Production Cost}}{(1 + \text{Interest Rate})^n} = \text{NPVMP (\$)}$$

$$\sum_{t=1}^{n} \frac{\$54,842,720.32 - \$52,013,439.95}{1.10} = \$26,671,384.03$$

NPVMP

If MP is <= 0, then MP = 0

C. Production Capacity Factor (PCF)

$$\frac{\text{Production Capacity of Existing Equipment or Process}}{\text{Production Capacity of New Equipment or Process}} = \text{PCF}$$

$$\frac{0}{300 \text{ MW} \times 56.21\%} = 1.00$$

PCF

D. Capital Cost New (CCN)

Pollution Control Property (PC) = $105,244,426.00

CCN

E. Capital Cost Old (CCO)

Comparable Technology = $0.00

CCO

Partial Use Determination Calculation

$$\frac{(PCF \times CCN)}{CCN} - CCO - MP = \text{Partial Use Determination \%}$$

$$\frac{\$105,244,426.00}{\$105,244,426.00} - \$0.00 - \$26,671,384.03 = 74.66\%$$

| TCEQ Use Determination Application Section 11 Uses: | |
|---|---|
| Use Percent: | 74.66% |
| Estimated Dollar Value: | $105,244,426.00 |

Eligible HRSG Costs = $78,573,041.97

(Partial Use Determination % x PC Property)

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-12 | 23.39 | 17.82 | 19.31 | 18.36 | 20.76 |
| Mar-12 | 24.75 | 16.87 | 18.33 | 17.41 | 20.89 |
| Apr-12 | 27.18 | 17.52 | 20.05 | 18.47 | 22.53 |
| May-12 | 31.21 | 16.57 | 20.83 | 17.95 | 24.22 |
| Jun-12 | 38.04 | 17.78 | 23.78 | 20.03 | 28.43 |
| Jul-12 | 58.75 | 19.98 | 26.68 | 22.61 | 38.93 |
| Aug-12 | 59.44 | 20.98 | 26.56 | 22.88 | 40.96 |
| Sep-12 | 36.06 | 17.76 | 23.33 | 20.12 | 26.85 |
| Oct-12 | 29.33 | 17.06 | 20.74 | 18.31 | 23.76 |
| Nov-12 | 26.84 | 18.41 | 20.76 | 19.29 | 22.81 |
| Dec-12 | 29.58 | 20.03 | 22.71 | 21.14 | 24.77 |
| Jan-13 | 33.68 | 25.22 | 28.96 | 26.59 | 29.94 |
| Feb-13 | 33.78 | 25.88 | 28.05 | 26.67 | 30.06 |
| Mar-13 | 31.99 | 22.55 | 24.58 | 23.35 | 27.26 |
| Apr-13 | 31.73 | 22.04 | 25.06 | 23.09 | 27.31 |
| May-13 | 35.38 | 22.13 | 27.16 | 23.98 | 29.37 |
| Jun-13 | 42.36 | 23.41 | 31.74 | 26.74 | 33.68 |
| Jul-13 | 61.93 | 28.18 | 37.13 | 31.47 | 45.88 |
| Aug-13 | 62.22 | 28.67 | 36.70 | 31.62 | 46.10 |
| Sep-13 | 39.18 | 23.29 | 30.23 | 26.07 | 31.90 |
| Oct-13 | 31.31 | 22.13 | 26.91 | 23.76 | 27.49 |
| Nov-13 | 32.16 | 23.18 | 26.27 | 24.41 | 27.85 |
| Dec-13 | 33.85 | 24.46 | 27.59 | 25.69 | 29.38 |
| Jan-14 | 33.62 | 29.96 | 31.27 | 30.44 | 31.94 |
| Feb-14 | 33.72 | 29.77 | 31.36 | 30.35 | 31.95 |
| Mar-14 | 29.96 | 25.67 | 27.86 | 26.53 | 28.08 |
| Apr-14 | 30.27 | 24.60 | 27.97 | 25.77 | 27.97 |
| May-14 | 36.32 | 24.51 | 30.36 | 26.80 | 31.10 |
| Jun-14 | 44.29 | 26.13 | 34.93 | 29.48 | 36.36 |
| Jul-14 | 63.97 | 31.25 | 41.18 | 34.90 | 48.65 |
| Aug-14 | 63.94 | 31.41 | 40.67 | 35.04 | 48.09 |
| Sep-14 | 40.66 | 25.65 | 32.90 | 28.37 | 34.11 |
| Oct-14 | 32.88 | 24.19 | 29.42 | 25.97 | 29.39 |
| Nov-14 | 33.53 | 25.01 | 28.49 | 26.48 | 29.45 |
| Dec-14 | 35.04 | 26.49 | 29.73 | 27.68 | 31.16 |
| Jan-15 | 36.82 | 32.13 | 34.24 | 32.96 | 34.70 |
| Feb-15 | 36.86 | 31.91 | 34.28 | 32.77 | 34.72 |
| Mar-15 | 32.39 | 27.76 | 30.12 | 28.63 | 30.41 |
| Apr-15 | 32.69 | 26.36 | 29.98 | 27.62 | 30.10 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| May-15 | 37.08 | 26.25 | 32.82 | 28.98 | 32.46 |
| Jun-15 | 43.99 | 28.09 | 37.03 | 31.20 | 37.45 |
| Jul-15 | 68.51 | 33.56 | 43.66 | 37.00 | 52.59 |
| Aug-15 | 68.46 | 33.29 | 43.11 | 37.14 | 51.28 |
| Sep-15 | 40.28 | 27.08 | 34.73 | 29.95 | 34.77 |
| Oct-15 | 31.81 | 25.90 | 29.58 | 27.25 | 29.41 |
| Nov-15 | 32.44 | 26.39 | 29.90 | 27.79 | 29.85 |
| Dec-15 | 33.87 | 27.76 | 31.16 | 29.01 | 31.31 |
| Jan-16 | 42.21 | 28.63 | 38.28 | 30.56 | 35.57 |
| Feb-16 | 43.07 | 29.92 | 32.39 | 30.80 | 36.72 |
| Mar-16 | 41.59 | 29.16 | 31.56 | 29.98 | 35.73 |
| Apr-16 | 44.02 | 29.56 | 33.82 | 31.16 | 37.16 |
| May-16 | 49.78 | 30.64 | 37.95 | 33.50 | 40.85 |
| Jun-16 | 49.44 | 30.35 | 40.02 | 33.72 | 41.40 |
| Jul-16 | 54.79 | 31.79 | 43.01 | 36.45 | 44.34 |
| Aug-16 | 57.02 | 34.21 | 43.29 | 37.30 | 47.05 |
| Sep-16 | 48.83 | 30.32 | 38.88 | 33.53 | 40.67 |
| Oct-16 | 45.25 | 29.23 | 36.22 | 31.97 | 37.97 |
| Nov-16 | 44.07 | 31.23 | 35.20 | 32.72 | 38.01 |
| Dec-16 | 41.82 | 31.23 | 35.23 | 32.80 | 36.87 |
| Jan-17 | 43.43 | 29.90 | 34.55 | 31.72 | 37.01 |
| Feb-17 | 44.68 | 31.16 | 33.78 | 32.11 | 38.10 |
| Mar-17 | 43.45 | 30.72 | 33.25 | 31.58 | 37.45 |
| Apr-17 | 45.60 | 31.62 | 36.39 | 33.58 | 38.89 |
| May-17 | 51.52 | 33.67 | 41.32 | 36.48 | 43.60 |
| Jun-17 | 51.98 | 33.59 | 44.29 | 37.32 | 44.48 |
| Jul-17 | 56.57 | 35.32 | 47.78 | 40.49 | 47.41 |
| Aug-17 | 59.27 | 38.36 | 48.54 | 41.82 | 50.45 |
| Sep-17 | 50.21 | 33.54 | 43.54 | 37.54 | 43.17 |
| Oct-17 | 47.41 | 33.57 | 41.20 | 36.37 | 41.60 |
| Nov-17 | 46.86 | 36.09 | 40.69 | 37.81 | 42.03 |
| Dec-17 | 45.27 | 36.25 | 41.09 | 38.26 | 41.27 |
| Jan-18 | 47.14 | 35.78 | 41.10 | 37.73 | 42.18 |
| Feb-18 | 50.42 | 37.19 | 40.31 | 38.32 | 44.08 |
| Mar-18 | 48.88 | 37.49 | 40.72 | 38.68 | 43.51 |
| Apr-18 | 53.44 | 34.98 | 40.02 | 36.87 | 44.60 |
| May-18 | 55.65 | 39.10 | 47.98 | 42.36 | 48.65 |
| Jun-18 | 59.75 | 41.71 | 55.57 | 46.90 | 52.90 |
| Jul-18 | 63.99 | 45.85 | 59.52 | 51.21 | 56.98 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Aug-18 | 68.83 | 49.61 | 62.79 | 54.10 | 61.38 |
| Sep-18 | 62.65 | 46.35 | 58.27 | 51.39 | 56.15 |
| Oct-18 | 66.59 | 43.23 | 51.70 | 46.11 | 50.80 |
| Nov-18 | 57.55 | 44.93 | 50.65 | 47.07 | 51.96 |
| Dec-18 | 62.00 | 51.89 | 57.66 | 54.28 | 57.60 |
| Jan-19 | 65.87 | 51.10 | 58.68 | 53.88 | 59.55 |
| Feb-19 | 67.33 | 51.37 | 55.68 | 52.94 | 59.79 |
| Mar-19 | 68.67 | 45.22 | 49.29 | 46.82 | 56.70 |
| Apr-19 | 72.58 | 51.82 | 58.93 | 54.30 | 63.24 |
| May-19 | 75.01 | 53.59 | 65.76 | 58.06 | 66.08 |
| Jun-19 | 78.73 | 58.49 | 73.22 | 64.38 | 70.76 |
| Jul-19 | 84.34 | 62.91 | 78.44 | 68.62 | 76.06 |
| Aug-19 | 87.91 | 65.39 | 81.76 | 71.40 | 79.21 |
| Sep-19 | 77.33 | 58.26 | 71.92 | 63.72 | 69.77 |
| Oct-19 | 68.57 | 45.65 | 55.52 | 49.01 | 58.68 |
| Nov-19 | 66.26 | 49.71 | 56.33 | 52.35 | 58.52 |
| Dec-19 | 66.50 | 53.54 | 60.39 | 56.22 | 60.86 |
| Jan-20 | 69.59 | 54.77 | 62.90 | 57.75 | 63.35 |
| Feb-20 | 71.65 | 53.46 | 58.10 | 55.24 | 62.78 |
| Mar-20 | 73.62 | 45.08 | 48.97 | 46.51 | 59.36 |
| Apr-20 | 75.45 | 53.08 | 60.36 | 55.61 | 65.31 |
| May-20 | 78.63 | 57.51 | 71.91 | 63.49 | 70.00 |
| Jun-20 | 83.06 | 61.90 | 77.25 | 67.24 | 74.98 |
| Jul-20 | 89.51 | 66.18 | 83.24 | 71.99 | 80.65 |
| Aug-20 | 92.69 | 68.26 | 86.20 | 75.29 | 83.15 |
| Sep-20 | 79.96 | 61.15 | 74.36 | 66.10 | 72.57 |
| Oct-20 | 71.97 | 54.23 | 66.56 | 58.76 | 65.01 |
| Nov-20 | 70.35 | 51.97 | 58.90 | 54.74 | 61.67 |
| Dec-20 | 69.01 | 58.35 | 64.18 | 60.49 | 64.52 |
| Jan-21 | 70.72 | 55.80 | 64.87 | 59.57 | 64.37 |
| Feb-21 | 69.66 | 54.24 | 58.79 | 55.90 | 62.45 |
| Mar-21 | 76.43 | 43.25 | 46.81 | 44.46 | 60.30 |
| Apr-21 | 78.42 | 52.11 | 59.26 | 54.60 | 66.24 |
| May-21 | 80.83 | 58.24 | 72.82 | 64.29 | 71.40 |
| Jun-21 | 85.71 | 63.19 | 79.71 | 68.94 | 77.14 |
| Jul-21 | 91.58 | 67.33 | 85.17 | 74.32 | 82.12 |
| Aug-21 | 94.32 | 68.79 | 87.72 | 75.74 | 84.53 |
| Sep-21 | 80.33 | 63.34 | 74.71 | 67.60 | 73.54 |
| Oct-21 | 74.13 | 64.43 | 67.44 | 59.53 | 66.13 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Nov-21 | 70.98 | 52.21 | 58.85 | 54.69 | 62.28 |
| Dec-21 | 68.86 | 58.88 | 64.04 | 60.64 | 64.70 |
| Jan-22 | 75.29 | 58.27 | 67.36 | 61.82 | 67.91 |
| Feb-22 | 73.84 | 56.94 | 61.71 | 58.68 | 65.90 |
| Mar-22 | 77.94 | 43.46 | 47.03 | 44.68 | 61.15 |
| Apr-22 | 79.06 | 57.51 | 65.79 | 60.61 | 69.22 |
| May-22 | 83.57 | 61.31 | 75.94 | 67.05 | 74.51 |
| Jun-22 | 87.78 | 64.98 | 81.64 | 70.77 | 79.09 |
| Jul-22 | 93.92 | 71.38 | 87.35 | 78.01 | 84.85 |
| Aug-22 | 96.74 | 71.06 | 89.93 | 77.48 | 87.01 |
| Sep-22 | 81.29 | 63.59 | 75.60 | 68.09 | 74.25 |
| Oct-22 | 75.21 | 52.00 | 64.42 | 56.87 | 65.15 |
| Nov-22 | 72.23 | 52.61 | 59.30 | 55.11 | 63.09 |
| Dec-22 | 69.50 | 61.53 | 64.63 | 62.75 | 65.80 |
| Jan-23 | 74.90 | 60.06 | 69.40 | 63.72 | 68.77 |
| Feb-23 | 74.43 | 65.25 | 59.88 | 56.93 | 65.26 |
| Mar-23 | 78.93 | 44.91 | 48.60 | 46.17 | 62.40 |
| Apr-23 | 80.47 | 58.05 | 66.81 | 61.55 | 69.96 |
| May-23 | 85.68 | 63.88 | 78.34 | 69.16 | 76.98 |
| Jun-23 | 89.67 | 67.16 | 83.40 | 72.81 | 81.05 |
| Jul-23 | 96.41 | 73.44 | 89.67 | 80.18 | 87.16 |
| Aug-23 | 98.43 | 72.84 | 91.54 | 79.20 | 88.71 |
| Sep-23 | 82.94 | 63.37 | 77.14 | 68.88 | 75.13 |
| Oct-23 | 76.56 | 56.88 | 69.82 | 61.63 | 68.69 |
| Nov-23 | 71.98 | 57.17 | 64.44 | 59.89 | 65.53 |
| Dec-23 | 70.99 | 63.27 | 66.02 | 64.41 | 67.24 |
| Jan-24 | 74.68 | 60.72 | 69.46 | 63.93 | 69.02 |
| Feb-24 | 76.95 | 61.24 | 66.30 | 63.04 | 69.75 |
| Mar-24 | 78.36 | 50.54 | 55.09 | 52.33 | 64.10 |
| Apr-24 | 83.69 | 52.78 | 60.02 | 55.30 | 69.18 |
| May-24 | 85.79 | 61.26 | 75.14 | 66.34 | 75.54 |
| Jun-24 | 90.94 | 67.51 | 84.57 | 74.33 | 81.71 |
| Jul-24 | 97.66 | 72.42 | 90.82 | 79.18 | 87.92 |
| Aug-24 | 100.99 | 75.13 | 98.92 | 82.03 | 91.00 |
| Sep-24 | 89.93 | 67.38 | 83.64 | 73.88 | 81.01 |
| Oct-24 | 76.18 | 57.20 | 69.57 | 61.41 | 68.72 |
| Nov-24 | 73.18 | 58.32 | 66.09 | 61.42 | 66.64 |
| Dec-24 | 74.05 | 60.80 | 68.57 | 63.85 | 68.46 |
| Jan-25 | 79.23 | 61.37 | 70.48 | 64.72 | 71.58 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-25 | 78.23 | 61.96 | 67.15 | 63.84 | 70.70 |
| Mar-25 | 78.21 | 50.66 | 55.22 | 52.45 | 64.10 |
| Apr-25 | 82.96 | 59.88 | 68.09 | 62.73 | 72.62 |
| May-25 | 86.88 | 63.96 | 79.25 | 69.97 | 77.61 |
| Jun-25 | 92.52 | 68.33 | 86.04 | 74.97 | 83.16 |
| Jul-25 | 100.33 | 73.00 | 93.31 | 80.46 | 89.86 |
| Aug-25 | 103.73 | 76.09 | 96.47 | 84.08 | 92.95 |
| Sep-25 | 90.95 | 68.06 | 84.58 | 74.26 | 82.05 |
| Oct-25 | 77.31 | 55.27 | 67.21 | 59.33 | 68.22 |
| Nov-25 | 73.88 | 57.95 | 66.02 | 61.35 | 66.63 |
| Dec-25 | 74.50 | 65.10 | 69.29 | 66.64 | 70.36 |
| Jan-26 | 82.40 | 65.45 | 75.63 | 69.44 | 75.29 |
| Feb-26 | 80.98 | 64.06 | 69.42 | 66.01 | 73.14 |
| Mar-26 | 82.79 | 58.61 | 58.23 | 55.31 | 68.33 |
| Apr-26 | 86.77 | 61.99 | 70.49 | 64.95 | 75.61 |
| May-26 | 91.21 | 67.77 | 84.74 | 74.81 | 81.87 |
| Jun-26 | 97.43 | 71.96 | 90.61 | 78.45 | 87.73 |
| Jul-26 | 105.34 | 77.34 | 97.96 | 84.36 | 94.74 |
| Aug-26 | 108.63 | 79.46 | 101.02 | 87.92 | 97.27 |
| Sep-26 | 94.03 | 71.22 | 87.45 | 77.31 | 85.11 |
| Oct-26 | 83.09 | 62.33 | 76.51 | 67.54 | 74.90 |
| Nov-26 | 80.50 | 60.69 | 68.77 | 63.91 | 71.28 |
| Dec-26 | 79.24 | 67.68 | 73.70 | 69.89 | 74.31 |
| Jan-27 | 83.80 | 65.92 | 76.64 | 70.37 | 76.15 |
| Feb-27 | 83.08 | 63.20 | 68.50 | 65.13 | 73.68 |
| Mar-27 | 85.92 | 51.98 | 56.26 | 53.44 | 69.53 |
| Apr-27 | 89.51 | 58.42 | 66.44 | 61.21 | 75.05 |
| May-27 | 94.27 | 67.39 | 84.26 | 74.39 | 82.94 |
| Jun-27 | 100.92 | 73.55 | 93.85 | 80.61 | 90.54 |
| Jul-27 | 108.71 | 79.59 | 101.10 | 88.03 | 97.37 |
| Aug-27 | 111.53 | 81.05 | 103.73 | 89.38 | 99.86 |
| Sep-27 | 95.09 | 74.61 | 88.44 | 79.79 | 86.93 |

United States Department of Agriculture
Rural Development Utilities Programs - Data Collection System



NAVIGATION

My DCS
Borrowers
Profile

## My DCS Borrowers

My Borrowers : Brazos Electric Power Cooperative, Inc. [TX0121]

**Financial and Operating Report Electric Power Supply - Filing Frequency: Annual**

| Year | Year-to-Date | Status | Audited Data | Action |
|---|---|---|---|---|
| 2010 | December | Submitted [04/06/2011 04:39 PM] | Yes | View Edit ASR BSP Export |
| 2009 | December | Submitted [04/12/2010 01:29 PM] | Yes | View Edit ASR BSP Export |
| 2008 | December | Submitted [04/02/2009 02:41 PM] | Yes | View Edit ASR BSP Export |
| 2007 | December | Submitted [04/15/2008 04:02 PM] | Yes | View Edit ASR BSP Export |
| 2006 | December | Submitted [04/09/2007 09:16 AM] | No | View Edit ASR BSP Export |
| 2005 | December | Submitted [03/15/2006 12:16 PM] | N/A | View Edit ASR BSP Export |
| 2004 | December | Submitted [03/14/2005 03:46 PM] | N/A | View Edit ASR BSP Export |
| 2003 | December | Submitted [03/12/2004 10:20 AM] | N/A | View Edit ASR BSP Export |
| 2002 | December | Submitted [04/08/2003 02:15 PM] | N/A | View Edit ASR BSP Export |

New Power Supply Operating Report

**Audit**

| Year | Approval-Date | File Name | Status | Action |
|---|---|---|---|---|
| No Audit File | | | | |

Upload Audit

### Users associated with the borrower

| Name | Phone Number | Phone Extension | Email | Title | Is Active? | Role(s) |
|---|---|---|---|---|---|---|
| Birkes, Kay | 254-750-6239 | | kbirkes@brazoselectric.com | Treasury/Property/Risk Accounting Supery | Yes | User |
| Bordovsky, Khaki | 254-716-3814 | | kbordovsky@brazosplectric.com | VP Services | Yes | Administrator, User |
| Breton, Gina | 254-749-0053 | | gbreton@brazoselectric.com | Accountant | Yes | User |
| Canada, Lois | 254-750-6237 | | lcanada@brazoselectric.com | Secretary, VP Finance | Yes | User |
| karnei, clifton | 254-750-6000 | | ckarnei@brazoselectric.com | Exec VP & General Manager | Yes | Certifier, User |
| Kramolis, Timothy | 254-750-6242 | | tkramolis@brazoselectric.com | Accountant | Yes | User |
| Pankonien, Kelly | 254-750-6236 | | kpankonien@brazoselectric.com | Accountant, Budget & Rates | Yes | User |
| perkins, wesley | 254-750-6632 | | dperkins@brazoselectric.com | General Accounting Supervisor | Yes | User |

Version 2.0.4106.17075

United States Department of Agriculture
Rural Development Utilities Programs - Data Collection System



NAVIGATION

Reports
Op. Report-Power Supply
Certification
Point Of Contact
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Section C
Part b SE
Part b PP
Part c RE
Part e
Parts d-g
Part h
Section A
Section B
Section C
Section D
Section E
Section F
Sub Section I
Sub Section II
Sub Section III
Sub Section IV
Section G
Section H
Section I
Section J
Section K
Section L
Part i
Section A
Section B
Section C
Section D

## Certification

Certification saved successfully.

*This information is analyzed and used to determine the submitter's financial situation and feasibility for loans and guarantees. You are required by contract and applicable regulations to provide the information. The information provided is subject to the Freedom of Information Act (5 U.S.C 552).*

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0032. The time required to complete this information collection is estimated to average 25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

**We recognize that statements contained herein concern a matter within the jurisdiction of an agency of the United States and the making of a false, fictitious or fraudulent statement may render the maker subject to prosecution under Title 18, United States Code Section 1001.**

We hereby certify that the entries in this report are in accordance with the accounts and other records of the system and reflect the status of the system to the best of our knowledge and belief.

**ALL INSURANCE REQUIRED BY PART 1788 OF 7CFR CHAPTER XVII, RUS, WAS IN FORCE DURING THE REPORTING PERIOD AND RENEWALS HAVE BEEN OBTAINED FOR ALL POLICIES**

**DURING THE PERIOD COVERED BY THIS REPORT PURSUANT TO PART 1718 OF 7CFR CHAPTER XVII**
*(check one of the following)*

(●) All of the obligations under the RUS loan documents have been fulfilled in all material respects.

( ) There has been a default in the fulfillment of the obligations under the RUS loan documents. Said default(s) is/are specifically described in Part a Section C of this report.

(●) Share this data with NRUCFC.

( ) Do not share this data with NRUCFC.

| | |
|---|---|
| Manager Name: | clifton karnei |
| Manager Title: | Exec VP & General Mgnr |
| Date Certified and Electronically Signed: | 4/6/2011 |

(●) Certify ( ) Uncertify

Save

(Rev. 12-05)

Version 2.0.4108.17075

United States Department of Agriculture
Rural Development Utilities Programs - Data Collection System



NAVIGATION

Reports
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Sub Section I
Sub Section II
Sub Section III
Sub Section IV
Section G
Section H
Section I
Section J
Section K
Section L
Part f
Section A
Section B
Section C
Section D

## Certification

*This information is analyzed and used to determine the submittor's financial situation and feasibility for loans and guarantees. You are required by contract and applicable regulations to provide the information. The information provided is subject to the Freedom of Information Act (5 U.S.C 552).*

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0032. The time required to complete this information collection is estimated to average 25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

**We recognize that statements contained herein concern a matter within the jurisdiction of an agency of the United States and the making of a false, fictitious or fraudulent statement may render the maker subject to prosecution under Title 18, United States Code Section 1001.**

We hereby certify that the entries in this report are in accordance with the accounts and other records of the system and reflect the status of the system to the best of our knowledge and belief.

**ALL INSURANCE REQUIRED BY PART 1788 OF 7CFR CHAPTER XVII, RUS, WAS IN FORCE DURING THE REPORTING PERIOD AND RENEWALS HAVE BEEN OBTAINED FOR ALL POLICIES**

**DURING THE PERIOD COVERED BY THIS REPORT PURSUANT TO PART 1718 OF 7CFR CHAPTER XVII**
*(check one of the following)*

(●) All of the obligations under the RUS loan documents have been fulfilled in all material respects.

( ) There has been a default in the fulfillment of the obligations under the RUS loan documents. Said default(s) is/are specifically described in Part a Section C of this report.

(●) Share this data with NRUCFC.

( ) Do not share this data with NRUCFC.

| | |
|---|---|
| Manager Name: | clifton karnei |
| Manager Title: | Exec VP & General Mana |
| Date Certified and Electronically Signed: | 4/6/2011 |

(●) Certify ( ) Uncertify

Save

(Rev. 12-05)

Version 2.0.4106.17076

*According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0032. The time required to complete this information collection is estimated to average 21 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.*

| | |
|---|---|
| UNITED STATES DEPARTMENT OF AGRICULTURE<br>RURAL UTILITIES SERVICE | BORROWER DESIGNATION TX0121 |
| FINANCIAL AND OPERATING REPORT<br>ELECTRIC POWER SUPPLY | PERIOD ENDED December, 2010 (Prepared with Audited Dat |
| INSTRUCTIONS - See help in the online application. | BORROWER NAME Brazos Electric Power Cooperative, Inc. |

This information is analyzed and used to determine the submitter's financial situation and feasibility for loans and guarantees. You are required by contract and applicable regulations to provide the information. The information provided is subject to the Freedom of Information Act (5 U.S.C. 552)

## CERTIFICATION

We recognize that statements contained herein concern a matter within the jurisdiction of an agency of the United States and the making of a false, fictitious or fraudulent statement may render the maker subject to prosecution under Title 18, United States Code Section 1001.

We hereby certify that the entries in this report are in accordance with the accounts and other records of the system and reflect the status of the system to the best of our knowledge and belief.

ALL INSURANCE REQUIRED BY PART 1788 OF 7 CFR CHAPTER XVII, RUS, WAS IN FORCE DURING THE REPORTING PERIOD AND RENEWALS HAVE BEEN OBTAINED FOR ALL POLICIES DURING THE PERIOD COVERED BY THIS REPORT PURSUANT TO PART 1718 OF 7 CFR CHAPTER XVII

*(check one of the following)*

[X] All of the obligations under the RUS loan documents have been fulfilled in all material respects.

[ ] There has been a default in the fulfillment of the obligations under the RUS loan documents. Said default(s) is/are specifically described in Part A Section C of this report.

clifton karnei — 4/6/2011
DATE

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART F CC - COMBINED CYCLE PLANT

BORROWER DESIGNATION TX0121

PLANT Jack County

PERIOD ENDED December, 2010

INSTRUCTIONS - See help in the online application.

## SECTION A. COMBINED CYCLE GENERATING UNITS

| NO. | UNIT NO. (a) | SIZE (kW) (b) | FUEL CONSUMPTION OIL (1000 Gals.) (c) | FUEL CONSUMPTION GAS (1000 Cf) (d) | FUEL CONSUMPTION OTHER (e) | FUEL CONSUMPTION TOTAL (f) | OPERATING HOURS IN SERVICE (g) | OPERATING HOURS ON STANDBY (h) | OPERATING HOURS OUT OF SERVICE SCHED. (i) | OPERATING HOURS OUT OF SERVICE UNSC. (j) | GROSS GENER. (MWh) (k) | BTU PER kWh (l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 1 | 160,000 | 0.00 | 10,978,614.00 | 0.00 | | 7,321 | 0 | 1,142 | 297 | 956,874 | |
| 2. | 2 | 160,000 | 0.00 | 11,298,177.00 | 0.00 | | 7,464 | 0 | 1,156 | 140 | 968,616 | |
| 3. | 3 | 280,000 | 0.00 | 0.00 | 0.00 | | 7,643 | 0 | 1,050 | 67 | 1,308,271 | |
| 4. | | | | | | | | | | | | |
| 5. | | | | | | | | | | | | |
| 6. | Total | 600,000 | 0.00 | 22,276,791.00 | 0.00 | | 22,428 | 0 | 3,348 | 504 | 3,230,761 | 7,022.26 |
| 7. | Average BTU | | 0.00 | 1,019.65 | | | Station Service (MWh) | | | | 96,787.00 | |
| 8. | Total BTU ($10^6$) | | 1,026.00 | 22,715,364.00 | | 22,716,390.00 | Net Generation (MWh) | | | | 3,133,974.00 | 7,248.43 |
| 9. | Total Del. Cost ($) | | 0.00 | 0.00 | 0.00 | | Station Service % Of Gross | | | | 3.00 | |

## SECTION B. LABOR REPORT

| NO. | ITEM | VALUE | NO. | ITEM | VALUE |
|---|---|---|---|---|---|
| 1. | No. Employees Full Time (Include. Superintendent) | 43 | 5. | Maintenance Plant Payroll ($) | 1188667 |
| 2. | No. Employees Part Time | 0 | 6. | Other Accounts Plant Payroll ($) | |
| 3. | Total Employee Hours Worked | 0 | 7. | Total Plant Payroll ($) | 2850925 |
| 4. | Operating Plant Payroll ($) | 1662258 | | | |

## SECTION C. FACTORS & MAXIMUM DEMAND

| NO. | ITEM | VALUE |
|---|---|---|
| 1. | Load Factor (%) | 55.23% |
| 2. | Plant Factor (%) | 61.47% |
| 3. | Running Plant Capacity Factor (%) | 71.70% |
| 4. | 15 Min. Gross Max. Demand (kW) | |
| 5. | Indicated Gross Max. Demand (kW) | 667,821 |

## SECTION D. COST OF NET ENERGY GENERATED

| NO. | PRODUCTION EXPENSE | ACCOUNT NUMBER | AMOUNT ($) (a) | MILLS/NET kWh (b) | $/$10^6$ BTU (c) |
|---|---|---|---|---|---|
| 1. | Operation, Supervision and Engineering | 500 | 833,052 | | |
| 2. | Fuel, Oil | 547.1 | 0 | | 0.00 |
| 3. | Fuel, Gas | 547.2 | 100,778,122 | | 4.43 |
| 4. | Fuel, Other | 547.3 | 0 | | |
| 5. | Energy for Compressed Air | 547.4 | 0 | 0.00 | |
| 6. | Fuel SubTotal (2 thru 5) | 547 | 100,778,122 | 32.15 | 4.43 |
| 7. | Generation Expenses | 548 | 966,938 | | |
| 8. | Miscellaneous Other Power Generation Expenses | 549 | 74,419 | | |
| 9. | Rents | 507 | 0 | | |
| 10. | Steam Expenses | 502 | 2,124,067 | | |
| 11. | Electric Expenses | 505 | 147,509 | | |
| 12. | Miscellaneous Steam Power Expenses | 506 | 2,109,572 | | |
| 13. | Allowances | 509 | 0 | | |
| 14. | Non-Fuel SubTotal (1 + 7 thru 13) | | 5,945,674 | 1.89 | |
| 15. | Operating Expense (6 + 14) | | 106,720,696 | 34.05 | |
| 16. | Maintenance, Supervision and Engineering | 551, 510 | 221,378 | | |
| 17. | Maintenance of Structures | 552, 511 | 2,044,416 | | |
| 18. | Maintenance of Generating and Electric Plant | 553, 513 | 8,805,034 | | |
| 19. | Maintenance of Miscellaneous Other Power Generating Plant | 554, 514 | 304,386 | | |
| 20. | Maintenance Expense (16 thru 19) | | 11,375,214 | 3.62 | |
| 21. | Total Production Expense (15 + 20) | | 118,096,910 | 37.68 | |
| 22. | Depreciation | 403.4, 403.1, 411.10 | 8,199,498 | | |
| 23. | Interest | 427 | 12,392,417 | | |
| 24. | Total Fixed Cost (22 + 23) | | 20,591,915 | 6.57 | |
| 25. | Power Cost (21 + 24) | | 138,687,822 | 44.25 | |

Remarks

| | Jack 1 STG Weighted Avg. Gas (MMBtu) | Value Without Transportation | Average Monthly Cost | Heat Rate | Value With Transportation | Johnson STG Weighted Avg. Gas (MMBtu) | Value Without Transportation | Value With Transportation |
|---|---|---|---|---|---|---|---|---|
| Jan-09 | 956,361 | $ 4,573,320.31 | $ 34.39 | 7.19 | $ 4,877,563.71 | 324,379 | $ 1,551,181.78 | $ 1,586,539.13 |
| Feb-09 | 843,818 | $ 2,892,612.77 | $ 24.46 | 7.13 | $ 3,019,185.67 | 234,291 | $ 803,149.47 | $ 838,293.12 |
| Mar-09 | 912,676 | $ 2,757,192.93 | $ 21.60 | 7.15 | $ 2,868,618.21 | - | $ - | $ - |
| Apr-09 | 220,030 | $ 733,578.69 | $ 22.63 | 6.79 | $ 785,725.70 | - | $ - | $ - |
| May-09 | 801,279 | $ 2,403,034.28 | $ 21.95 | 7.32 | $ 2,513,610.72 | 199,361 | $ 597,882.50 | $ 625,394.26 |
| Jun-09 | 1,047,398 | $ 3,290,925.77 | $ 22.66 | 7.21 | $ 3,416,613.58 | 395,940 | $ 1,244,042.86 | $ 1,291,555.64 |
| Jul-09 | 1,175,097 | $ 4,044,682.36 | $ 24.92 | 7.24 | $ 4,184,518.85 | 436,267 | $ 1,501,629.80 | $ 1,553,545.53 |
| Aug-09 | 1,170,960 | $ 3,807,962.31 | $ 23.66 | 7.28 | $ 3,944,964.84 | 398,842 | $ 1,297,359.56 | $ 1,344,035.78 |
| Sep-09 | 955,927 | $ 2,470,115.73 | $ 18.94 | 7.33 | $ 2,586,738.84 | 356,756 | $ 921,857.94 | $ 965,362.19 |
| Oct-09 | 645,815 | $ 2,330,745.61 | $ 25.63 | 7.10 | $ 2,420,513.87 | 327,844 | $ 1,183,190.13 | $ 1,228,760.49 |
| Nov-09 | 395,283 | $ 1,557,810.30 | $ 29.89 | 7.58 | $ 1,623,822.56 | 302,661 | $ 1,192,786.42 | $ 1,243,330.78 |
| Dec-09 | 935,970 | $ 4,272,703.69 | $ 33.11 | 7.25 | $ 4,388,763.99 | 287,764 | $ 1,313,641.07 | $ 1,349,323.76 |
| Jan-10 | 890,560 | $ 5,183,057.86 | $ 41.51 | 7.13 | $ 5,299,721.19 | 330,752 | $ 1,924,877.40 | $ 1,968,305.93 |
| Feb-10 | 791,756 | $ 4,259,645.13 | $ 38.16 | 7.09 | $ 4,364,156.87 | 312,599 | $ 1,681,783.75 | $ 1,723,046.84 |
| Mar-10 | 224,813 | $ 1,002,888.83 | $ 33.31 | 7.47 | $ 1,051,448.34 | 302,377 | $ 1,348,902.23 | $ 1,414,216.58 |
| Apr-10 | 742,624 | $ 2,823,456.37 | $ 27.76 | 7.30 | $ 2,935,592.59 | 84,561 | $ 321,501.36 | $ 334,270.08 |
| May-10 | 750,748 | $ 3,030,769.95 | $ 29.64 | 7.34 | $ 3,139,628.42 | 183,830 | $ 742,123.18 | $ 768,778.58 |
| Jun-10 | 1,084,434 | $ 4,477,628.48 | $ 30.15 | 7.30 | $ 4,618,604.92 | 400,855 | $ 1,655,132.00 | $ 1,707,243.20 |
| Jul-10 | 1,063,612 | $ 4,856,453.31 | $ 37.33 | 8.18 | $ 4,977,705.10 | 433,624 | $ 1,979,925.29 | $ 2,029,358.38 |
| Aug-10 | 1,217,747 | $ 5,148,633.47 | $ 30.46 | 7.20 | $ 5,299,634.07 | 495,894 | $ 2,096,641.60 | $ 2,158,132.50 |
| Sep-10 | 966,276 | $ 3,479,015.60 | $ 26.74 | 7.44 | $ 3,595,208.71 | 416,970 | $ 1,498,174.88 | $ 1,548,211.34 |
| Oct-10 | 284,601 | $ 1,041,364.33 | $ 26.65 | 7.28 | $ 1,095,713.08 | 374,872 | $ 1,371,658.02 | $ 1,443,258.64 |
| Nov-10 | 702,850 | $ 2,274,423.51 | $ 22.80 | 7.05 | $ 2,367,902.59 | 314,649 | $ 1,018,205.80 | $ 1,060,053.97 |
| Dec-10 | 716,364 | $ 2,936,527.10 | $ 29.27 | 7.14 | $ 3,030,221.75 | 320,868 | $ 1,316,202.38 | $ 1,357,273.55 |
| Jan-11 | 788,032 | $ 3,171,827.43 | $ 29.00 | 7.21 | $ 3,272,695.48 | 311,764 | $ 1,254,851.06 | $ 1,294,756.88 |
| Feb-11 | 799,836 | $ 3,528,076.60 | $ 31.71 | 7.19 | $ 3,641,653.31 | 300,991 | $ 1,327,670.33 | $ 1,370,411.02 |
| Mar-11 | 304,272 | $ 1,143,151.52 | $ 29.28 | 7.79 | $ 1,217,089.72 | 312,348 | $ 1,173,493.21 | $ 1,249,393.89 |
| Apr-11 | 841,645 | $ 3,514,709.13 | $ 30.22 | 7.24 | $ 3,609,815.00 | 103,956 | $ 434,120.34 | $ 445,867.37 |
| May-11 | 930,809 | $ 3,937,320.32 | $ 31.38 | 7.42 | $ 4,044,363.31 | 267,952 | $ 1,133,436.75 | $ 1,164,251.22 |
| Jun-11 | 1,102,253 | $ 4,757,322.74 | $ 34.52 | 8.00 | $ 4,910,535.86 | 317,458 | $ 1,370,149.07 | $ 1,414,275.75 |
| Jul-11 | 1,119,881 | $ 4,805,769.07 | $ 30.32 | 7.06 | $ 4,985,710.27 | 336,406 | $ 1,444,529.08 | $ 1,497,681.29 |
| Aug-11 | 916,276 | $ 3,848,359.69 | $ 30.60 | 7.28 | $ 3,983,968.56 | 446,780 | $ 1,876,476.25 | $ 1,942,599.70 |
| Sep-11 | 910,576 | $ 3,554,888.86 | $ 28.28 | 7.24 | $ 3,707,865.63 | 286,117 | $ 1,156,039.01 | $ 1,205,786.59 |
| Oct-11 | 161,661 | $ 583,756.80 | $ 26.26 | 7.27 | $ 623,202.01 | 290,800 | $ 1,050,077.36 | $ 1,121,032.46 |
| Nov-11 | 770,091 | $ 2,552,081.67 | $ 23.95 | 7.23 | $ 2,703,019.51 | 305,564 | $ 1,012,838.53 | $ 1,072,529.04 |
| Dec-11 | 797,476 | $ 2,604,556.47 | $ 23.51 | 7.20 | $ 2,743,317.29 | 106,068 | $ 346,416.52 | $ 364,872.27 |
| | 28,941,806 | | | | $ 117,669,414 | 10,632,261 | | $ 43,681,767 |
| | | | | | 4.07 | | | 4.11 |

Johnson County, Steam Output Revenue/Cost Stream

| | Period Energy | Period Revenue | Revenue 36 month avg | Expense | mmBTU/mwh | Avg $/mmBTU | Expense 36 month avg |
|---|---|---|---|---|---|---|---|
| Jan 2009 - Dec 2011 | 1,349,799 | $ 60,034,499 | $ 44.48 | $ 42,141,847 | 7.86 | $ 3.96 | $ 31.22 |

Jack County 1, Steam Output Revenue/Cost Stream

| | Period Energy | Period Revenue | Revenue 36 month avg | Expense | mmBTU/mwh | Avg $/mmBTU | Expense 36 month avg |
|---|---|---|---|---|---|---|---|
| Jan 2009 - Dec 2011 | 3,968,191 | $ 166,363,269 | $ 41.92 | $ 113,655,359 | 7.29 | $ 3.93 | $ 28.64 |

Notes:
[1] Steam Energy based on monthly EIA Reports
[2] Revenue calculations based on SCADA extracts reconciled to EIA Reports
[3] Cost stream calculations based on EIA information w/ allocation of MMBTU based on ratio of steam energy output to total plant output

Attachment I

BEPC's Discussion regarding Partial Use Calculations

The calculation provided as part of TCEQ's Cost Analysis Procedure ("CAP")is designed for a situation in which add-on pollution control equipment is being utilized to reduce emissions from a facility. It is not suited for equipment that represents a system design change, such as a HRSG, where the pollution control is derived from pollution prevention attributed to an improvement in the equipment's efficiency. The Executive Director's staff has introduced further hurdles to obtaining a positive use determination by mandating the use of some specific inputs for the CAP's variables, such that it is not believed that there are any circumstances under which a positive use determination can be made if one is required to utilize these inputs. This result is contrary to the Legislature's enactment of Tex. Tax Code § 11.31(b).

Specifically, the Executive Director's staff's interpretation of the CAP calculation does not make sense for the following reasons:

(1) The Executive Director's staff has directed the HRSG Applicants to calculate the Production Capacity Factor ("PCF") "by dividing the capacity of the existing equipment or process by the capacity of the new equipment or process." This calculation accurately reflects the first portion of the TCEQ's rules, found in 30 TAC § 17.17(b). However, the Executive Director's staff failed to note that the rule has specifically recognized that the PCF is to be included in the CAP formula only in limited circumstances. The rule notes, "when there is an increase in production capacity, PCF is used to adjust the capacity of the new equipment or process to the capacity of the existing equipment or process. When there is a decrease in production capacity. PCF is used to adjust the capacity of the existing equipment or process to the production capacity of the new equipment or process. In this case, this calculation is modified so that PCF is applied to Capital Cost Old (CCO) rather than Capital Cost New." *Id.*

The Executive Director's staff's direction to the HRSG Applicants, in this regard, is inconsistent with the rule. First, there is no existing equipment or process. As a result, there is no increase or decrease in capacity. Under such circumstances, the rule recognizes that no calculation of PCF should be made. As a result, that portion of the CAP calculation is to be omitted.

(2) Inserting a value in for CCO requires that there be "old equipment." As stated, this is not a replacement of an HRSG. There is no old equipment.

(3) The Executive Director's staff has directed the HRSG Applicants to calculate Capital Cost Old as "the cost of a boiler(s) required to the (sic) produce same amount of steam produced by the HRSGs." The Executive Director's staff's interpretation of CCO is contrary to TCEQ's rules, which define "Capital cost old" as "The cost of the equipment that is being or has been replaced by the equipment covered in an application." 30 TAC § 17.2(2). The definition continues by directing that the calculation of this variable in the CAP procedure is to be performed using one of the four hierarchical methods set forth in 30 TAC § 17.17(b)(1).[4]

The hierarchical methods, with an analysis of their applicability, are as follows:

[4] It appears that this reference should be to 30 TAC § 17.17(c)(1).

**Method 3.1**: If comparable equipment without the pollution control feature is on the market in the United States, then an average market price of the most recent generation of technology must be used.

**Analysis**: There is no equipment that serves the function of the HRSG without its pollution control feature. The HRSG is the equipment that is the subject of the use determination application. There is no substitute for this equipment. Method 3.1 is therefore inapplicable.[5]

**Method 3.2**: If the conditions in variable 3.1 do not apply and the company is replacing an existing unit that already has received a positive use determination, the company shall use the CCO from the previous use determination.

**Analysis**: The company is not replacing an existing unit that already has received a positive use determination. Method 3.2 is therefore inapplicable.

**Method 3.3**: If the conditions in variable 3.1 and 3.2 do not apply and the company is replacing an existing unit, then the company shall convert the original cost of the unit to today's dollars by using a published industry specific standard. If the production capacity of the new equipment or process is lower than the production capacity of the old equipment or process, CCO is divided by the PCF to adjust CCO to reflect the same capacity as CCN.

**Analysis**: The company is not replacing an existing unit. Method 3.3 is therefore inapplicable.

**Method 3.4**: If the conditions in variables 3.1. 3.2 and 3.3 do not apply, and the company can obtain an estimate of the cost to manufacture the alternative equipment without the pollution control feature, then an average estimated cost to manufacture the unit must be used. The comparable unit must be the most recent generation of technology. A copy of the estimate must be provided with the worksheet including the specific source of the information.

**Analysis**: There is no alternative equipment that could be manufactured to serve the function of the HRSG without its pollution control feature. The HRSG is the equipment that is the subject of the use determination application. There is no substitute for this equipment. Method 3.4 is therefore inapplicable.

As applied, TCEQ hierarchical methods are not applicable. Therefore, for purposes of this Application and its CAP calculation, CCO is zero.

(4) TCEQ's rules additionally define CCO in the CAP formula set forth in 30 TAC 17.17(c), stating, "Capital Cost Old is the cost of comparable equipment or process without the pollution control." *See* Figure: 30 TAC § 17.17(c)(1). First, this definition is inconsistent with the TCEQ's earlier definition of the same term, as set forth in 30 TAC § 17.2(2). Second, the Executive Director's staff's interpretation of this element of the formula disregards the fact, as stated above, that the subject of the application is a HRSG, for which there is no other

[5] For purposes of facilitating a timely resolution of this matter, and without waiving its rights to pursue a partial use determination of 74.66%, BEPC is submitting alternatives for the Executive Director's consideration. One of these alternatives is the treatment of the HRSG as the hypothetical "replacement" for piping necessary to fill the gap that would otherwise exist between pieces of equipment if one were to remove the HRSG and its dedicated ancillary equipment.

"comparable equipment or process without the pollution control." There is no other comparable equipment, and thus there can be no value for CCO in the CAP calculation for the HRSG.

(5) As applied, the staff's interpretation of the formula ensures that, under no circumstances, will a HRSG ever be granted a positive use determination. Such an outcome is inconsistent with the Legislature's determination that a HRSG constitutes pollution control equipment, and is therefore invalid, improper and illegal rulemaking.

(6) Even if one were replacing a HRSG, CCO does not make sense. As previously utilized, CCO was designed to identify the portion of the new equipment that was an environmental improvement on the old equipment's design. Pulling out the CCO from the CCN isolated the environmentally beneficial equipment that was eligible for a tax exemption. This conclusion is supported by the TCEQ's treatment of certain equipment referenced in the introductory language under the Tier I Table of 30 TAC 17.14(a), which states. "For items where the description limits the use determination to the incremental cost difference, the cost of the property or device with the pollution control feature is compared to a similar device or property without the pollution control feature." BEPC, through its Application, is not presenting a situation for which an environmental element must be isolated. The formula works solely when an entity is replacing in-kind, like equipment, with updated equipment that has an additional pollution control feature. The consideration of CCO in such a circumstances allows the entity to isolate the value of that environmental feature. In the case of the HRSG, the use of the CCO, as interpreted by the Executive Director's staff, simply makes the HRSG twice as expensive - first, the entity must purchase the HRSG, then it must discount the value of the HRSG by the cost of hypothetical equipment designed to mimic the productivity of the HRSG itself. Such an approach negates the purpose of installing the HRSG in the first place - producing greater quantities of steam while reducing the environmental impact that would occur without the use of this equipment.

(7) If one does use a CCO, as defined by the Executive Director's staff for the first time in the NOD, based on the cost of a boiler(s) required to produce the same amount of steam produced by the HRSG, there is no basis for discounting that result to account for the income stream associated with the additional steam produced by the HRSG. NPVMP is designed to capture "the production benefits of property used partially for pollution control and partially for production." *See* 35 Tex. Reg. 10964, 10965 (Dec 10, 2010). Because the CCO and CCN have been equalized or normalized, the HRSG is no longer producing additional steam beyond that produced by the equipment reflected in the calculation of CCO. Therefore, there is no basis for NPVMP under such circumstances.

(8) TCEQ's rules define "Production Cost" as "The costs directly attributed to the production of the product. including raw materials, storage, transportation. and personnel, but excluding non-cash costs. such as overhead and depreciation." 30 TAC § 17.17(c)(2). Through its NOD, the staff narrows the scope of Production Cost by asserting that the cost attributed to the production of electricity, which the staff has designated as the marketable product, must "exclude costs relating to operating the gas turbine, associated duct burners, or the steam turbine including fuel costs." Attachment A, p. 3. Without the operation of these units, and their associated expenses (including fuel costs), no electricity would be generated from any steam produced via the HRSG, and therefore no marketable product would be generated. The staff cannot have it both ways. If electricity is the marketable product, the HRSG Applicants must be allowed to take into account the costs (and the equipment) associated with generating that marketable product as part of its NPVMP calculation. TCEQ's rules mandate it.

(9) The exclusion of fuel costs from Production Cost is particularly problematic and inappropriate. "Production Cost" expressly includes the cost of "raw materials." *See* 30 TAC § 17.17(c)(2). In this context, fuel is the raw material for the production of the steam and its costs are an element of Production Cost, by definition. Additional costs that are included in Production Cost include storage, transportation, and personnel costs. *See id.* The staff's interpretation of the elements to be included in, and excluded from, the calculation of NPVMP is inaccurate and constitutes improper and illegal rulemaking.

(10) In addition, it should be noted that local appraisal districts in Texas have the authority to use and are legally required to at least consider application of the income approach when appraising plants like BEPC's. *See, e.g.*, TEX. TAX CODE §§ 23.01(b), 23.0101. The income approach is specifically grounded upon a consideration of overall plant revenues,[6] which would include revenues associated with the production of electricity by and through BEPC's steam turbines, and revenues, if any, from the HRSG's steam itself. Accordingly, the deduction of any NPVMP in the CAP calculation would cause an inappropriate and unjust "double counting" of those revenues and, as far as ad valorem taxation goes, effectively cause BEPC to pay a "double tax" on those revenues.

Specifically, through its proposed calculation of NPVMP, the staff reduces the amount of exemption authorized for a HRSG to account for the steam's income stream. Then, the appraisal district is authorized to tax the entity on that same income stream, under an income-based approach. In fact, under the staff' s approach, the value of the steam is essentially taxed three times. First, the CCO costs are inflated to normalize the steam production of the hypothetical CCO and that of the CCN. Second, this result is discounted by the value of the steam's income stream. Finally, the tax appraisal district can appraise the steam's income stream. Two discounts of the potential tax exemption based on the value of the steam, and an appraisal on the revenue from the steam itself, is two too much. TCEQ should leave the consideration of any income stream arising from the use of the HRSG to the governmental entity best able to determine its value – the appraisal district.

(11) The application of the Executive Director's staff interpretation of the CAP formula TCEQ's formula consistently results in a negative partial use calculation. HRSGs have been statutorily designated as pollution control equipment. As such, some portion of the value of that equipment must be attributed to pollution control, and provided a tax exemption. A result of zero, less than zero, or far less than zero is not valid, any more than a result of greater than 100% is valid. Because the formula is capable of generating a naught or a negative number, it is inconsistent with state law, and invalid as a matter of law.

(12) Ironically, the more efficiently a power plant with a HRSG operates, the lower is the result of the formula. A power plant that operates more efficiently will produce more steam, which will generate a higher income stream under the CAP formula. Because the income stream is then used to reduce the potential positive use determination, the formula actually provides an incentive for power plants to operate less efficiently, so as to obtain a higher tax exemption. This is counter to the purpose for the constitutional amendment and the statute that established the tax exemption.

For all of these reasons. the CAP formula and the Executive Director's staff's interpretation thereof, is invalid, indeed illegal, as applied to the HRSG applicants. The Executive Director's staff has so modified the interpretation of its rule as to ensure its

[6] *See* TEX. TAX CODE § 23.012.

inconsistency with the statute pursuant to which it was promulgated. In doing so, the Executive Director's staff has engaged in improper and illegal rulemaking, the elements of which are as follows:

(a) Requiring the calculation of a Production Capacity Factor premised on the presence of existing equipment which, in fact, does not exist. Doing so in a straight-forward manner results in a calculation of zero (No old equipment capacity / HRSG capacity: 0 x X = 0). This calculation ensures a negative use determination for a HRSG and such a result is contrary to the statutory intent of TEX. TAX CODE § 11.31;

(b) Incorporating a value for Capital Cost Old which is entirely hypothetical and without any basis in law. For the HRSG applications, there is no old equipment and as stated in Item 2 above, were there such, the purpose for subtracting out such value is not present in the case of the installation of a HRSG:

(c) Requiring HRSG applicants to engage in a fictional consideration of the cost of a boiler(s) that would be necessary should the applicants have desired to produce the same amount of steam without the usage of a HRSG;

(d) Requiring HRSG applicants to deduct the value of the steam's income stream after requiring the applicants to equalize or normalize the production capacity of the HRSG with that of a boiler(s) that would be necessary should the applicants have desired to produce the same amount of steam without the usage of a HRSG;

(e) Dictating that the marketable product generated by the HRSG is electricity, although the HRSG produces no electricity. The Executive Director's staff's interpretation runs directly counter to its definition of "marketable product" as set forth in Figure: 30 TAC § 17.17(c)(2), note i;

(f) Excluding from its calculation of Production Cost the cost of fuel to operate the gas turbine, which generates the heat necessary to operate the HRSG: and

(g) Through the sum of these actions, ensuring in each and every instance a negative use determination for a HRSG, such result being contrary to the statutory intent of TEX. TAX CODE § 11.31.

Attachment J

BEPC's Partial Use Calculation Utilizing the
Executive Director's Staff's Mandated Inputs
into CAP Calculation Variables

# Attachment J - Use Determination Utilizing ED's Assumptions to which BEPC Objects

TCEQ Use Determin: Application Section 11 use:
Company: Br tric Power Cooperative, Inc.
Plant: Jack ... ity Generation Facility
Unit: Jack 2 - 600 MW 2 x 1 Configuration Combined Cycle Power Plant (2011)
Address: Bridgeport, Texas
Project: Tier III Cost Analysis Procedure
Date: 10-Feb-12

**I. Assumptions** (HRSG Only)

| Pollution Control Property (PC) | Input Variable | Source |
|---|---|---|
| Property Cost: | $105,244,426.00 | BEC Accting |
| Capital Cost ($/KW): | 375.87 | PC/TC |
| Total Capacity (MW): | 600 | Σ (CT1,CT2,ST) |
| CT1 Capacity (MW): | 160 | BEC 2010 RUS Form 12 |
| CT2 Capacity (MW): | 160 | BEC 2010 RUS Form 12 |
| ST Capacity (MW): | 280 | BEC 2010 RUS Form 12 |
| 2010 Net Annual ST Energy Production (kWh): | 1,308,271,000 | BEC 2010 RUS Form 12 |
| 2010 Net Annual ST Energy Production (MWh): | 1,308,271 | BEC 2010 RUS Form 12 |
| 2010 ST Capacity Factor: | 53.3379% | Energy/(TC * 8760) |
| 2010 Net Plant Heat Rate (Btu/kWh): | 6,900 | Design |
| 2010 Net Plant Heat Rate (MMBtu/kWh): | 0.006900 | NPHR/1E06 |
| 2010 Operating Hours | 7,643 | BEC 2010 RUS Form 12 |
| Capital Cost Old: | 134,400,000 | |
| Comparable Technology Cost: | 0 | |
| Comparable Technology: | 0 | |
| Design Capacity Factor: | 0 | |
| Capacity (MW): | 1 | |

| Conversion Factors | |
|---|---|
| hr/yr | 8,760 |
| kW/MW | 1,000 |
| lb/kg | 2.2 |
| s/hr | 3,600 |
| Btu/MMBtu | 1,000,000 |

| Economic Assumptions | Input Variable | Source |
|---|---|---|
| Discount Rate (%) | 10.00% | Standard project rate |
| Periods | 30 | RUS depreciation |
| PC Property Fixed O&M Cost ($) | $8,805,034.00 | BEC 2010 RUS Form 12 |
| CT1 Fixed O&M Costs ($) | $2,348,009.07 | Formula |
| CT2 Fixed O&M Costs ($) | $2,348,009.07 | Formula |
| ST Fixed O&M Costs ($) | $4,109,015.87 | Formula |
| Fuel Cost ($/MMBTU) | $0.00 | Note 1 |
| PC property Variable Cost ($/MWh) | $5.00 | Check with QSE |
| PC property Variable Cost ($/kWh) | $0.0050 | Formula |
| ERCOT N. Zone Price ($/MWh) | $41.92 | Note 2 |
| Interest Rate (%) | 10.00% | |

Note 1: Average cost for fuel (2009 - 2011) weighted by monthly steam turbine generation

Note 2: Average Settlement Point price for resource weighted by hourly steam turbine generation, reflected by North Load Zone Market Clearing Price for Energy (MCPE) for Jan 1, 2009 - Nov 30, 2010 and Real-time Resource Settlement Point Price (Nodal) for Dec 1, 2010 - Dec 31, 2011.

**II. Cost Analysis Procedure**

A. $$\frac{[(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{Marketable Product})]}{\text{Capital Cost New}}$$

| Levelized Cost of Energy (LCOE) Model Outputs | |
|---|---|
| Capitol Recovery Factor (%) | 10.61% |
| LCOE ($/KWh) | $0.01167 |

**B. Cost Analysis Procedure Formulas (TCEQ)**

Partial Use Determination

$$\frac{[(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{Marketable Product Value})]}{\text{Capital Cost New}}$$

where: $\text{Marketable Product Value} = \sum_{t=1}^{n} \frac{\text{Marketable Product Value - Production Cost}}{(1 + \text{Interest Rate})^n}$

n = estimated useful life in years of years equipment
t = year one
Interest Rate = 10%

**C. Cost Analysis Procedure for Pollution Control Property**

Marketable Product Value = Electricity Price ($/MWh) x MWh per Year
Direct Cost of Production = Levelized Cost of Energy x KWh per Year

$$\text{LCOE ($/KWh)} = \frac{(\text{Capital Cost} \times \text{Capital Recovery Factor}) + \text{Fixed O\&M Costs}}{\text{Hours per Year} \times \text{Capcity Factor}} + (\text{Fuel Cost} \times \text{Heat Rate})$$

Capital Recovery Factor (CRF) $\frac{i \times (1+i)^n}{[1+i)^n - 1}$

| (PC) | (CRF) | | (Annual cost to carry) | | (FOM) | (Total Annual FC) | |
|---|---|---|---|---|---|---|---|
| $105,244,426.00 | 10.61% | = | $11,164,249.59 | + | $4,109,015.87 | $15,273,265.46 | |
| | | | | | | $0.0117 | /kWh |
| | | | | | (Fuel x NPHR) | $0.0000 | |
| | | | | | LCOE: | $0.01167 | ($/kWh) |

III. Cost Analysis Pr[illegible]e Calculations For Jack County (Jack 2) HRSG3 and HRSG4

Formula: $\frac{(PCF \times CCN) - CCO - NPVMP}{CCN}$

**A. Marketable Prod[illegible]alue (MPV)**

| Electricity Price | $ | | Plant MWh | | = ($) MPV |
|---|---|---|---|---|---|
| $41.92 | x | | 1,308,271 | = | $54,842,720.32 |

NPVMP

**B. Production Cost (PC)**

| Levelized Cost Of Energy (LCOE) | $ | | Plant MWh | = ($) PC |
|---|---|---|---|---|
| $0.01167 | x | | 1,308,271,000 | = $15,273,265.46 |

Net Present Value Marketable Product (NPVMP) Calculation

$$\sum_{t=1}^{n} \frac{\text{Product Value - Production Cost}}{(1 + \text{Interest Rate})^n} = \text{NPVMP (\$)}$$

NPVMP

$$\sum_{t=1}^{n} \frac{\$54,842,720.32 - \$15,273,265.46}{1.10} = \$373,017,866.48$$

$373,017,866.48 $39,569,454.86

If MP is <= 0, then MP = 0

**C. Production Capacity Factor (PCF)**

$$\frac{\text{Production Capacity of Existing Equipment or Process}}{\text{Production Capacity of New Equipment or Process}} = \text{PCF}$$

$$\frac{0}{300 \text{ MW} \times 56.21\%} = \text{PCF} = 1.00$$

**D. Capital Cost New (CCN)**

Pollution Control Property (PC) = CCN = $105,244,426.00

**E. Capital Cost Old (CCO)**

Comparable Technology = CCO = $134,400,000.00

Partial Use Determination Calculation

$$\frac{(PCF \times CCN) - CCO}{CCN} - MP = \text{Partial Use Determination \%}$$

$$\frac{\$105,244,426.00 - \$134,400,000.00}{\$105,244,426.00} - \$373,017,866.48 = -382.13\%$$

| TCEQ Use Determination Application Section 11 Use | |
|---|---|
| Use Percent | -382.13% |
| Estimated Dollar Value | $402,173,440.48 |

Eligible HRSG Costs = -$402,173,440.48

(Partial Use Determination % x PC Property)

39569454.86

Attachment K

BEPC's Partial Use Calculation Utilizing an
Avoided NOx Emissions Approach

# Brazos Tier III - Avoided NOx Emissions

| Input | Brazos Details | Data Source | Baseline Details | Data Source |
|---|---|---|---|---|
| Configuration | Combined Cycle | | Simple Cycle | |
| Avg Heat Rate (Btu/kWh) | 6,900 | 2010 capacity test | 10,870 | 2010 operation data |
| NOx Emissions (tpy) | 179.0 | 2011 | | |
| Plant Capacity (MW) | 600 | Design data | | |
| Capacity Factor | 53.34% | 2010 | | |
| Total Gateway Facility Cost | $105,244,426 | 2010 | | |

## STEP 1
## CT/HRSG Output-Based Emissions Calculation (lbs NOx/MWh)

| Input-based Emissions (lbs NOx/MMBtu) | x | Heat Rate (Btu/kWh) | / | Unit Conversions (1,000,000 Btu/1,000 kWh) | = | Output-based Emissions (lbs NOx/MWh) |
|---|---|---|---|---|---|---|
| 0.0140 | | 6,900 | | 1,000 | | 0.0966 |

## STEP 2
## CT/HRSG Output Conversion Calculation (tons NOx/yr)

| Output-based Emissions (lbs NOx/MWh) | x | Capacity (MW) | x | Capacity Factor (%) | x | Unit Conversions (24 hrs/day x 365 days/yr /2,000 lbs/ton) | = | Emissions (tons/yr) |
|---|---|---|---|---|---|---|---|---|
| 0.0966 | | 600 | | 53.34% | | 4.38 | | 135.4 |

## STEP 3
## CT only Output-Based Emissions Calculation (lbs NOx/MWh)

| Input-based Emissions (lbs NOx/MMBtu) | x | Heat Rate (Btu/kWh) | / | Unit Conversions (1,000,000 Btu/1,000 kWh) | = | Output-based Emissions (lbs NOx/MWh) |
|---|---|---|---|---|---|---|
| 0.0140 | | 10,870 | | 1,000 | | 0.1522 |

## STEP 4
## CT only Output Conversion Calculation (tons NOx/yr)

| Output-based Emissions (lbs NOx/MWh) | x | Capacity (MW) | x | Capacity Factor (%) | x | Unit Conversions (24 hrs/day x 365 days/yr /2,000 lbs/ton) | = | Emissions (tons/yr) |
|---|---|---|---|---|---|---|---|---|
| 0.1522 | | 600 | | 53.34% | | 4.38 | | 213.3 |

## STEP 5
## Percent NOx Reduction Calculation

| Baseline Emissions (tons/yr) | - | Gateway Emissions (tons/yr) | / | Gateway Emissions (tons/yr) | = | NOx Reduction (%) |
|---|---|---|---|---|---|---|
| 213.3 | | 135.4 | | 135.4 | | **57.5%** |

Attachment L

BEPC's Partial Use Calculation Utilizing
the HRSG as the Replacement for Piping,
with the Cost of the Piping as CCO

# Attachment L, With Piping as Assumed "Replaced Equipment" and its Cost as CCO

TCEQ Use Determi' Application Section 11 use:
**Company:** Bi .ectric Power Cooperative, Inc.
**Plant:** Jack County Generation Facility
**Unit:** Jack 2 - 600 MW 2 x 1 Configuration Combined Cycle Power Plant (2011)
**Address:** Bridgeport, Texas
**Project:** Tier III Cost Analysis Procedure
**Date:** 10-Feb-12

**I. Assumptions** (HRSG Only)

| Pollution Control Property (PC) | Input Variable | Source |
|---|---|---|
| Property Cost: | $105,244,426.00 | BEC Accting |
| Capital Cost ($/KW): | 375.87 | PC/TC |
| Total Capacity (MW): | 600 | ∑ (CT1,CT2,ST) |
| CT1 Capacity (MW): | 160 | BEC 2010 RUS Form 12 |
| CT2 Capacity (MW): | 160 | BEC 2010 RUS Form 12 |
| ST Capacity (MW): | 280 | BEC 2010 RUS Form 12 |
| 2010 Net Annual ST Energy Production (kWh): | 1,308,271,000 | BEC 2010 RUS Form 12 |
| 2010 Net Annual ST Energy Production (MWh): | 1,308,271 | BEC 2010 RUS Form 12 |
| 2010 ST Capacity Factor: | 53.3379% | Energy/(TC * 8760) |
| 2010 Net Plant Heat Rate (Btu/kWh): | 6,900 | Design |
| 2010 Net Plant Heat Rate (MMBtu/kWh): | 0.006900 | NPHR/1E06 |
| 2010 Operating Hours | 7,643 | BEC 2010 RUS Form 12 |
| Capital Cost Old: | 0 | |
| Comparable Technology Cost: | 0 | |
| Comparable Technology: | 0 | |
| Design Capacity Factor: | 0 | |
| Capacity (MW): | 1 | |

| Conversion Factors | |
|---|---|
| hr/yr | 8,760 |
| kW/MW | 1,000 |
| lb/kg | 2.2 |
| s/hr | 3,600 |
| Btu/MMBtu | 1,000,000 |

| Economic Assumptions | Input Variable | Source |
|---|---|---|
| Discount Rate (%) | 10.00% | Standard project rate |
| Periods | 30 | RUS depreciation |
| PC Property Fixed O&M Cost ($) | $8,805,034.00 | BEC 2010 RUS Form 12 |
| CT1 Fixed O&M Costs ($) | $2,348,009.07 | Formula |
| CT2 Fixed O&M Costs ($) | $2,348,009.07 | Formula |
| ST Fixed O&M Costs ($) | $4,109,015.87 | Formula |
| Fuel Cost ($/MMBTU) | $4.07 | Note 1 |
| PC property Variable Cost ($/MWh) | $5.00 | Check with QSE |
| PC property Variable Cost ($/kWh) | $0.0050 | Formula |
| ERCOT N. Zone Price ($/MWh) | $41.92 | Note 2 |
| Interest Rate (%) | 10.00% | |

Note 1: Average cost for fuel (2009 - 2011) weighted by monthly steam turbine generation
Note 2: Average Settlement Point price for resource weighted by hourly steam turbine generation, reflected by North Load Zone Market Clearing Price for Energy (MCPE) for Jan 1, 2009 - Nov 30, 2010 and Real-time Resource Settlement Point Price (Nodal) for Dec 1, 2010 - Dec 31, 2011.

**II. Cost Analysis Procedure**

A. $$\frac{[(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{Marketable Product}]}{\text{Capital Cost New}}$$

| Levelized Cost of Energy (LCOE) Model Outputs | |
|---|---|
| Capitol Recovery Factor (%) | 10.61% |
| LCOE ($/KWh) | $0.03976 |

**B. Cost Analysis Procedure Formulas (TCEQ)**

Partial Use Determination

$$\frac{[(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{Marketable Product Value}]}{\text{Capital Cost New}}$$

where: $\text{Marketable Product Value} = \sum_{t=1}^{n} \frac{\text{Marketable Product Value} - \text{Production Cost}}{(1 + \text{Interest Rate})^n}$

n = estimated useful life in years of years equipment
t = year one
Interest Rate = 10%

**C. Cost Analysis Procedure for Pollution Control Property**

Marketable Product Value = Electricity Price ($/MWh) x MWh per Year
Direct Cost of Production = Levelized Cost of Energy x KWh per Year

$$\text{LCOE (\$/KWh)} = \frac{(\text{Capital Cost} \times \text{Capital Recovery Factor}) + \text{Fixed O\&M Costs}}{\text{Hours per Year} \times \text{Capcity Factor}} + (\text{Fuel Cost} \times \text{Heat Rate})$$

Capital Recovery Factor (CRF) $\frac{i \times (1+i)^n}{(1+i)^n - 1}$

| (PC) | (CRF) | | (Annual cost to carry) | | (FOM) | (Total Annual FC) | |
|---|---|---|---|---|---|---|---|
| $105,244,426.00 | 10.61% | = | $11,164,249.59 | + | $4,109,015.87 | $15,273,265.46 | |
| | | | | | | $0.0117 | /kWh |
| | | | | | (Fuel x NPHR) | $0.0281 | |
| | | | | | LCOE: | $0.03976 | ($/kWh) |

# Attachment L, cont'

**III. Cost Analysis P… e Calculations For Jack County (Jack 2) HRSG3 and HRSG4**

Formula: $\frac{(PCF \times CCN) - CCO - NPVMP}{CCN}$

**A. Marketable Product Value (MPV)**

Electricity Price $ x Plant MWh = ($) MPV

$41.92 x 1,308,271 = $54,842,720.32

NPVMP

**B. Production Cost (PC)**

Levelized Cost Of Energy (LCOE) $ x Plant MWh = ($) PC

$0.03976 x 1,308,271,000 = $52,013,439.95

Net Present Value Marketable Product (NPVMP) Calculation

Σ n, t=1: (Product Value - Production Cost) / (1 + Interest Rate)^n = NPVMP ($)

Σ n, t=1: ($54,842,720.32 - $52,013,439.95) / 1.10 = NPVMP $26,671,384.03 — $26,671,384.03

If MP is <= 0, then MP = 0

**C. Production Capacity Factor (PCF)**

Production Capacity of Existing Equipment or Process / Production Capacity of New Equipment or Process = PCF

0 / 300 MW x 56.21% = PCF 1.00

**D. Capital Cost New (CCN)**

Pollution Control Property (PC) = CCN $105,244,426.00

**E. Capital Cost Old (CCO)**

Comparable Technology = CCO $150,000.00

Partial Use Determination Calculation

((PCF x CCN) - CCO - MP) / CCN = Partial Use Determination %

($105,244,426.00 - $150,000.00 - $26,671,384.03) / $105,244,426.00 = 74.52%

Eligible HRSG Costs (Partial Use Determination % x PC Property) = $78,423,041.97

| TCEQ Use Determination Application Section 11 use: | |
|---|---|
| Use Percent | 74.52% |
| Estimated Dollar Value | $78,423,041.97 |

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Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

Rec'd 1-30-14

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

January 24, 2014

Mr. Jim Harris
Agent
H & H Associates
406 FM 3016
Grapeland, Texas 75844

Re: Notice of Technical Deficiency
Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
Bridgeport (Jack County)
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Application Number: 16413

Dear Mr. Harris:

This letter responds to Brazos Electric Power Cooperative, Inc.'s Application for Use Determination, received March 7, 2012 pursuant to the Texas Commission on Environmental Quality's (TCEQ) Tax Relief for Pollution Control Property Program for the Jack County Generation Facility.

The TCEQ has conducted further technical review and determined that additional information required by Title 30 Texas Administrative Code (TAC) §17.10 is warranted for application #16413.

The Executive Director interprets Texas Tax Code (TTC) §§11.31(k) and (m) as establishing an expedited review process and exempting an applicant from providing detailed information regarding the anticipated environmental benefit for property on the k-list. Because Article VIII, Section 1-l, of the state constitution authorizes the exemption only for property used to meet or exceed an environmental rule, the Executive Director does not interpret TTC §11.31 subsection (m) as exempting §11.31(k)-listed property from the TCEQ's review standards at Title 30 Texas Administrative Code (TAC) Chapter 17 or mandating the issuance of a positive use determination, when the property is not used, constructed, acquired or installed to meet or exceed an environmental rule.

Please revise your application to include the following information.

Issue 1 – Review of Environmental Rule Citations

In review of the facility's air permits and associated filings, the following comments on rule citations are in part based on representations made in the permit documents. It does not appear that sufficient information has been provided to establish a clear connection

between the listed equipment and the cited rules. For each cited rule, please provide an explanation of how the equipment is used to meet a requirement in the rule.

The plant was initially authorized on July 22, 2003 by air permit 52756 (issued to Duke Energy North America and subsequently transferred to Brazos Electric Cooperative, Inc.). The initial permit indicates the site was subject to New Source Performance Standard (NSPS) Subparts Da, Dc, and GG. The permit was amended September 12, 2011 to authorize maintenance, startup, and shutdown (MSS) emissions. At that time, the federal applicability section cited the same subparts of NSPS. Subpart Da is a standard of performance for electric utility steam generating units, i.e., the HRSG, and provides emission limits for nitrogen oxides ($NO_x$), particulate matter, and sulfur dioxide ($SO_2$). Given that Da only applies to the HRSG itself, it does not appear that use of the HRSG is required to meet Da or that it helps the facility meet the emission limit for the HRSG itself. The absence of a HRSG (that is subject to regulation under Da) would not affect emission limitations of other sources at the plant, e.g., the gas turbine (regulated under GG). Please explain in detail how a HRSG is used to meet the requirements of Da.

Regarding the Clean Air Interstate Rule (CAIR), CAIR is a cap and trade program that allocates allowances to all electric generating units. Please explain how a Heat Recovery Steam Generator (HRSG) is required to meet a CAIR requirement.

Title 40 CFR §52.21(b)(49)(v) states, "Beginning July 1, 2011, in addition to the provisions in paragraph (b)(49)(iv) of this section, the pollutant greenhouse gases (GHGs) shall also be subject to regulation (a) at a new stationary source that will emit or have the potential to emit 100,000 tpy carbon dioxide equivalent (CO2e); or (b) At an existing source that emits or has the potential to emit 100,000 tpy CO2e, when such stationary source undertakes a physical change or change in the method of operation that will result in an emissions increase of 75,000 tpy CO2e or more." The Jack County Generation Facility was authorized by air permit 52756 which was dated July 22, 2003 and air permit 83801 which was dated November 17, 2008. The air permit general conditions required that construction be started no more than 18 months after permit issuance. Therefore, criterion (a) above does not apply. There is no documentation that the site has undergone a modification which would trigger criterion (b) above. Similarly, the application has not demonstrated that the site has gone through a major modification which would trigger a control technology review as described in 40 CFR §52.21(j). An applicant cannot claim eligibility for a positive use determination based on exceeding a rule that the applicant is not required to meet.

Best Achievable Control Technology (BACT) analysis is completed in conjunction with construction and amendment air permit applications. A thorough review of documentation for air permits 52756 and 83801 was conducted including the construction permit applications and any subsequent amendment applications. Both construction permit applications were filed under the seal of a professional engineer. For air permits 52756 and 83801 the proposed BACT and approved BACT was low-NOx combustion and selective catalytic reduction (SCR) for NOx control. Proposed and approved BACT for MSS activities was to minimize the duration of startups and shutdowns such that there is no increase in the annual permitted emission rates. None of the reviewed applications indicated the HRSGs provide pollution control or were necessary to satisfy BACT. It is not appropriate to revise a BACT analysis in order to justify a property tax exemption.

42 U.S.C. §7401(c) states, "A primary goal of this chapter is to encourage or otherwise promote reasonable Federal, State, and local governmental actions, consistent with the provisions of this chapter, for pollution prevention." This does not compel an applicant to install a HRSG.

The application cites 40 CFR §50.11, 50.17, 50.6, and 50.8 which are the National Ambient Air Quality Standards (NAAQS) for NO2, SO2, PM10, and CO respectively. States employ state implementation plans and incorporated air permitting programs to ensure continued compliance with the NAAQS in attainment areas and reasonable progress toward attainment in non-attainment areas. NAAQS are ambient air concentrations promulgated by the EPA to protect public health and welfare. The NAAQS is not an emission limit for a particular facility or source of pollution and does not require specific facilities to use any particular pollution controls.

Issue 2 – Calculation of an Appropriate Partial Positive Use Determination

The notice of deficiency response received on June 24, 2013, includes five approaches for calculating a partial use determination. Since this application was received on March 7, 2012, the only allowable method for calculating a partial use determination is the method adopted under TTC §11.31(g). This method is the Cost Analysis Procedure (CAP) located in 30 TAC §17.17. Neither the "Avoided NOx Emissions" approach nor the "Executive Director's 2008 Adopted Recommendation" are valid approaches for this application.

The other proposed calculations use the CAP to calculate a partial determination percentage. One method uses the CAP as proposed by the TCEQ in the February 21, 2013 request for additional information. The other two calculate the variables Capital Cost Old (CCO) and Production Cost differently. For all three equations, Capital Cost New (CCN) is defined as the HRSGs and dedicated ancillary equipment. CCO is defined to be either "piping necessary to fill the gap created by the absence of the HRSG" or as $0. The Production Cost variable in the Net Present Value of Marketable Product (NPVMP) calculation includes fuel costs.

First, all three proposed CAP calculations include dedicated ancillary equipment in CCN. The CEMS units should be removed from this application and included on a separate Tier I application. The feedwater systems, boiler systems, chemical injection, cooling air systems, nitrogen systems, and condensate systems are production equipment for which the TCEQ has consistently issued negative use determinations since it is not used to prevent, control, monitor, or reduce air, water, or land pollution. Please remove these items from the application.

The "piping necessary to fill the gap created by the absence of the HRSG" would be used to convey exhaust gases from the combustion chamber to a control device or stack. HRSG's are used to convert energy contained in waste heat into steam. The appropriate comparable equipment is a boiler sized to create the same amount of steam as the HRSG. Allowing CCO to be $0 or the value of a piece of ducting would lead to a determination that a piece of production equipment, the HRSG, was installed for the single purpose of preventing pollution rather than for the purpose of producing steam for sale or use in producing electricity.

Production Costs are the costs related to operating the equipment for which the positive use determination is being requested. In the request for additional information we stated that Production Costs were to exclude "costs related to operating the gas turbine, associated duct burners, or the steam turbine including fuel costs." The appropriate costs to be included in Production Costs are those costs related to operating the HRSG. We agree that this includes the costs related to the operation of the duct burners including fuel costs. We do not agree that production costs include costs related to operating the gas turbine, the water systems, or the steam turbine.

Please resubmit your application using the CAP with the variables calculated as explained in the February 21, 2013, letter with the exception of additional production costs as explained in the preceding paragraph.

The TCEQ appreciates your response in this matter. The revised application must be submitted by March 7, 2014 to the TCEQ Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087. Failure to submit a complete application, including the requested information, may result in your application being voided and the associated application fee being forfeited in accordance with 30 TAC §17.20(b).

If you have questions regarding this letter or need further assistance, please contact Ronald Hatlett of the Tax Relief for Pollution Control Property Program by telephone at (512) 239-6348, by e-mail at ronald.hatlett@tceq.texas.gov, or write to the Texas Commission on Environmental Quality, Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

Chance Goodin, Team Leader
Stationary Source Programs
Air Quality Division

CG/RH

THOMPSON & KNIGHT LLP

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EMAIL: paul.sarahan@tklaw.com

March 21, 2014

**Via E-mail and U.S. Mail**

Mr. Ronald Hatlett
Texas Commission on Environmental Quality
Tax Relief for Pollution Control Property
Program
P. O. Box 13087, MC-1110
Austin, TX 78711-3087

Re: Brazos Electric Power Cooperative Inc.; Jack County Generation Facility; Use Determination Application No. 16413; Response to Second Notice of Technical Deficiency

Dear Mr. Hatlett:

On behalf of Brazos Electric Power Cooperative, Inc. ("BEPC"), I am submitting this response to the Notice of Technical Deficiency issued by the Executive Director on January 24, 2014 ("2014 NOTD"), and received by BEPC on January 30, 2014. The Executive Director extended the deadline for BEPC to file a response to March 21, 2014, and this response is timely filed. A copy of the NOTD is attached hereto as Attachment A. Through the NOTD, the Executive Director requested additional information related to two issues: (i) provision of a "clear connection between the listed equipment and the cited rule;" and (ii) submission of the Cost Analysis Procedure with the variables calculated as explained in the February 21, 2013 Notice of Technical Deficiency ("2013 NOTD") with the exception of additional production costs, as described in the 2014 NOTD. BEPC provides the following response, which is supplemental to its prior submissions to the Executive Director and the Commission pursuant to the 2013 NOTD. This response incorporates these prior submissions herein. BEPC further reserves the right to rely upon the submissions of the other HRSG applicants that have matters pending before the Commission at this time should additional proceedings in this matter occur.

The 2014 NOTD illuminates three fundamental issues that divide the HRSG applicants and the Executive Director, specifically: (i) what applicable law requires of a HRSG applicant; (ii) what information is required for an applicant to support its contention that the HRSG "is used to meet or exceed" an environmental rule; and (iii) what elements must be included in a calculation of the positive use determination percentage. Essential to resolving these issues is a recognition by all involved that HRSGs have been statutorily designated as "pollution control equipment." As such, some portion of the value of the HRSGs must necessarily be attributed to pollution control, and provided a tax exemption. The process in which the parties are now engaged is to determine the portion (expressed in percentages) of the HRSGs' value is attributable to production and what percentage is attributable to pollution control. The percentages must add up to 100%. To conclude this matter without further proceedings, the

HRSG applicants and the Executive Director will need to agree upon a satisfactory resolution of these issues.

While BEPC is committed to working toward such a resolution, the Executive Director's 2014 NOTD requires that BEPC set forth, once again, its position with respect to these three fundamental issues, or else, as the 2014 NOTD implies, the Executive Director may find that BEPC has failed to submit a complete application and therefore determine that BEPC's application is void.

**Texas Tax Code § 11.31(m) Removes Need for Environmental Rule to Be Cited in HRSG Application**

As stated in its response to the 2013 NOTD, BEPC objects to the Executive Director's requirement to identify an environmental regulation that is met or exceeded through the use of its HRSGs. The Texas Legislature expressed its intent that HRSGs be treated as pollution control "facilities, devices or methods for the control of air, water, or land pollution" when it amended Section 11.31 of the Tax Code in 2007 to include subsection (k). That subsection requires that TCEQ adopt rules establishing a non-exclusive a list of such facilities, devices and methods and mandates that HRSGs be included on that list. *See* TEX. TAX CODE § 11.31(k).

Here, the Legislature deliberately and purposefully included HRSGs in its list of facilities, devices, or methods that "must" be treated as "facilities, devices, or methods for the control of air, water, or land pollution ..." TEX. TAX CODE § 11.31(k). The Legislature did so with full knowledge that HRSGs are devices that are necessarily part of the production process and are commonly used as power plant components. Accordingly, HRSGs must be treated as pollution control facilities, devices or methods, and the Executive Director cannot interpret the statute in a contrary manner to avoid this unambiguous legislative mandate.

Section 11.31(m) states:

> (m) Notwithstanding the other provisions of this section, if the ... facility, device, or method is a ... facility, device, or method ... included on the list adopted under Subsection (k), the executive director ... and *without regard to whether the information required by Subsection (c)(1)*[1] *has been submitted* ... shall determine

[1] Texas Tax Code § 11.31(c) states, "In applying for an exemption under this section, a person seeking the exemption shall present in a permit application or permit exemption request to the executive director of the Texas Natural Resource Conservation Commission information detailing:

(1) the anticipated environmental benefits from the installation of the facility, device, or method for the control of air, water, or land pollution;

(2) the estimated cost of the pollution control facility, device, or method; and

(3) the purpose of the installation of such facility, device, or method, and the proportion of the installation that is pollution control property."

> that the ... facility, device, or method... is used wholly or partly as a ... facility, device, or method ... for the control of air, water, or land pollution and shall take the actions that are required by Subsection (d) in the event such a determination is made.

TEX. TAX CODE § 11.31(m) (emphasis added). This legislative directive is definitive and unambiguous. The list comprises facilities, devices, or methods that the Legislature has conclusively determined meet all criteria to constitute pollution control property. The phrase "notwithstanding the other provisions of this section" clearly and directly contradicts the Executive Director's position that it must independently evaluate and apply criteria found in other parts of Section 11.31 before a positive use finding may be issued.

Further, the Executive Director is to make his determination without regard to whether the environmental benefit information required by Tex. Tax Code § 11.31(c)(1) has been submitted. The applicants are exempted from submitting information regarding environmental benefit, i.e., the environmental law or rule that is being met or exceeded by the HRSG, because inclusion of HRSGs on the list represents a legislative determination that environmental benefit exists.

The Executive Director appears to contend that the Legislature's enactment of Section 11.31(m) is contrary to the Texas Constitution.[2] Neither the Executive Director nor any other entity has challenged the constitutionality of Section 11.31(m). The Executive Director's apparent attempt to override the Legislature's directive in this matter is outside the scope of his authority. As a rule, TCEQ, as an administrative agency, lacks authority to decide the constitutionality of a statute.[3] Agencies may not create for themselves any excess powers.[4] Instead, the Executive Director is bound to interpret the statute as being consistent with the Texas Constitution, and to give meaning to all of the words within the statute. Using such an approach, the appropriate interpretation is that the Legislature, through its enactment of Tex. Tax Code § 11.31(c)(1), (k), and (m), has determined that HRSGs are used to meet one or several environmental regulations, and, therefore, a HRSG applicant is not required to include that information in an application because the Texas Legislature has determined that requirement has already been met.

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[2] The Executive Director recognizes that Texas Tax Code § 11.31(k) and (m) establish an expedited review process and exempt an applicant from providing detailed information regarding the anticipated environmental benefit for property on the k-list. However, the Executive Director then eviscerates this result, stating, "Because Article VIII, Section 1-l, of the state constitution authorizes the exemption only for property used to meet or exceed an environmental rule, the Executive Director does not interpret §11.31 (m) as exempting §11.31(k)-listed property from the TCEQ's review standards set forth in 30 Tex. Admin. Code ch. 17 or mandating the issuance of a positive use determination, when the property is not used, constructed, acquired or installed to meet or exceed an environmental rule.

[3] *Edwards Aquifer Authority v. Day*, 369 S.W.3d 814, 844 (Tex. 2012).

[4] *Subaru of America, Inc. v. David McDavid Nissan, Inc.*, 84 S.W.3d 212, 220 (Tex. 2002).

**Issue No. 1: BEPC's Application Cites Several Rules Met or Exceeded by Use of HRSGs**

Subject to, and without waiving the objection set forth in the section above, the installation and use of the HRSGs and dedicated ancillary equipment allows BEPC to meet or exceed the following environmental rules or regulations:

(1) 40 C.F.R. Part 60 Subpart KKKK, and specifically, 40 C.F.R. §§ 60.4305(a), 60.4320, 60.4330, 60.4333 (Standards of Performance for Stationary Combustion Turbines);[5]

(2) Clean Air Interstate Rule ("CAIR"); 30 TEX. ADMIN. CODE § 101.506;

(3) Greenhouse Gas Regulations;

(4) Best Available Control Technology ("BACT") requirements; 30 TEX. ADMIN. CODE §§ 116.10(1), 116.111(a)(2)(C), 116.160(c)(1)(A); 40 C.F.R. § 52.21(b)(12);

(5) 42 U.S.C. § 7401(c);

(6) 40 C.F.R. § 50.11 – establishing National Ambient Air Quality Standards ("NAAQS") for $NO_x$. HRSGs also assist in meeting NAAQS for $SO_2$ (40 C.F.R. § 50.17), $PM_{10}$ (40 C.F.R. § 50.6) and CO (40 C.F.R. § 50.8).

**The ED's Position is Contrary to the Plain Language of the Statute and Rule**

The Executive Director has raised specific objections with respect to each of these rule citations. As an overriding objection, the Executive Director has contended that BEPC has failed to show that any of the cited rules compels an applicant to install a HRSG.[6] The applicable statute and rule address the issue differently, however. In establishing the pollution control tax abatement that is the subject of BEPC's application, the Legislature enacted Tex. Tax Code § 11.31, which states in part:

> § 11.31. POLLUTION CONTROL PROPERTY. (a) A person is entitled to an exemption from taxation of all or part of real and personal property that the

[5] BEPC has previously cited 40 C.F.R. Part 60, Subpart Da, and specifically 40 C.F.R.§ 60.44Da in its application, its appeal of the initial negative use determination, and its response to the Executive Director's first Notice of Technical Deficiency. Although the Jack 1 facility, which is permitted by TCEQ under Permit No. 52756 and PSD-TX-1026, is subject to 40 C.F.R. Part 60, Subpart Da, the expanded Jack County Generation Facility ("Jack 2"), for which the pending application was submitted, is subject to 40 C.F.R. Part 60 Subpart KKKK, and specifically, 40 C.F.R. §§ 60.4305(a), 60.4320, 60.4330, 60.4333. This subpart applies to emissions from the HRSGs and duct burners associated with the stationary combustion turbine. 40 C.F.R. § 60.4305(a). Therefore, the HRSGs and duct burners are exempted from similar requirements under 40 C.F.R. Part 60, Subparts Da, Db, and Dc.

[6] While this contention is most specifically set forth in the NOTD's discussion of CAIR, 42 U.S.C. § 7401(c), and 40 C.F.R. §§ 50.6, 50.8, 50.11, and 50.17, since his initial rejection of BEPC's application in June 2012, the Executive Director has, in error, consistently contended that BEPC must establish that an environmental regulation mandates the installation of the HRSG.

> person owns and that is used wholly or partly as a facility, device, or method for the control of air, water, or land pollution. ...
>
> (b) In this section, "facility, device, or method for the control of air, water, or land pollution" means land that is acquired after January 1, 1994, or any structure, building, installation, excavation, machinery, equipment, or device, and any attachment or addition to or reconstruction, replacement, or improvement of that property, that is used, constructed, acquired, or installed wholly or partly to meet or exceed rules or regulations adopted by any environmental protection agency of the United States, this state, or a political subdivision of this state for the prevention, monitoring, control, or reduction of air, water, or land pollution.

To the extent any environmental rule must be cited in a HRSG application, the statute states that the equipment must be used, constructed, acquired, or installed wholly or partly to meet or exceed an environmental rule. It does not say that an environmental rule must mandate the use of the equipment.

Likewise, TCEQ's own rule places the emphasis on the equipment being used to meet or exceed an environmental rule, rather than on whether a law, a rule or regulation mandates the use of the equipment. The rule states, "To obtain a positive use determination, the pollution control property must be used, constructed, acquired, or installed wholly or partly to meet or exceed laws, rules, or regulations adopted by any environmental protection agency of the United States, Texas, or a political subdivision of Texas, for the prevention, monitoring, control, or reduction of air, water, or land pollution." 30 TEX. ADMIN. CODE § 17.4(a).

The Executive Director's interpretation of the statute and TCEQ's own rule is contrary to the plain language used in each. To address it formulaically or logically:

*Equipment Used to Meet or Exceed Rule ≠ Rule Must Mandate Use of Equipment*

Further, if it were that a rule had to mandate the use of equipment, there would be no way in which an applicant could show that its use of the equipment exceeded an environmental rule, as specifically provided for in both the statute and the rule. The Executive Director's interpretation of the statute and TCEQ's own rule makes the "exceed" portion of each meaningless and superfluous. This is contrary to the long-held and commonly understood rules of statutory and regulatory interpretation.[7]

[7] *See, e.g., Leordeanu v. American Protection Ins. Co.*, 330 S.W. 239, 248 n. 35 (Tex. 2010) ("The Supreme Court construes statutes to give effect to every provision and ensure that no provision is rendered meaningless or superfluous."); *Columbia Med. Ctr. of Las Colinas, Inc. v. Hogue*, 271 S.W.3d 238, 256 (Tex. 2008); *City of Marshall v. City of Uncertain*, 206 S.W.3d 97, 105 (Tex. 2006).

In addition, as BEPC has stated previously, the Executive Director's position on this issue would reflect a return to the "command and control" approach to environmental regulation that Texas, and specifically, the TCEQ, has long ago rejected. For these reasons, the Executive Director's position on this issue cannot stand.

The remainder of this section addresses the specific issues raised by the Executive Director with respect to each environmental rule or requirement cited by BEPC in its application.

**HRSGs are Used to Meet or Exceed 40 C.F.R. Part 60, Subpart KKKK**

Subpart KKKK establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that have a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel and that commenced construction, modification or reconstruction after February 18, 2005. The expanded Jack County Generation Facility is equipped with two gas turbines that meet this qualification criteria. This subpart also applies to emissions from the associated HRSGs and duct burners.

BEPC asserts that the HRSGs are used to meet 40 C.F.R. §§ 60.4305(a), 60.4320, 60.4330, 60.4333. BEPC began construction of its electric utility steam generating unit after February 18, 2005. BEPC uses the HRSGs to meet or exceed 40 C.F.R. Part 60, Subpart KKKK emissions standards primarily by reducing fossil fuel consumption and related $NO_x$ and $SO_2$ emissions. The use of BEPC's HRSGs in the combined cycle configuration described in the Application results in significantly lower $NO_x$ emissions for the same electric power that could be generated by a simple cycle plant without pollution control equipment. HRSGs accomplish this result by capturing/recycling and using heat generated by BEPC combustion turbines to convert water into steam to power steam (rather than natural gas) turbines which produce additional power without use of additional fossil fuel or its associated, additional $NO_x$ emissions. Stated conversely, without its HRSGs, BEPC would be unable to produce the same amount of power without producing more $NO_x$ emissions and might well, in that instance, even exceed the environmental standards of 40 C.F.R. Part 60, Subpart KKKK.

The applicability of 40 C.F.R. Part 60, Subpart KKKK is premised on 40 C.F.R. § 60.4305(a), which states that the HRSGs and duct burners associated with a stationary combustion turbine with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005, are subject to Subpart KKKK. BEPC, through this response to the 2014 NOTD, amends its application to reference 40 C.F.R. Part 60 Subpart KKKK, and specifically, 40 C.F.R. §§ 60.4305(a), 60.4320, 60.4330, 60.4333 as environmental rules that are met or exceeded by BEPC through the use of the HRSGs that are the subject of the pending application.

asked, and BEPC has met this eligibility requirement for the tax abatement, to the extent it is applicable.

**HRSGs are Used to Exceed Greenhouse Gas Requirements**

BEPC's use of the HRSGs exceed current greenhouse gas ("GHG") regulations. EPA has decided that GHGs must be regulated under the Clean Air Act and has started implementation of that regime through BACT reviews. On January 8, 2014, EPA proposed Standards of Performance for Greenhouse Gas Emissions From New Electric Utility Generating Units. *See* 79 Fed. Reg. 1430 (Jan. 8, 2014).

Based on EPA's GHG BACT reviews to date, efficiency reflected through lower output-based emissions of GHGs is the most important factor in meeting the GHG BACT requirements.[9] In its GHG BACT Guidance Document, the EPA states, "Considering the most energy efficient technologies in the BACT analysis helps reduce the products of combustion, which includes not only GHGs but other regulated NSR pollutants (e.g. $NO_x$, $SO_2$, $PM/PM_{10}/PM_{2.5}$, CO etc.) Thus, it is also important to emphasize that energy efficiency should be considered in BACT determinations for all regulated NSR pollutants (not just GHGs)." EPA, PSD and Title V Permitting Guidance for Greenhouse Gases, at 22 (Nov. 2010).

Output-based emission reductions, such as those obtained through the use of HRSGs, have been expressly identified by the EPA as a preferred method of compliance with BACT for a wide range of pollutants. BEPC's early implementation of this pollution prevention mechanism exceed the regulatory requirements and therefore meets this eligibility requirement for the tax abatement, to the extent this eligibility requirement is applicable.

The Executive Director contends, "An applicant cannot claim eligibility for a positive use determination based on exceeding a rule that the applicant is not required to meet." NOTD, p. 2. This statement has no basis in the statute or the rule.[10] The Executive Director has provided no

[9] EPA's recognition of the environmental benefits of combined-cycle units pre-dates its most recent consideration of the technology for purposes of reducing GHGs. In 2004, and again in 2006, EPA developed an economic impact analysis with respect to regulations it was developing under Section 111 of the Clean Air Act for new stationary combustion turbines. The proposed. and ultimately adopted, regulations were designed to reduce emissions of $NO_x$ and sulfur dioxide generated by the combustion of fossil fuels in new combustion turbines. *See* 40 C.F.R. Part 60, Subpart KKKK; 71 Fed. Reg. 38482 (Jul. 6, 2006). In support of its rulemaking, EPA cited the environmental efficiency gains achieved from combined-cycle combustion turbines. According to EPA, the use of such a turbine system "decreases $NO_x$ emissions by 14 percent over simple-cycle combustion turbines and 89 percent over existing ... coal electricity generation plants. In addition, $CO_2$ emissions will be 5 percent lower than emissions from SCCTs and 64 percent lower than existing coal plants." EPA, Economic Impact Analysis of the Stationary Combustion Turbines NSPS: Final Report, Feb. 2006, at 2-3, 2-4.

[10] The Executive Director's interpretation is set forth as a rule of general applicability. As such, to be valid, the Executive Director must go through a formal rulemaking procedure. *See El Paso Hosp. Dist. v. Texas Health and Human Services Comm'n*, 247 S.W.3d 709, 715 (Tex. 2008). Because he has not chosen to do so, any attempted application of this rule of general applicability in the absence of formal rulemaking is invalid. *Id.*

basis for denying a positive use determination for equipment used to obtain advanced pollution prevention gains. GHGs are subject to regulation. BEPC's early efforts to prevent the emission of such pollutants exceed these regulatory requirements. The statute and the rule in question here specifically allow for an entity to exceed regulatory requirements. The GHG regulations are an appropriate regulatory scheme on which BEPC's application can be premised. As such, BEPC has met this eligibility requirement for the tax abatement, to the extent this eligibility requirement is applicable.

**HRSGs are Used to Meet BACT Requirements.**

As the Executive Director is aware, BEPC's permit O-02169, does not identify particular pieces of equipment as "required Best Available Control Technology." Best Available Control Technology or BACT is defined as the reduction in total emissions that can be achieved through the use of either (i) add-on pollution control equipment; or (ii) ***production processes***, systems, methods, or work practices. 30 TEX. ADMIN. CODE § 116.10(1) (emphasis added). HRSGs serve as part of the production process and reduce the total $NO_x$ emissions from the facility.

BACT is an issue that is addressed through a permit application (*see, e.g.*, Attachment D) and TCEQ's processing of that permit application (*see, e.g.*, Attachment E). The permit reflects the results of that analysis but does not identify specific equipment as being "required Best Available Control Technology." However, as a permit application's representations are considered conditions upon which the permit is issued,[11] and are enforceable as such, BEPC is entitled to rely on these representations for purposes of establishing that the HRSGs constituted BACT for the Plant, so as to establish that the HRSGs meet or exceed the requirements of 30 Tex. Admin. Code §§ 116.111(a)(2)(C), 116.160(c)(1)(A); 40 C.F.R. § 52.21(b)(12).

**HRSGs are Used to Meet Federal Goals of Pollution Prevention Set Forth in 42 U.S.C. § 7401(c)**

This provision of the Federal Clean Air Act establishes, as a primary goal of the Act, the encouragement and promotion of pollution prevention. As the Executive Director notes, "This does not compel an applicant to install a HRSG." 2014 NOTD, p. 2. As discussed above, that is not the statutory or regulatory requirement to establish eligibility for a positive use determination. Instead, the issue is whether the use of the HRSG helps meet or meet or exceed rules or regulations adopted by any environmental protection agency of the United States, this state, or a political subdivision of this state for, among other things, the prevention or reduction of air, water, or land pollution.

HRSGs prevent pollution. This fact has been recognized explicitly by the Legislature by its inclusion of HRSGs on the list set forth in Tex. Tax Code § 11.31(k). As such, there is a clear connection between the HRSG and the pollution prevention goal established in 42 U.S.C. §

[11] *See* 30 TEX. ADMIN. CODE § 116.116(a).

7401(c). BEPC has met this eligibility requirement for the tax abatement, to the extent it is applicable.

**HRSGs are Used to Meet NAAQS Requirements**

BEPC's HRSGs are used to meet or exceed the National Ambient Air Quality Standards ("NAAQS") for $NO_x$ (40 C.F.R. § 50.11), along with 30 Tex. Admin. Code §§ 101.20 and 101.21 (incorporating federal standards). The use of BEPC's HRSGs also assist in meeting NAAQS for $SO_2$ (40 C.F.R. § 50.17), $PM_{10}$ (40 C.F.R. § 50.6) and CO (40 C.F.R. § 50.8). As the Executive Director notes, "The NAAQS is not an emission limit for a particular facility or source of pollution ..." 2014 NOTD, p. 3. This is true, but without the use of such equipment, areas of Texas would not be able to achieve compliance with the NAAQS. It is for this reason that the EPA has adopted standards such as those set forth in 40 C.F.R. Part 60, Subpart Da, as well as CAIR. Further, it is why these requirements have been incorporated into TCEQ's rules and the permits it issues. As Commissioner Rubenstein explained, "I also don't think it's appropriate to discount the fact that that efficiency ends up in emission avoidance, and . . . we've touted the improvements in air quality that we've made because we're targeting the emissions, in large respects the increased efficiencies because of the regulations that we have also let us get there."

BEPC's HRSGs are pollution control facilities, devices, or methods. This fact has been recognized by the Legislature. This fact has been recognized by the Commission, both formally through its Chapter 17 rulemaking, and in its discussion in the proceedings before the Commission in this matter. BEPC's HRSGs are used to meet NAAQS and BEPC has met this eligibility requirement for the tax abatement, to the extent it is applicable.

**Issue No. 2: The ED's Mandated Inputs are Contrary to Tex. Tax Code § 11.31(b)**

The Executive Director correctly notes that BEPC submitted five approaches for calculating a partial use determination. In the 2013 NOTD, the Executive Director requested that BEPC calculate a partial use determination using specific inputs for the variables set forth in the Cost Analysis Procedure set forth in 30 Tex. Admin. Code § 17.17(b). While BEPC objected and continues to object to the mandated inputs,[12] as this action constitutes improper and illegal rulemaking, BEPC provided the requested calculation. The mandated calculation resulted in a partial use determination of -382.13%.

In addition, in an effort to reach a resolution of this matter, and without waiving its rights to pursue a partial use determination of 74.66%, BEPC proposed four other calculations for the Executive Director's consideration. Two involved approaches that did not follow the CAP formula, specifically: (i) The Executive Director's 2008 Adopted Recommendation, which

[12] *See, e.g.*, Attachment I of BEPC's Response to the Executive Director's Notice of Technical Deficiency, dated June 24, 2013.

proposed an across-the-board 61% positive use determination for HRSG applicants; and (ii) a five-step Avoided $NO_x$ Emissions calculation that would result in a 57.5% positive use determination. BEPC reiterates its suggestion that the Executive Director consider these approaches as a means of reaching a more reasoned calculation of a positive use determination given the flaws in the CAP formula that have been demonstrated by BEPC and the other HRSG applicants.

The final two (2) calculations utilized the CAP formula with inputs for the variables which were consistent with the CAP formula, but which differed from the inputs mandated by the Executive Director. In the first, BEPC proposed utilizing the cost of piping as the input for the Cost of Capital Old variable. Using this approach, the application of the CAP formula results in a positive use determination of 74.52%.

BEPC proposed the piping as "comparable equipment" that could be used to calculate the Capital Cost Old ("CCO") in the CAP formula. As stated in BEPC's previous submission in this matter, without the HRSG, exhaust gases would be conveyed via piping from the combustion chamber to a control device or stack. No additional power would be generated, and no pollution control would be achieved. With the use of the HRSGs, both objectives are realized.

In the 2014 NOTD, the Executive Director asserts that allowing the CCO to be the value of the piping "would lead to a determination that a piece of production equipment, the HRSG, was installed for the single purpose of preventing pollution rather than for the purpose of producing steam for sale or use in producing electricity." With this statement and the further assertion that, instead, a boiler is the appropriate equipment for the CCO calculation, the Executive Director errs in three ways.

First, the HRSG is not solely production equipment. As the Executive Director well knows and as the Legislature has expressly recognized, the HRSG serves two functions: (i) it allows BEPC to reuse heat to generate steam and thereby generate more electricity; and (ii) by doing so, it reduces the amount of energy needed to generate the increased amount of electricity and, as a result, prevents pollution that would occur in the absence of the HRSG. The Legislature has recognized that the HRSG is pollution control property. The Executive Director and the Commission, through rulemaking, have also recognized this fact.

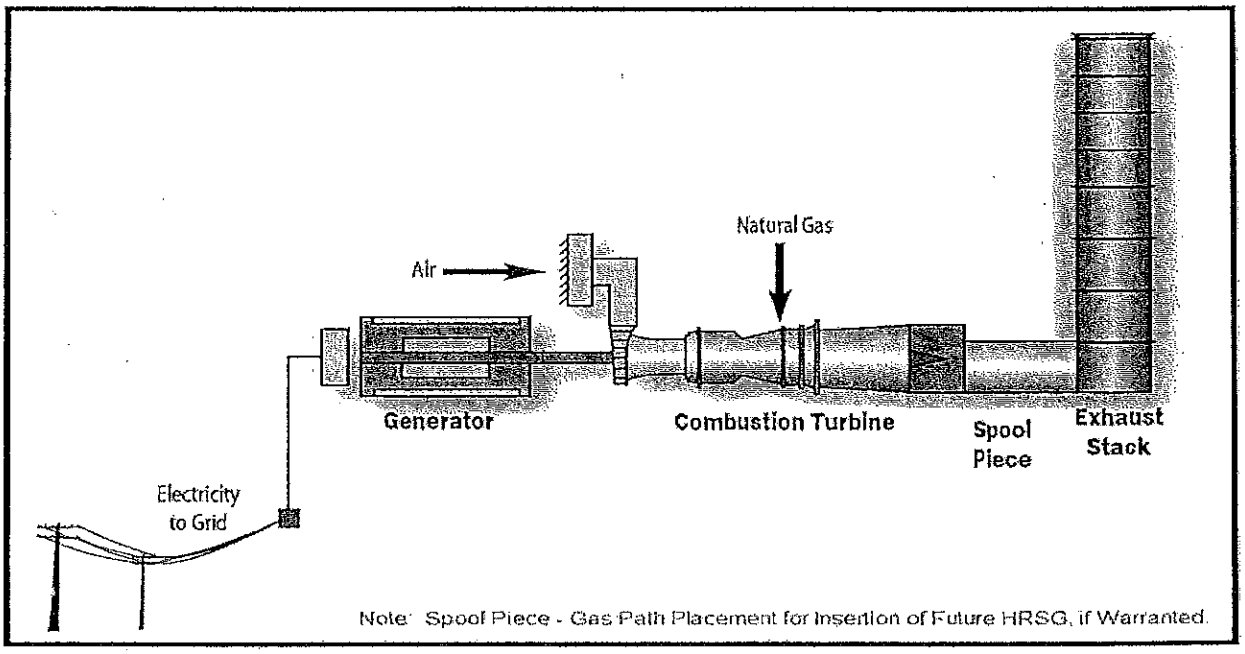
Second, BEPC has never contended that the HRSG was installed solely for the purpose of pollution control. The process in which BEPC and the Executive Director are currently engaged is to determine the allocation of the HRSG's two functions, i.e., what percentage is attributable to production and what percentage is attributable to pollution control. A resulting consequence is that the two percentages must add up to 100%. As noted herein, and in BEPC's previous submissions, the Executive Director's use and interpretation of the CAP formula does not meet this test.

Third, by fiat, the Executive Director has determined that a boiler sized to create the same amount of steam as the HRSG is *the*, i.e., the one and only, appropriate comparable equipment that may be used in a CAP calculation for a HRSG. The Executive Director has exceeded his authority by mandating one and only one approach to this variable, and further, in that regard, mandating the consideration of quite possibly the most expensive equipment possible. "Comparable equipment" is not a defined term in 30 Tex. Admin. Code ch. 17. "Comparable" is defined in normal usage as similar, or capable of comparison. Synonyms include "analogous," "corresponding," "matching," and "resembling." BEPC asserts that replacement boilers do not match or resemble a HRSG, and therefore the Executive Director's mandate is improper.

Further, even if replacement boilers were analogous to a HRSG, it cannot be argued that replacement boilers are the only comparable equipment. If a CCO must be used, BEPC asserts that an appropriate comparable equipment is a pipe that would vent heat in the absence of a HRSG.

In BEPC's final proposed calculation, BEPC proposed using zero as the CCO and NPVMP variables. Using these inputs for the designated variables, BEPC's HRSGs would be entitled to a 100% positive use determination. As set forth above, BEPC asserts that replacement boilers do not match or resemble a HRSG, and therefore the Executive Director's mandate is improper. Indeed, an application of TCEQ's hierarchical definition of "Capital Cost Old," found in 30 Tex. Admin. Code § 17.17(c)(1), note 3, will conclude that no CCO should be used in the CAP calculation for a HRSG.

The mandate of "comparable equipment" that is, in fact, not comparable as hypothetical "replaced" equipment is inappropriate and constitutes improper and illegal rulemaking. On the basis of this objection, BEPC respectfully requests that the Executive Director determine that there be no CCO for CAP calculations related to HRSGs or, in the alternative, that the hypothetical "replaced" equipment be considered to be the piping reflected as "Spool Piece" in the diagram set forth below.




BEPC reasserts the use determination approaches provided in its response to the 2013 NOTD. These approaches all provide a basis for determining the allocation of the HRSG's two functions and result in positive use determinations that are consistent with the Legislature's determination that HRSGs are pollution control property. BEPC urges the Executive Director to reconsider his position and work with the HRSG applicants to resolve the pending applications through the use of one of the approaches that BEPC has proposed.

In his 2014 NOTD, the Executive Director has directed that BEPC remove certain equipment, specifically the CEMS units; feedwater systems; boiler systems; chemical injection; cooling air systems; nitrogen systems; and condensate systems be removed from the CAP-based calculations. In addition, the Executive Director has required that BEPC remove from the calculation of Production Costs any costs related to operating the gas turbine, the water systems, or the steam turbine. The Executive Director acknowledged that his initial refusal to include costs related to the operation of the duct burners, including fuel costs, was in error, and he requested that these costs be included in the calculation of Production Costs.

It should be noted that BEPC included the CEMS units in the list of equipment associated with the HRSGs, but the costs associated with these units were not included in BEPC's calculations for any of the CAP-based calculations. As the Executive Director noted, these units are eligible for their own Tier I application. BEPC has done so and has received a tax abatement for the CEMS equipment.

The Executive Director contends that the feedwater systems, boiler systems, chemical injection, cooling air systems, nitrogen systems, and condensate systems are all production equipment for which a positive use determination is not available. However, these systems are essential to the operation of the HRSG. Without these pieces of equipment, the HRSG will not function and neither the production nor the pollution prevention benefits will be achieved. The HRSG must include all ancillary equipment and production costs required for the equipment to operate. The HRSG itself does not function without the heat generated from fuel burned by a combustion turbine ("CT"), nor will it function without water to make steam. In order for water to be introduced to the HRSG, the following equipment must be present: the feed water system, cooling air systems, condensate systems, and chemical injection systems. The production costs essential for HRSG to operate, and produce the required megawatts ("MW") demanded by the grid, must include CT fuel consumption, duct burner fuel consumption, and Steam Turbine production costs. In order for the HRSG to produce the MW required to supply the grid with the load required by ERCOT while limiting the total emissions produced, as required by applicable environmental regulations, a HRSG must function as designed. This design includes the feed water system, cooling air systems, condensate systems, and chemical injection systems. The allocation of the production and pollution control functions of the equipment serves to appropriately identify the proportion of the equipment costs for which a tax abatement may be obtained.

The Executive Director, through the processing of this applications, has also narrowed the scope of the CAP's Production Cost variable by asserting that the cost attributed to the production of electricity, which the Executive Director has designated as the marketable product, must exclude costs relating to operating the gas turbine or the steam turbine including fuel costs.

Without the operation of these units, and their associated expenses (including fuel costs), no electricity would be generated from any steam produced via the HRSG, and therefore no marketable product would be generated. The Executive Director cannot have it both ways. If electricity is the marketable product, the HRSG Applicants must be allowed to take into account the costs (and the equipment) associated with generating that marketable product as part of its NPVMP calculation. TCEQ's rules mandate it.

The exclusion of fuel costs from Production Cost is particularly problematic and inappropriate. "Production Cost" expressly includes the cost of "raw materials." *See* 30 TEX. ADMIN. CODE § 17.17(c)(2). In this context, fuel is the raw material for the production of the steam and its costs are an element of Production Cost, by definition. Additional costs that are included in Production Cost include storage, transportation, and personnel costs. *See id.* The interpretation of the elements to be included in, and excluded from, the calculation of NPVMP is inaccurate and constitutes improper and illegal rulemaking.

Without waiving its objections to the Executive Director's directives included in the NOTD, as set forth above, and in prior proceedings and filings in this matter, BEPC has prepared a revised calculation in conformance with these directives. This calculation is prepared for

purposes of responding to the 2014 NOTD lest the Executive Director find that BEPC has failed to submit a complete application and therefore determine that its application is void. BEPC expressly reserves its right to contest the Executive Director's directives. Using the Executive Director's mandated approach, the use determination calculation is -277.50%. *See* Attachment F.

As can be seen, it is BEPC's conclusion that the calculation, using the specific inputs mandated by the Executive Director, will in each and every case result in a negative use determination, based on a CAP calculation that will be highly negative. Such a result is no more appropriate than a situation in which a calculation consistently results in a use determination of greater than 100%. This result is contrary to the Legislature's enactment of Tex. Tax Code § 11.31(b). HRSGs have been statutorily designated as pollution control equipment. As such, some portion of the value of that equipment must be attributed to pollution control, and provided a tax exemption. A result of zero, less than zero, or far less than zero is not valid, any more than a result of greater than 100% would be valid. The purpose of the calculation is to determine what percentage of the equipment's value is attributable to production and what percentage is attributable to pollution control. The percentages must add up to 100%. Because the formula is capable of generating a naught or a negative number, it is inconsistent with state law, and invalid as a matter of law. Given this outcome, the Executive Director must revisit the mandated inputs and develop an approach that is consistent with the Legislature mandate that HRSGs constitute pollution control equipment.

Subject to its objections stated above, BEPC appreciates the opportunity to provide the enclosed additional information for the Executive Director consideration. BEPC understands that TCEQ will be receiving additional information from the other HRSG Applicants as well that might be utilized to resolve the pending HRSG applications. BEPC is willing and available to meet with the Executive Director and his staff to attempt to resolve these pending applications in an equitable manner. Please contact me if you have any questions or require any additional explanation or information in support of BEPC Application No. 16413.

Sincerely,

Paul C. Sarahan

PS/cb
Attachments

# ATTACHMENT A

Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

Rec'd 1-30-14

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

January 24, 2014

Mr. Jim Harris
Agent
H & H Associates
406 FM 3016
Grapeland, Texas 75844

Re: Notice of Technical Deficiency
Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
Bridgeport (Jack County)
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Application Number: 16413

Dear Mr. Harris:

This letter responds to Brazos Electric Power Cooperative, Inc.'s Application for Use Determination, received March 7, 2012 pursuant to the Texas Commission on Environmental Quality's (TCEQ) Tax Relief for Pollution Control Property Program for the Jack County Generation Facility.

The TCEQ has conducted further technical review and determined that additional information required by Title 30 Texas Administrative Code (TAC) §17.10 is warranted for application #16413.

The Executive Director interprets Texas Tax Code (TTC) §§11.31(k) and (m) as establishing an expedited review process and exempting an applicant from providing detailed information regarding the anticipated environmental benefit for property on the k-list. Because Article VIII, Section 1-l, of the state constitution authorizes the exemption only for property used to meet or exceed an environmental rule, the Executive Director does not interpret TTC §11.31 subsection (m) as exempting §11.31(k)-listed property from the TCEQ's review standards at Title 30 Texas Administrative Code (TAC) Chapter 17 or mandating the issuance of a positive use determination, when the property is not used, constructed, acquired or installed to meet or exceed an environmental rule.

Please revise your application to include the following information.

Issue 1 – Review of Environmental Rule Citations

In review of the facility's air permits and associated filings, the following comments on rule citations are in part based on representations made in the permit documents. It does not appear that sufficient information has been provided to establish a clear connection

between the listed equipment and the cited rules. For each cited rule, please provide an explanation of how the equipment is used to meet a requirement in the rule.

The plant was initially authorized on July 22, 2003 by air permit 52756 (issued to Duke Energy North America and subsequently transferred to Brazos Electric Cooperative, Inc.). The initial permit indicates the site was subject to New Source Performance Standard (NSPS) Subparts Da, Dc, and GG. The permit was amended September 12, 2011 to authorize maintenance, startup, and shutdown (MSS) emissions. At that time, the federal applicability section cited the same subparts of NSPS. Subpart Da is a standard of performance for electric utility steam generating units, i.e., the HRSG, and provides emission limits for nitrogen oxides ($NO_X$), particulate matter, and sulfur dioxide ($SO_2$). Given that Da only applies to the HRSG itself, it does not appear that use of the HRSG is required to meet Da or that it helps the facility meet the emission limit for the HRSG itself. The absence of a HRSG (that is subject to regulation under Da) would not affect emission limitations of other sources at the plant, e.g., the gas turbine (regulated under GG). Please explain in detail how a HRSG is used to meet the requirements of Da.

Regarding the Clean Air Interstate Rule (CAIR), CAIR is a cap and trade program that allocates allowances to all electric generating units. Please explain how a Heat Recovery Steam Generator (HRSG) is required to meet a CAIR requirement.

Title 40 CFR §52.21(b)(49)(v) states, "Beginning July 1, 2011, in addition to the provisions in paragraph (b)(49)(iv) of this section, the pollutant greenhouse gases (GHGs) shall also be subject to regulation (a) at a new stationary source that will emit or have the potential to emit 100,000 tpy carbon dioxide equivalent (CO2e); or (b) At an existing source that emits or has the potential to emit 100,000 tpy CO2e, when such stationary source undertakes a physical change or change in the method of operation that will result in an emissions increase of 75,000 tpy CO2e or more." The Jack County Generation Facility was authorized by air permit 52756 which was dated July 22, 2003 and air permit 83801 which was dated November 17, 2008. The air permit general conditions required that construction be started no more than 18 months after permit issuance. Therefore, criterion (a) above does not apply. There is no documentation that the site has undergone a modification which would trigger criterion (b) above. Similarly, the application has not demonstrated that the site has gone through a major modification which would trigger a control technology review as described in 40 CFR §52.21(j). An applicant cannot claim eligibility for a positive use determination based on exceeding a rule that the applicant is not required to meet.

Best Achievable Control Technology (BACT) analysis is completed in conjunction with construction and amendment air permit applications. A thorough review of documentation for air permits 52756 and 83801 was conducted including the construction permit applications and any subsequent amendment applications. Both construction permit applications were filed under the seal of a professional engineer. For air permits 52756 and 83801 the proposed BACT and approved BACT was low-NOx combustion and selective catalytic reduction (SCR) for NOx control. Proposed and approved BACT for MSS activities was to minimize the duration of startups and shutdowns such that there is no increase in the annual permitted emission rates. None of the reviewed applications indicated the HRSGs provide pollution control or were necessary to satisfy BACT. It is not appropriate to revise a BACT analysis in order to justify a property tax exemption.

42 U.S.C. §7401(c) states, "A primary goal of this chapter is to encourage or otherwise promote reasonable Federal, State, and local governmental actions, consistent with the provisions of this chapter, for pollution prevention." This does not compel an applicant to install a HRSG.

The application cites 40 CFR §50.11, 50.17, 50.6, and 50.8 which are the National Ambient Air Quality Standards (NAAQS) for NO2, SO2, PM10, and CO respectively. States employ state implementation plans and incorporated air permitting programs to ensure continued compliance with the NAAQS in attainment areas and reasonable progress toward attainment in non-attainment areas. NAAQS are ambient air concentrations promulgated by the EPA to protect public health and welfare. The NAAQS is not an emission limit for a particular facility or source of pollution and does not require specific facilities to use any particular pollution controls.

Issue 2 – Calculation of an Appropriate Partial Positive Use Determination

The notice of deficiency response received on June 24, 2013, includes five approaches for calculating a partial use determination. Since this application was received on March 7, 2012, the only allowable method for calculating a partial use determination is the method adopted under TTC §11.31(g). This method is the Cost Analysis Procedure (CAP) located in 30 TAC §17.17. Neither the "Avoided NOx Emissions" approach nor the "Executive Director's 2008 Adopted Recommendation" are valid approaches for this application.

The other proposed calculations use the CAP to calculate a partial determination percentage. One method uses the CAP as proposed by the TCEQ in the February 21, 2013 request for additional information. The other two calculate the variables Capital Cost Old (CCO) and Production Cost differently. For all three equations, Capital Cost New (CCN) is defined as the HRSGs and dedicated ancillary equipment. CCO is defined to be either "piping necessary to fill the gap created by the absence of the HRSG" or as $0. The Production Cost variable in the Net Present Value of Marketable Product (NPVMP) calculation includes fuel costs.

First, all three proposed CAP calculations include dedicated ancillary equipment in CCN. The CEMS units should be removed from this application and included on a separate Tier I application. The feedwater systems, boiler systems, chemical injection, cooling air systems, nitrogen systems, and condensate systems are production equipment for which the TCEQ has consistently issued negative use determinations since it is not used to prevent, control, monitor, or reduce air, water, or land pollution. Please remove these items from the application.

The "piping necessary to fill the gap created by the absence of the HRSG" would be used to convey exhaust gases from the combustion chamber to a control device or stack. HRSG's are used to convert energy contained in waste heat into steam. The appropriate comparable equipment is a boiler sized to create the same amount of steam as the HRSG. Allowing CCO to be $0 or the value of a piece of ducting would lead to a determination that a piece of production equipment, the HRSG, was installed for the single purpose of preventing pollution rather than for the purpose of producing steam for sale or use in producing electricity.

Production Costs are the costs related to operating the equipment for which the positive use determination is being requested. In the request for additional information we stated that Production Costs were to exclude "costs related to operating the gas turbine, associated duct burners, or the steam turbine including fuel costs." The appropriate costs to be included in Production Costs are those costs related to operating the HRSG. We agree that this includes the costs related to the operation of the duct burners including fuel costs. We do not agree that production costs include costs related to operating the gas turbine, the water systems, or the steam turbine.

Please resubmit your application using the CAP with the variables calculated as explained in the February 21, 2013, letter with the exception of additional production costs as explained in the preceding paragraph.

The TCEQ appreciates your response in this matter. The revised application must be submitted by March 7, 2014 to the TCEQ Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087. Failure to submit a complete application, including the requested information, may result in your application being voided and the associated application fee being forfeited in accordance with 30 TAC §17.20(b).

If you have questions regarding this letter or need further assistance, please contact Ronald Hatlett of the Tax Relief for Pollution Control Property Program by telephone at (512) 239-6348, by e-mail at ronald.hatlett@tceq.texas.gov, or write to the Texas Commission on Environmental Quality, Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

Chance Goodin, Team Leader
Stationary Source Programs
Air Quality Division

CG/RH

# ATTACHMENT B

Bryan W. Shaw, Ph.D., *Chairman*
Buddy Garcia, *Commissioner*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

September 21, 2011

MR MIKE MEYERS ADR
ENVIRONMENTAL ENGINEER
BRAZOS ELECTRIC POWER COOPERATIVE INC
PO BOX 2585
WACO TX 76702-2585

Re: Permit Alteration
Permit Number: 83801
Jack County Generation Facility
Bridgeport, Jack County
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Account Number: JA-0068-E
Associated Permit Number: PSDTX1117

Dear Mr. Meyers:

This is in response to your letter received September 1, 2011, requesting alteration of the conditions of the above-referenced permit. We understand you wish to revise Special Condition No. 5 to match your Title V permit.

As indicated in Title 30 Texas Administrative Code § 116.116(c) [30 TAC § 116.116(c)], and based on our review, Permit Number 83801 is altered. Enclosed are the altered permit conditions to replace those currently attached to your permit. Please attach these to your permit.

Planned maintenance, startup, and shutdown emissions have been previously reviewed, authorized, and included in the MAERT. Any other maintenance activities are not authorized by this permit and will need to obtain a separate authorization.

As of July 1, 2008, all analytical data generated by a mobile or stationary laboratory in support of compliance with air permits must be obtained from a NELAC (National Environmental Laboratory Accreditation Conference) accredited laboratory under the Texas Laboratory Accreditation Program or meet one of several exemptions. Specific information concerning which laboratories must be accredited and which are exempt may be found in 30 TAC § 25.4 and § 25.6.

Re: Permit Number: 83801

For additional information regarding the laboratory accreditation program and a list of accredited laboratories and their fields of accreditation, please see the following Web site:

www.tceq.texas.gov/compliance/compliance_support/qa/env_lab_accreditation.html

For questions regarding the accreditation program, you may contact the Texas Laboratory Accreditation Program at (512) 239-3754 or by e-mail at labprgms@tceq.texas.gov.

Your cooperation in this matter is appreciated. If you need further information or have any questions, please contact Ms. Ruth Alvirez at (512) 239-5220 or write to the Texas Commission on Environmental Quality, Office of Air, Air Permits Division, MC-163, P.O. Box 13087, Austin, Texas 78711-3087.

This action is taken under authority delegated by the Executive Director of the Texas Commission on Environmental Quality.

Sincerely,

Michael Wilson, P.E., Director
Air Permits Division
Office of Air
Texas Commission on Environmental Quality

MPW/RA/ra

Enclosure

cc: Air Section Manager, Region 3 - Abilene

Project Number: 169606

SPECIAL CONDITIONS

Permit Numbers 83801 and PSDTX1117

Federal Applicability

1. These facilities shall comply with applicable requirements of the U.S. Environmental Protection Agency (EPA) regulations on Standards of Performance for New Stationary Sources (NSPS), Title 40 Code of Federal Regulations Part 60 (40 CFR Part 60),

   A. Subpart A: General Provisions

   B. Subpart Dc: Small Industrial-Commercial-Institutional Steam Generating Units

   C. Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

   D. Subpart KKKK: Standards of Performance for Stationary Combustion Turbines

   If any condition of this permit is more stringent than the regulations so incorporated, then for the purposes of complying with this permit, the permit shall govern and be the standard by which compliance shall be demonstrated.

Emission Standards and Operating Specifications

2. The two General Electric Model 7FA combustion turbine generator (CTG) units each rated at a nominal electric power output of 171.1 megawatts (MW) operating in combined cycle mode with two heat recovery steam generators (HRSGs) and associated duct burners rated at 600 million British thermal units per hour (MMBtu/hr) based on the higher heating value (HHV) of the fuel and a 342 MW steam turbine generator are authorized by this permit. The plant's electric generating capacity is approximately 684 MW.

3. The concentration of nitrogen oxides ($NO_x$) in the stack gases from the two CTGs (Emission Point Numbers [EPN]: HRSG3 and HRSG4) shall not exceed 2.0 parts per million by volume dry (ppmvd) corrected to 15 percent oxygen ($O_2$), on a rolling 24-hour average, subject to the following specifications:

   A. A valid hour consists of a minimum of four, and normally 60, approximately equally spaced data points.

   B. Emissions occurring during start-up and shutdown or reduced load operations authorized by this permit are not included.

   C. Excess emissions caused by malfunction are excluded.

D. Excess emission during initial or other major DLN tuning sessions are excluded. Major tuning sessions are scheduled events and would occur after completion of initial construction, a combustor change-out, a major repair or maintenance to a combustor, or other similar circumstances.

E. During the first 24 months of operation following completion of the initial demonstration of compliance testing as required by this permit, hourly average periods may be excluded from selected 24-hour averages, if the hourly average is above 2.0 ppmvd nitrogen oxides ($NO_x$) because of rapid shifts in electrical load and resulting exhaust flow or $NO_x$ concentration, that make it impossible for the emission controller to maintain the desired $NO_x$ set point.

F. No later than the 25th month following completion of the initial demonstration of compliance, the permit holder shall submit a request to TCEQ Air Permits Division for a permit alteration of Special Condition No. 3E to specify a limit on the number of hourly exclusions due to rapid load shifts. The request shall include a report identifying the date and time of each excluded hour during the 24 month period, the hourly average $NO_x$ concentration, and the reason (including the entity requesting it) for the rapid change in load. In addition, the report shall identify the maximum rate of load change for which 2.0 ppm $NO_x$ concentration can be maintained. The TCEQ will alter the permit based upon its review of the data and any other information which may available at the time. The exclusion applies only to Special Condition No. 3, and not the maximum allowable emissions rates table (MAERT), and does not relieve the permit holder from all other provisions.

The concentration of carbon monoxide (CO) in the stack gases from EPNs HRSG3 and HRSG4 during normal operations shall not exceed a three-hour rolling average of 11.0 ppmvd @ 15 percent $O_2$.

The concentrations of $NO_x$ and CO above apply over each turbines normal operating range of 50 to 100 percent of full load and do not apply to emissions from start-up and shutdown activities.

Reduced load operation below 50 percent of base load is authorized provided that the maximum pounds per hour (lb/hr) emission rates specified in the table titled "Emission Sources - Maximum Allowable Emission Rates" (MAERT) are not exceeded.

4. Fuel-fired in the CTGs, duct burners, and auxiliary boiler is limited to pipeline-quality natural gas containing no more than 2.0 grains total sulfur per 100 dscf on an hourly basis and 0.50 grains total sulfur per 100 dscf on an annual basis.

The emergency generator engine (EPN: DG-2) is authorized to combust diesel fuel containing no more than 0.05 percent total sulfur by weight and is limited to a maximum of 150 hours of operation annually.

The auxiliary boiler (EPN: B-2) is limited to an annual capacity factor of 20 percent.

Upon request by the Executive Director of the Texas Commission on Environmental Quality (TCEQ) or any local air pollution control program having jurisdiction, the holder of this permit shall provide a sample and/or an analysis of the fuel-fired or shall allow air pollution control agency representatives to obtain a sample for analysis.

5. Opacity of emissions from natural gas or diesel fired facilities authorized by this permit shall not exceed 5 percent averaged over a six-minute period. During periods of start-up or shutdown opacity shall not exceed 15 percent averaged over a six-minute period.

Opacity shall be determined by EPA Reference Method 9 during the initial determination of compliance stack sampling. After the initial determination of compliance stack sampling has been completed, the permit holder shall conduct visible emissions observations of each operating natural gas or diesel fired facility quarterly following the procedures of EPA Reference Method 22. If visible emissions are present, opacity shall be determined by EPA Reference Method 9. (9/11)

Aqueous Ammonia ($NH_3$)

6. Concentrations of $NH_3$ from EPNs HRSG3 and HRSG4 shall not exceed 7.0 ppmvd when corrected to 15percent $O_2$ on a three-hour rolling average.

The concentration for $NH_3$ above apply over each turbines normal operating range of 50 to 100 percent of full load and do not apply to emissions from start-up and shutdown activities.

Reduced load operation below 50 percent of base load is authorized provided that the maximum pounds per hour (lb/hr) emission rates specified in the MAERT are not exceeded.

7. The permit holder shall maintain prevention and protection so as to protect the $NH_3$ storage system which includes (but is not limited to) the following:

The $NH_3$ storage tank area will be marked and protected so as to protect the $NH_3$ storage tank form accidents that could cause a rupture.

The ammonia stored and handled at the facility shall be in aqueous solution and shall contain no more than 20 percent ammonia by mass.

8. In addition to the requirements of Special Condition 7, the permit holder shall maintain the piping and valves in $NH_3$ service as follows:

   A. All operating practices and procedures relating to the handling and storage of $NH_3$ shall conform to the safety recommendations specified for that compound by guidelines of the American National Standards Institute.

   B. Audio, olfactory and visual checks for $NH_3$ leaks with the operating area shall be made once a day.

   C. As soon as possible, following the detection of a leak, plant personnel shall take one or more of the following actions:

      (1) Locate and isolate the leak, if necessary.
      (2) Commence repair or replacement of the leaking component.
      (3) Use a leak collection or containment system to control the leak until repair or replacement can be made if immediate repair is not possible.

Start-up and Shutdown

9. The emissions from start-up and shutdown activities are reflected in the MAERT. These emissions will be minimized by the following:

   A. Facility and air pollution control equipment will be operated in a manner consistent with good practices for minimizing emissions.

   B. The frequency and duration of operation in start-up and shutdown mode will be minimized and the applicable emissions monitoring systems will be kept in operation.

   C. Cold start-up events for EPNs HRSG3 and HRSG4 shall not exceed seven hours. A cold start-up is defined as a start-up after a unit has received no fuel for a period of 24 hours or more.

   D. Warm start-up events for EPNs HRSG3 and HRSG4 shall not exceed five hours. A warm start-up is defined as a start-up which is not a cold start-up.

   E. Shutdown events for both EPNs HRSG3 and HRSG4 shall not exceed two hours.

   F. The start-up and shutdown activities are authorized provided that the $NO_x$, CO, and VOC emission rates in lb/hr do not exceed those specified in the MAERT and comply with the tons per year specified in the MAERT at normal operating conditions.

Initial Determination of Compliance

10. Sampling ports and platforms shall be incorporated into the design of all exhaust stacks according to the specifications set forth in the attachment entitled "Chapter 2, Stack Sampling Facilities." Alternate sampling facility designs may be submitted for approval by the TCEQ Regional Director.

11. The holder of this permit shall perform stack sampling and other testing as required to establish the actual quantities of air contaminants being emitted into the atmosphere from EPNs HRSG3 and HRSG4, and to determine initial compliance with all emission limits established by this permit. Sampling shall be conducted in accordance with the appropriate procedures of the TCEQ Sampling Procedures Manual and in accordance with the appropriate EPA Reference Methods 201A and 202 or Reference Method 5, modified to include back-half condensibles, for the concentration of particulate matter less than 10 microns in diameter ($PM_{10}$); Reference Method 8 or Reference Methods 6 or 6c for sulfur dioxide ($SO_2$); Reference Method 9 for opacity (consisting of 30 six-minute readings as provided in 40 CFR § 60.11[b]); Reference Method 10 for the concentration of CO; Reference Method 25A, modified to exclude methane and ethane, for the concentration of VOC (to measure total carbon as propane); and Reference Method 20 for the concentrations of $NO_x$ and $O_2$; or other equivalent methods approved by the TCEQ Regional Director.

    Fuel sampling using the methods and procedures of 40 CFR § 60.4415 may be conducted in lieu of stack sampling for $SO_2$ or the permit holder may be exempted from fuel monitoring as provided under 40 CFR § 60.4365(a). If fuel sampling is used, compliance with New Source Performance Standards (NSPS), Subpart KKKK, $SO_2$ limits shall be based on 100 percent conversion of the sulfur in the fuel to $SO_2$. Any deviations from those procedures must be approved by the Executive Director of the TCEQ prior to sampling. The TCEQ Executive Director or a designated representative shall be afforded the opportunity to observe all such sampling. The holder of this permit is responsible for providing sampling and testing facilities and conducting the sampling and testing operations at their expense.

    A. The TCEQ Abilene Regional Office shall be contacted as soon as testing is scheduled but not less than 45 days prior to sampling to schedule a pretest meeting.

        The notice shall include:

        (1) Date for pretest meeting.
        (2) Date sampling will occur.
        (3) Name of firm conducting sampling.
        (4) Type of sampling equipment to be used.
        (5) Method or procedure to be used in sampling.
        (6) Procedure used to determine CTG loads during and after the sampling period.

The purpose of the pretest meeting is to review the necessary sampling and testing procedures, to provide the proper data forms for recording pertinent data, and to review the format procedures for submitting the test reports. A written proposed description of any deviation from sampling procedures specified in permit conditions, or TCEQ or EPA sampling procedures shall be made available to the TCEQ prior to the pretest meeting. The TCEQ Regional Director shall approve or disapprove of any deviation from specified sampling procedures. Requests to waive testing for any pollutant specified in this condition shall be submitted to the TCEQ Office of Air, Air Permits Division. Test waivers and alternate/equivalent procedure proposals for NSPS testing which must have EPA approval shall be submitted to the TCEQ Regional Office.

B. Air contaminants and diluents from the turbines to be sampled and analyzed include (but are not limited to) $NO_x$, $O_2$, CO, VOC, formaldehyde ($H_2CO$), $SO_2$, and $PM_{10}$. (Fuel sampling using the methods and procedures of 40 CFR § 60.4415 may be conducted in lieu of stack sampling for $SO_2$.)

C. Each turbine shall be tested at 50 percent and 100 percent of base load of the permitted operating range that is defined in Special Condition No. 3 for the atmospheric conditions which exist during testing. Each tested turbine load shall be identified in the sampling report. The permit holder shall present at the pretest meeting the manner in which stack sampling will be executed in order to demonstrate compliance with emission standards found in 40 CFR Part 60, Subpart KKKK.

D. Sampling as required by this condition shall occur within 60 days after achieving the maximum production rate at which each CTG will be operated but no later than 180 days after initial start-up of each unit. Additional sampling shall occur as may be required by the TCEQ or EPA.

E. Within 60 days after the completion of the testing and sampling required herein, two copies of the sampling reports shall be distributed as follows:

(1) One copy to the TCEQ Abilene Regional Office.
(2) One copy to the EPA Region 6 Office, Dallas.

Continuous Determination of Compliance

12. The holder of this permit shall install, calibrate, maintain, and operate a continuous emission monitoring system (CEMS) to measure and record the concentrations of $NO_x$, CO, and diluent gases ($O_2$ or carbon dioxide [$CO_2$]) from EPNs HRSG3 and HRSG4.

A. Monitored $NO_x$ and CO concentrations shall be corrected and reported in dimensional units corresponding to the emission rate and concentration limits specified in Special Condition No. 3.

B. The CEMS data shall be used to demonstrate compliance with the $NO_x$ and CO emissions limitations in Special Condition No. 3 and the attached MAERT

C. The CEMS shall be operated according to the methods and procedures as set out in 40 CFR § 60.4345.

D. Reporting of monitoring data shall be in accordance with the methods and procedures as set out in 40 CFR § 60.4380(b).

E. Compliance with the continuous emissions monitor requirements above can be demonstrated by meeting the requirements of 40 CFR Part 75 provided that the permit holder demonstrates compliance with applicable NSPS regulations.

F. The TCEQ Abilene Regional Office shall be notified at least 30 days prior to any required relative accuracy test audit (RATA) in order to provide them the opportunity to observe the testing.

13. The $NH_3$ concentration in each Exhaust Stack shall be tested or calculated according to one of the methods listed below and shall be tested or calculated according to frequency listed below. Testing for $NH_3$ slip is only required on days when the Selective Catalytic Reduction (SCR) unit is in operation.

A. The holder of this permit may install, calibrate, maintain, and operate a CEMS to measure and record the concentrations of $NH_3$. The $NH_3$ concentrations shall be corrected and reported in accordance with Special Condition No. 6.

B. As an approved alternative, the $NH_3$ slip may be measured using a sorbent or stain tube device specific for $NH_3$ measurement in the 5 to 10 ppm range. The frequency of sorbent/stain tube testing shall be daily for the first 60 days of operation, after which, the frequency may be reduced to weekly testing if operating procedures have been developed to prevent excess amounts of $NH_3$ from being introduced in the SCR unit and when operation of the SCR unit has been proven successful with regard to controlling $NH_3$ slip. Daily sorbent or stain tube testing shall resume when the catalyst is within 30 days of its useful life expectancy. These results shall be recorded and used to determine compliance with Special Condition No. 6.

C. As an approved alternative to sorbent/stain tube testing or an $NH_3$ CEMS, the permit holder may install and operate a second $NO_x$ CEMS probe located between the duct burners and the SCR, upstream of the stack $NO_x$ CEMS, which may be used in association with the SCR efficiency and $NH_3$ injection rate to estimate $NH_3$ slip. This

condition shall not be construed to set a minimum $NO_x$ reduction efficiency on the SCR unit. These results shall be recorded and used to determine compliance with Special Condition No. 6.

D. If the measured or calculated $NH_3$ slip concentration exceeds 6 ppm at any time, the permit holder shall begin $NH_3$ testing by either the Phenol-Nitroprusside Method, the Indophenol Method, or EPA Conditional Test Method (CTM) 27 on a quarterly basis, in addition to the weekly sorbent or stain tube testing. The quarterly testing shall continue until such time as the SCR unit catalyst is replaced; or if the quarterly testing indicates $NH_3$ slip is 5 ppm or less, the Phenol-Nitroprusside/Indophenol/CTM 27 tests may be suspended until sorbent/stain tube testing again indicate 6 ppm $NH_3$ slip or greater. These results shall be recorded and used to determine compliance with Special Condition No. 6.

E. As an approved alternative to sorbent or stain tube testing, $NH_3$ CEMS, or a second $NO_x$ CEMS, the permit holder may install and operate a dual stream system of $NO_x$ CEMS at the exit of the SCR. One of the exhaust streams would be routed, in an unconverted state, to one $NO_x$ CEMS and the other exhaust stream would be routed through a $NH_3$ converter to convert $NH_3$ to $NO_x$ and then to a second $NO_x$ CEMS. The $NH_3$ slip concentration shall be calculated from the difference between the two $NO_x$ CEMS readings (converted and unconverted).

F. Any other method used for measuring $NH_3$ slip shall require prior approval from the TCEQ Regional Office.

14. The holder of this permit shall additionally install, calibrate, maintain, and operate continuous monitoring systems to monitor and record the average hourly natural gas consumption of the CTGs, duct burners and the auxiliary boiler. The systems shall be accurate to ± 5.0 percent of the unit's maximum flow.

15. If any emission monitor fails to meet specified performance, it shall be repaired or replaced as soon as reasonably possible.

Recordkeeping Requirements

16. The following records shall be kept at the plant for the life of the permit. All records required in this permit shall be made available at the request of personnel from the TCEQ, EPA, or any air pollution control agency with jurisdiction.

A. A copy of this permit.

B. A complete copy of the testing reports and records of the initial performance testing completed pursuant to Special Condition No. 11 to demonstrate initial compliance.

C. Stack sampling results or other air emissions testing (other than CEMS data) that may be requested by the TCEQ Executive Director on units authorized under this permit.

17. The following information shall be maintained by the holder of this permit in a form suitable for inspection for a period of five years after collection and shall be made available as soon as practical upon request to representatives of the TCEQ, EPA, or any local air pollution control program having jurisdiction:

A. The CEMS data of $NO_x$, CO, and $O_2$ emissions from EPNs HRSG3 and HRSG4 to demonstrate compliance with the emission rates listed in the MAERT.

B. Raw data files of all CEMS data including calibration checks and adjustments and maintenance performed.

C. Records of the hours of operation and average daily quantity of natural gas-fired in the CTGs, duct burners, and auxiliary boiler.

D. Records of the hours of operation of the emergency diesel generator.

E. Records of $NH_3$ emissions sampling and calculations pursuant to Special Condition No. 13.

F. Written records of any accidental releases, spills or venting of $NH_3$ and the corrective action taken.

G. Written records of maintenance performed to any piping and valves in $NH_3$ service pursuant to Special Condition 8.

H. Records to identify the times emissions data have been excluded from the calculation of average concentration for purposes of demonstrating compliance with the emission limitations in Special Condition No. 3 and Special Condition No. 6 along with the justification.

I. Record to identify the times and duration of start-up and shutdown periods pursuant to Special Condition No. 9.

J. Record of visible/opacity observations pursuant to Special Condition No. 5. (9/11)

Reporting

18. The holder of this permit shall submit to the TCEQ Abilene Regional Office and the Air Enforcement Branch of EPA in Dallas periodic reports as described in 40 CFR § 60.7. Such reports are required for each emission unit which is required to be continuously monitored pursuant to this permit.

Date: September 21, 2011

# ATTACHMENT C

Bryan W. Shaw, Ph.D., *Commissioner*
Buddy Garcia, *Chairman*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

September 28, 2009

MR DAVID P MURPHY
VICE PRESIDENT GENERATION
BRAZOS ELECTRIC POWER COOPERATIVE INC
PO BOX 2585
WACO TX 76702-2585

BEPC
RECEIVED
SEP 30 2009
POWPROD

Re: Effective Permit Approval
Renewal
Permit Number: O2169
Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
Jacksboro, Jack County
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Account Number: JA-0068-E

Dear Mr. Murphy:

The effective federal operating permit (FOP) for Brazos Electric Power Cooperative, Inc., Jack County Generation Facility, is enclosed. This FOP constitutes authority to operate the emission units identified in the FOP application.

All site operating permits are subject to public petition for 60 days following the expiration of the 45-day U.S. Environmental Protection Agency (EPA) review. The public petition period for the FOP extends from September 5, 2009 until November 3, 2009. If the EPA receives a valid petition and objects to the above-referenced permit, you will be notified promptly by the Texas Commission on Environmental Quality (TCEQ).

It should be noted that from the date of this letter Brazos Electric Power Cooperative, Inc., Jack County Generation Facility, must operate in accordance with the requirements of Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122) and the FOP. Some of the terms and conditions contained in the FOP include recordkeeping conditions, reporting conditions (which includes deviation reporting), and compliance certification conditions. All reports, along with any questions regarding the reports, shall be forwarded to the TCEQ Abilene Regional Office, 1977 Industrial Boulevard, Abilene, Texas 79602-7833.

Consistent with 30 TAC Chapter 122, Subchapter C, the permit holder shall submit an application to the Air Permits Division (APD) for a revision to an FOP for those activities at a site which change, add, or remove one or more FOP terms or conditions. The permit holder shall also submit an application to the APD for a revision to a permit to address the following: the adoption of an applicable requirement previously designated as federally enforceable only; the promulgation of a new applicable requirement; the adoption of a new state-only requirement; or a change in a state-only designation.

Thank you again for your cooperation in this matter. If you have questions concerning the review or this notice, please contact Mr. Alfredo Mendoza, P.E., at (512) 239-1335.

This action is taken under authority delegated by the Executive Director of the TCEQ.

Sincerely,

Steve Hagle, P.E., Director
Air Permits Division
Office of Permitting and Registration
Texas Commission on Environmental Quality

SH/AM/pg

cc: Mr. Mike Meyers, Environmental Manager, Brazos Electric Power Cooperative, Inc., Waco
Air Section Manager, Region 3 - Abilene

Enclosure: Effective Permit

cc: Air Permit Section Chief, U.S. Environmental Protection Agency, Region 6, Dallas

Project Number: 13334

# FEDERAL OPERATING PERMIT

A FEDERAL OPERATING PERMIT IS HEREBY ISSUED TO

Brazos Electric Power Cooperative, Inc.

AUTHORIZING THE OPERATION OF

Jack County Generation Facility
Electric Services

LOCATED AT

Jack County, Texas

Latitude 33° 06' 11" Longitude 097° 57' 28"

Regulated Entity Number: RN100221985

This permit is issued in accordance with and subject to the Texas Clean Air Act (TCAA), Chapter 382 of the Texas Health and Safety Code and Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122), Federal Operating Permits. Under 30 TAC Chapter 122, this permit constitutes the permit holder's authority to operate the site, emission units, and affected sources listed in this permit. Operations of the site, emission units, and affected sources listed in this permit are subject to all additional rules or amended rules and orders of the Commission pursuant to the TCAA.

This permit does not relieve the permit holder from the responsibility of obtaining New Source Review authorization for new, modified, or existing facilities in accordance with 30 TAC Chapter 116, Control of Air Pollution by Permits for New Construction or Modification.

The site, emission units, and affected sources authorized by this permit shall be operated in accordance with 30 TAC Chapter 122, the general terms and conditions, special terms and conditions, and attachments contained herein.

This permit shall expire five years from the date of issuance. The renewal requirements specified in 30 TAC § 122.241 must be satisfied in order to renew the authorization to operate the site, emission units, and affected sources.

Permit No: O2169 Issuance Date: September 28, 2009

For the Commission

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## GENERAL TERMS AND CONDITIONS

The permit holder shall comply with all terms and conditions contained in 30 TAC § 122.143 (General Terms and Conditions), 30 TAC § 122.144 (Recordkeeping Terms and Conditions), 30 TAC § 122.145 (Reporting Terms and Conditions), and 30 TAC § 122.146 (Compliance Certification Terms and Conditions).

If the permit holder chooses to demonstrate that this permit is no longer required, a written request to void this permit shall be submitted to the Texas Commission on Environmental Quality (TCEQ) by the Responsible Official in accordance with 30 TAC § 122.161(e). The permit holder shall comply with the permit's requirements, including compliance certification and deviation reporting, until notified by the TCEQ that this permit is voided.

The permit holder shall comply with 30 TAC Chapter 116 by obtaining a New Source Review authorization prior to new construction or modification of emission units located in the area covered by this permit.

All reports required by this permit shall be forwarded as one original and one copy to the TCEQ Regional Office for your site. Reports submitted must include a cover letter which identifies the following information: company name, TCEQ regulated entity number, site name, area name (if applicable), and Air Permits Division permit number.

## SPECIAL TERMS AND CONDITIONS:

**Emission Limitations and Standards, Monitoring and Testing, and Recordkeeping and Reporting:**

1. Permit holder shall comply with the following requirements:

   A. Emission units (including groups and processes) in the Applicable Requirements Summary attachment shall meet the limitations, standards, equipment specifications, monitoring, recordkeeping, reporting, testing, and other requirements listed in the Applicable Requirements Summary attachment to assure compliance with the permit.

   B. The textual description in the column titled "Textual Description" in the Applicable Requirements Summary attachment is not enforceable and is not deemed as a substitute for the actual regulatory language. The Textual Description is provided for information purposes only.

   C. A citation listed on the Applicable Requirements Summary attachment, which has a notation [G] listed before it, shall include the referenced section and subsection for all commission rules, or paragraphs for all federal and state regulations and all subordinate paragraphs, subparagraphs and clauses, subclauses, and items contained within the referenced citation as applicable requirements.

2. The permit holder shall comply with the following sections of 30 TAC Chapter 101 (General Air Quality Rules):

A. Title 30 TAC § 101.1 (relating to Definitions), insofar as the terms defined in this section are used to define the terms used in other applicable requirements

B. Title 30 TAC § 101.3 (relating to Circumvention)

C. Title 30 TAC § 101.8 (relating to Sampling), if such action has been requested by the TCEQ

D. Title 30 TAC § 101.9 (relating to Sampling Ports), if such action has been requested by the TCEQ

E. Title 30 TAC § 101.10 (relating to Emissions Inventory Requirements)

F. Title 30 TAC § 101.201 (relating to Emission Event Reporting and Recordkeeping Requirements)

G. Title 30 TAC § 101.211 (relating to Scheduled Maintenance, Start-up, and Shutdown Reporting and Recordkeeping Requirements)

H. Title 30 TAC § 101.221 (relating to Operational Requirements)

I. Title 30 TAC § 101.222 (relating to Demonstrations)

J. Title 30 TAC § 101.223 (relating to Actions to Reduce Excessive Emissions)

3. Permit holder shall comply with the following requirements of 30 TAC Chapter 111:

A. For stationary vents with a flow rate of less than 100,000 actual cubic feet per minute and constructed after January 31, 1972, that are not listed in the Applicable Requirements Summary attachment, the permit holder shall comply with the following requirements:

(i) Title 30 TAC § 111.111(a)(1)(B) (relating to Requirements for Specified Sources)

(ii) Title 30 TAC § 111.111(a)(1)(E)

(iii) Title 30 TAC §§ 111.111(a)(1)(F)(i), (ii), (iii), or (iv)

(iv) For emission units with vent emissions subject to 30 TAC § 111.111(a)(1)(B), complying with 30 TAC §§ 111.111(a)(1)(F)(ii), (iii), or (iv), and capable of producing visible emissions from (but not limited to) particulate matter, acid gases, and $NO_x$, the permit holder shall also comply with the following periodic monitoring requirements for the purpose of annual compliance certification under 30 TAC § 122.146.

These periodic monitoring requirements do not apply to vents that do not emit visible emissions such as vents that emit only VOC or vents that provide passive ventilation, such as plumbing vents; or vents that are subject to the emission limitation of 30 TAC § 111.111(a)(1)(B) and Compliance Assurance Monitoring, as specified in the attached "Applicable Requirements Summary" and "Additional Monitoring Requirements:"

1. An observation of stationary vents from emission units in operation shall be conducted at least once during each calendar quarter unless the emission unit is not operating for the entire quarter.

2. For stationary vents from a combustion source, if an alternative to the normally fired fuel is fired for a period greater than or equal to 24 consecutive hours, the permit holder shall conduct an observation of the stationary vent for each such period to determine if visible emissions are present. If such period is greater than three months, observations shall be conducted once during each quarter. Supplementing the normally fired fuel with natural gas or fuel gas to increase the net heating value to the minimum required value does not constitute creation of an alternative fuel.

3. Records of all observations shall be maintained.

4. Visible emissions observations of emission units operated during daylight hours shall be conducted no earlier than one hour after sunrise and no later than one hour before sunset. Visible emissions observations of emission units operated only at night must be made with additional lighting and the temporary installation of contrasting backgrounds. Visible emissions observations shall be made during times when the activities described in 30 TAC § 111.111(a)(1)(E) are not taking place. Visible emissions shall be determined with each stationary vent in clear view of the observer. The observer shall be at least 15 feet, but not more than 0.25 mile, away from each stationary vent during the observation. For outdoor locations, the observer shall select a position where the sun is not directly in the observer's eyes. When condensed water vapor is present within the plume, as it emerges from the emissions outlet, observations must be made beyond the point in the plume at which condensed water vapor is no longer visible. When water vapor within the plume condenses and becomes visible at a distance from the emissions outlet, the observation shall be evaluated at the outlet prior to condensation of water vapor. A certified opacity reader is not required for visible emissions observations.

5. Compliance Certification:

(a) If visible emissions are not present during the observation, the RO may certify that the source is in compliance with the applicable opacity requirement in 30 TAC §§ 111.111(a)(1) and (a)(1)(B).

(b) However, if visible emissions are present during the observation, the permit holder shall either list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2) or conduct the appropriate opacity test specified in 30 TAC § 111.111(a)(1)(F) to determine if the source is in compliance with the opacity requirements. If an opacity test is performed and the source is determined to be in compliance, the RO may certify that the source is in compliance with the applicable opacity requirement. However, if an opacity test is performed and the source is determined to be out of compliance, the permit holder shall list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2). The opacity test must be performed by a certified opacity reader.

(c) Some vents may be subject to multiple visible emission or monitoring requirements. All credible data must be considered when certifying compliance with this requirement even if the observation or monitoring was performed to demonstrate compliance with a different requirement.

B. For visible emissions from a building, enclosed facility, or other structure; the permit holder shall comply with the following requirements:

(i) Title 30 TAC § 111.111(a)(7)(A) (relating to Requirements for Specified Sources)

(ii) Title 30 TAC §§ 111.111(a)(7)(B)(i) or (ii)

(iii) For a building containing an air emission source, enclosed facility, or other structure containing or associated with an air emission source subject to 30 TAC § 111.111(a)(7)(A), complying with 30 TAC § 111.111(a)(7)(B)(i) or (ii), and capable of producing visible emissions from (but not limited to) particulate matter, acid gases, and $NO_x$, the permit holder shall also comply with the following periodic monitoring requirements for the purpose of annual compliance certification under 30 TAC § 122.146:

1. An observation of visible emissions from a building containing an air emission source, enclosed facility, or other structure containing or associated with an air emission source which is required to comply with 30 TAC § 111.111(a)(7)(A) shall be conducted at least once during each calendar quarter unless the air emission source or enclosed facility is not operating for the entire quarter.

2. Records of all observations shall be maintained.

3. Visible emissions observations of air emission sources or enclosed facilities operated during daylight hours shall be conducted no earlier than one hour after sunrise and no later than one hour before sunset. Visible emissions observations of air emission sources or enclosed facilities operated only at night must be made with additional lighting and the temporary installation of contrasting backgrounds. Visible emissions shall be determined with each emissions outlet in clear view of the observer. The observer shall be at least 15 feet, but not more than 0.25 mile, away from each emissions outlet during the observation. For outdoor locations, the observer shall select a position where the sun is not directly in the observer's eyes. When condensed water vapor is present within the plume, as it emerges from the emissions outlet, observations must be made beyond the point in the plume at which condensed water vapor is no longer visible. When water vapor within the plume condenses and becomes visible at a distance from the emissions outlet, the observation shall be evaluated at the outlet prior to condensation of water vapor. A certified opacity reader is not required for visible emissions observations.

4. Compliance Certification:

   (a) If visible emissions are not present during the observation, the RO may certify that the source is in compliance with the applicable opacity requirement in 30 TAC §§ 111.111(a)(7) and (a)(7)(A).

   (b) However, if visible emissions are present during the observation, the permit holder shall either list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2) or conduct the appropriate opacity test specified in 30 TAC § 111.111(a)(7)(B) to determine if the source is in compliance with the opacity requirements. If an opacity test is performed and the source is determined to be in compliance, the RO may certify that the source is in compliance with the applicable opacity requirement. However, if an opacity test is performed and the source is determined to be out of compliance, the permit holder shall

list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2). The opacity test must be performed by a certified opacity reader.

C. Certification of opacity readers determining opacities under Method 9 (as outlined in 40 CFR Part 60, Appendix A) to comply with opacity monitoring requirements shall be accomplished by completing the Visible Emissions Evaluators Course, or approved agency equivalent, no more than 180 days before the opacity reading.

D. For emission units with contributions from uncombined water, the permit holder shall comply with the requirements of 30 TAC § 111.111(b).

E. Emission limits on nonagricultural processes, except for the steam generators specified in 30 TAC § 111.153, shall comply with the following requirements:

(i) Emissions of PM from any source may not exceed the allowable rates as required in 30 TAC § 111.151(a) (relating to Allowable Emissions Limits)

(ii) Sources with an effective stack height ($h_e$) less than the standard effective stack height ($H_e$), must reduce the allowable emission level by multiplying it by $[h_e/H_e]^2$ as required in 30 TAC § 111.151(b)

(iii) Effective stack height shall be calculated by the equation specified in 30 TAC § 111.151(c)

F. Permit holder shall comply with the following requirements for steam generators:

(i) Emissions from any solid fuel-fired steam generator may not exceed 0.3 pound of TSP per MMBtu of heat input, averaged over a two-hour period, as required in 30 TAC § 111.153(b) (relating to Emissions Limits for Steam Generators)

4. The permit holder shall comply with the following requirements for units subject to any subpart of 40 CFR Part 60, unless otherwise stated in the applicable subpart:

A. Title 40 CFR § 60.7 (relating to Notification and Recordkeeping)

B. Title 40 CFR § 60.8 (relating to Performance Tests)

C. Title 40 CFR § 60.11 (relating to Compliance with Standards and Maintenance Requirements)

D. Title 40 CFR § 60.12 (relating to Circumvention)

E. Title 40 CFR § 60.13 (relating to Monitoring Requirements)

F. Title 40 CFR § 60.14 (relating to Modification)

G. Title 40 CFR § 60.15 (relating to Reconstruction)

H. Title 40 CFR § 60.19 (relating to General Notification and Reporting Requirements)

**Additional Monitoring Requirements**

5. Unless otherwise specified, the permit holder shall comply with the compliance assurance monitoring requirements as specified in the attached "CAM Summary" upon issuance of the permit. In addition, the permit holder shall comply with the following:

   A. The permit holder shall comply with the terms and conditions contained in 30 TAC § 122.147 (General Terms and Conditions for Compliance Assurance Monitoring).

   B. The permit holder shall report, consistent with the averaging time identified in the "CAM Summary," deviations as defined by the deviation limit in the "CAM Summary." Any monitoring data below a minimum limit or above a maximum limit, that is collected in accordance with the requirements specified in 40 CFR § 64.7(c), shall be reported as a deviation. Deviations shall be reported according to 30 TAC § 122.145 (Reporting Terms and Conditions).

   C. The permit holder may elect to collect monitoring data on a more frequent basis and average the data, consistent with the averaging time specified in the "CAM Summary," for purposes of determining whether a deviation has occurred. However, the additional data points must be collected on a regular basis. In no event shall data be collected and used in particular instances in order to avoid reporting deviations. All monitoring data shall be collected in accordance with the requirements specified in 40 CFR § 64.7(c).

   D. The permit holder shall operate the monitoring, identified in the attached "CAM Summary," in accordance with the provisions of 40 CFR § 64.7.

6. The permit holder shall comply with the periodic monitoring requirements as specified in the attached "Periodic Monitoring Summary" upon issuance of the permit. Except for, as applicable, monitoring malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments), the permit holder shall conduct all monitoring in continuous operation (or shall collect data at all required intervals) at all times that the pollutant-specific emissions unit is operating. The permit holder may elect to collect monitoring data on a more frequent basis and average the data, consistent with the averaging time specified in the "Periodic Monitoring Summary," for purposes of determining whether a deviation has occurred. However, the additional data points must be collected on a regular basis. In no event shall data be collected and used in particular instances to avoid reporting deviations. Deviations shall be reported according to 30 TAC § 122.145 (Reporting Terms and Conditions).

**New Source Review Authorization Requirements**

7. Permit holder shall comply with the requirements of New Source Review authorizations issued or claimed by the permit holder for the permitted area, including permits, permits by rule, standard permits, flexible permits, special permits, permits for existing facilities including Voluntary Emissions Reduction Permits and Electric Generating Facility Permits issued under 30 TAC Chapter 116, Subchapter I, or special exemptions referenced in the New Source Review Authorization References attachment. These requirements:

   A. Are incorporated by reference into this permit as applicable requirements

   B. Shall be located with this operating permit

   C. Are not eligible for a permit shield

8. The permit holder shall comply with the general requirements of 30 TAC Chapter 106, Subchapter A or the general requirements, if any, in effect at the time of the claim of any PBR.

**Compliance Requirements**

9. The permit holder shall certify compliance with all permit terms and conditions using, at a minimum (but not limited to) the continuous or intermittent compliance method data from monitoring, recordkeeping, reporting, or testing required by the permit and any other credible evidence or information. The certification period may not exceed 12 months and the certification must be submitted within 30 days after the end of the period being certified.

10. Use of Discrete Emission Credits to Comply with Applicable Requirements:

   A. Unless other wise prohibited, the permit holder may use discrete emission credits to comply with the following applicable requirements listed elsewhere in this permit:

      (i) Title 30 TAC Chapter 115

      (ii) Title 30 TAC Chapter 117

      (iii) If applicable, offsets for 30 TAC Chapter 116

      (iv) Temporarily exceed state NSR permit allowables

   B. The permit holder shall comply with the following requirements in order to use the credit to comply with the applicable requirements:

(i) The permit holder must notify the TCEQ according to 30 TAC § 101.376(d)

(ii) The discrete emission credits to be used must meet all the geographic, timeliness, applicable pollutant type, and availability requirements listed in 30 TAC Chapter 101, Subchapter H, Division 4

(iii) The executive director has approved the use of the discrete emission credits according to 30 TAC § 101.376(d)(1)(A)

(iv) The permit holder keeps records of the use of credits towards compliance with the applicable requirements in accordance with 30 TAC § 101.372(h) and 30 TAC Chapter 122

**Protection of Stratospheric Ozone**

11. Permit holders at a site subject to Title VI of the FCAA Amendments shall meet the following requirements for protection of stratospheric ozone:

A. Any on-site servicing, maintenance, and repair on refrigeration and nonmotor vehicle air-conditioning appliances using ozone-depleting refrigerants or non-exempt substitutes shall be conducted in accordance with 40 CFR Part 82, Subpart F. Permit holders shall ensure that repairs on or refrigerant removal from refrigeration and nonmotor vehicle air-conditioning appliances using ozone-depleting refrigerants are performed only by properly certified technicians using certified equipment. Records shall be maintained as required by 40 CFR Part 82, Subpart F.

**Permit Location**

12. The permit holder shall maintain a copy of this permit and records related to requirements listed in this permit on-site.

**Permit Shield (30 TAC § 122.148)**

13. A permit shield is granted for the emission units, groups, or processes specified in the attached "Permit Shield." Compliance with the conditions of the permit shall be deemed compliance with the specified potentially applicable requirements or specified potentially applicable state-only requirements listed in the attachment "Permit Shield." Permit shield provisions shall not be modified by the executive director until notification is provided to the permit holder. No later than 90 days after notification of a change in a determination made by the executive director, the permit holder shall apply for the appropriate permit revision to reflect the new determination. Provisional terms are not eligible for this permit shield. Any term or condition, under a permit shield, shall not be protected by the permit shield if it is replaced by a provisional term or condition or the basis of the term and condition changes.

**Acid Rain Permit Requirements**

14. For units CT-1, CT-2, CT-3, and CT-4 (identified in the Certificate of Representation as CT-1, CT-2, CT-3, and CT-4), located at the affected source identified by ORIS/Facility code 55230, the designated representative and the owner or operator, as applicable, shall comply with the following Acid Rain Permit requirements.

A. General Requirements

(i) Under 30 TAC § 122.12(1) and 40 CFR Part 72, the Acid Rain Permit requirements contained here are a separable portion of the Federal Operating Permit (FOP) and have an independent public comment process which may be separate from, or combined with the FOP.

(ii) The owner and operator shall comply with the requirements of 40 CFR Part 72 and 40 CFR Part 76. Any noncompliance with the Acid Rain Permit will be considered noncompliance with the FOP and may be subject to enforcement action.

(iii) The owners and operators of the affected source shall operate the source and the unit in compliance with the requirements of this Acid Rain Permit and all other applicable State and federal requirements.

(iv) The owners and operators of the affected source shall comply with the General Terms and Conditions of the FOP that incorporates this Acid Rain Permit.

(v) The term for the Acid Rain permit shall commence with the issuance of the FOP that incorporates the Acid Rain permit and shall be run concurrent with the remainder of the term of the FOP. Renewal of the Acid Rain permit shall coincide with the renewal of the FOP that incorporates the Acid Rain permit and subsequent terms shall be no more than five years from the date of renewal of the FOP and run concurrent with the permit term of the FOP.

B. Monitoring Requirements

(i) The owners and operators, and the designated representative, of the affected source and each affected unit at the source shall comply with the monitoring requirements contained 40 CFR Part 75.

(ii) The emissions measurements recorded and reported in accordance with 40 CFR Part 75 and any other credible evidence shall be used to determine compliance by the affected source with the acid rain emissions limitations and emissions reduction requirements for $SO_2$ and $NO_x$ under the ARP.

(iii) The requirements of 40 CFR Part 75 shall not affect the responsibility of the owners and operators to monitor emission of other pollutants or other emissions characteristics at the unit under other applicable requirements of the FCAA Amendments (42 U.S.C. 7401, as amended November 15, 1990) and other terms and conditions of the operating permit for the source.

C. $SO_2$ emissions requirements

(i) The owners and operators of each source and each affected unit at the source shall comply with the applicable acid rain emissions limitations for $SO_2$.

(ii) As of the allowance transfer deadline the owners and operators of the affected source and each affected unit at the source shall hold, in the units's compliance subaccount, allowances in an amount not less than the total annual emissions of $SO_2$ for the previous calendar year.

(iii) Each ton of $SO_2$ emitted in excess of the acid rain emissions limitations for $SO_2$ shall constitute a separate violation of the FCAA amendments.

(iv) An affected unit shall be subject to the requirements under (i) and (ii) of the $SO_2$ emissions requirements as follows:

1. Starting January 1, 2000, an affected unit under 40 CFR § 72.6(a)(2); or

2. Starting on the later of January 1, 2000, or the deadline for monitor certification under 40 CFR Part 75, an affected unit under 40 CFR § 72.6(a)(3).

(v) Allowances shall be held in, deducted from, or transferred into or among Allowance Tracking System accounts in accordance with the requirements of the ARP.

(vi) An allowance shall not be deducted, for compliance with the requirements of this permit, in a calendar year before the year for which the allowance was allocated.

(vii) An allowance allocated by the EPA Administrator or under the ARP is a limited authorization to emit $SO_2$ in accordance with the ARP. No provision of the ARP, Acid Rain permit application, this Acid Rain Permit, or an exemption under 40 CFR §§ 72.7 or 72.8 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.

(viii) An allowance allocated by the EPA Administrator under the ARP does not constitute a property right.

D. $NO_x$ Emission Requirements

(i) The owners and operators of the source and each affected unit at the source shall comply with the applicable acid rain emissions limitations for $NO_x$ under 40 CFR Part 76.

E. Excess emissions requirements for $SO_2$ and $NO_x$.

(i) The designated representative of an affected unit that has excess emissions in any calendar year shall submit a proposed offset plan, as required under 40 CFR Part 77.

(ii) If an affected source has excess emissions in any calendar year shall, as required by 40 CFR Part 77:

1. Pay, without demand, the penalty required and pay, upon demand, the interest on that penalty.

2. Comply with the terms of an approved offset plan.

F. Recordkeeping and Reporting Requirements

(i) Unless otherwise provided, the owners and operators of the affected source and each affected unit at the source shall keep on-site at the source each of the following documents for a period of five years from the date the document is created. This period may be extended for cause, at any time before the end of five years, in writing by the permitting authority or the EPA Administrator.

1. The certificate of representation for the designated representative for the source and each affected unit and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR § 72.24; provided that the certificate and documents shall be retained on-site at the source beyond such five-year period until such documents are superseded because of the submission of a new certificate of representation changing the designated representative.

2. All emissions monitoring information, in accordance with 40 CFR Part 75, provided that to the extent that 40 CFR Part 75 provides for a three-year period for recordkeeping (rather than a five-year period cited in 30 TAC § 122.144), the three-year period shall apply.

3. Copies of all reports, compliance certifications, and other submissions and all records made or required under the ARP or relied upon for compliance certification.

4. Copies of all documents used to complete a acid rain permit application and any other submission under the ARP or to demonstrate compliance with the requirements of the ARP.

(ii) The designated representative of an affected source and each affected unit at the source shall submit the reports required under the ARP including those under 40 CFR Part 72, Subpart I and 40 CFR Part 75.

G. Liability

(i) Any person who knowingly violates any requirement or prohibition of the ARP, a complete acid rain permit application, an acid rain permit, or a written exemption under 40 CFR §§ 72.7 or 72.8, including any requirement for the payment of any penalty owed to the United States, shall be subject to enforcement pursuant to FCAA § 113(c).

(ii) Any person who knowingly makes a false, material statement in any record, submission, or report under the ARP shall be subject to criminal enforcement pursuant to FCAA § 113(c) and 18 U.S.C. 1001.

(iii) No permit revision shall excuse any violation of the requirements of the ARP that occurs prior to the date that the revision takes effect.

(iv) The affected source and each affected unit shall meet the requirements of the ARP contained in 40 CFR Parts 72 through 78.

(v) Any provision of the ARP that applies to an affected source or the designated representative of an affected source shall also apply to the owners and operators of such source and of the affected units at the source.

(vi) Any provision of the ARP that applies to an affected unit (including a provision applicable to the DR of an affected unit) shall also apply to the owners and operators of such unit. Except as provided under 40 CFR § 72.44 (Phase II repowering extension plans) and 40 CFR § 76.11 ($NO_x$ averaging plans), and except with regard to the requirements applicable to units with a common stack under 40 CFR Part 75 (including 40 CFR §§ 75.16, 75.17, and 75.18), the owners and operators and the DR of one affected unit shall not be liable for any violation by any other affected unit of which they are not owners or operators or the DR and that is located at a source of which they are not owners or operators or the DR.

(vii) Each violation of a provision of 40 CFR Parts 72, 73, 74, 75, 76, 77, and 78 by an affected source or affected unit, or by an owner or operator or DR of such source or unit, shall be a separate violation of the FCAA Amendments.

H. Effect on other authorities. No provision of the ARP, an acid rain permit application, an acid rain permit, or an exemption under 40 CFR §§ 72.7 or 72.8 shall be construed as:

(i) Except as expressly provided in Title IV of the FCAA Amendments, exempting or excluding the owners and operators and, to the extent applicable, the DR of an affected source or affected unit from compliance with any other provision of the FCAA Amendments, including the provisions of Title I of the FCAA Amendments relating to applicable National Ambient Air Quality Standards or State Implementation Plans

(ii) Limiting the number of allowances a unit can hold; *provided*, that the number of allowances held by the unit shall not affect the source's obligation to comply with any other provisions of the FCAA Amendments

(iii) Requiring a change of any kind in any state law regulating electric utility rates and charges, affecting any state law regarding such state regulation, or limiting such state regulation, including any prudence review requirements under such state law

(iv) Modifying the Federal Power Act or affecting the authority of the Federal Energy Regulatory Commission under the Federal Power Act; or,

(v) Interfering with or impairing any program for competitive bidding for power supply in a state in which such program is established

I. The number of $SO_2$ allowances allocated by the EPA in 40 CFR Part 73 is enforceable only by the EPA Administrator.

**Clean Air Interstate Rule Permit Requirements**

15. For units CT-1, CT-2, CT-3, and CT-4 (identified in the Certificate of Representation as CT-1, CT-2, CT-3, and CT-4), located at the site identified by ORIS/Facility code 55230, the designated representative and the owner or operator, as applicable, shall comply with the following Clean Air Interstate Rule (CAIR) Permit requirements. Until approval of the Texas CAIR SIP by EPA, the permit holder shall comply with the equivalent requirements of 40 CFR Part 97 in place of the referenced 40 CFR Part 96 requirements in the Texas CAIR permit and 30 TAC Chapter 122 requirements.

A. General Requirements

(i) Under 30 TAC § 122.420(b) and 40 CFR §§ 96.120(b) and 96.220(b) the CAIR Permit requirements contained here are a separable portion of the Federal Operating Permit (FOP).

(ii) The owners and operators of the CAIR $NO_x$ and the CAIR $SO_2$ source shall operate the source and the unit in compliance with the requirements of this CAIR permit and all other applicable State and federal requirements.

(iii) The owners and operators of the CAIR $NO_x$ and the CAIR $SO_2$ source shall comply with the General Terms and Conditions of the FOP that incorporates this CAIR Permit.

(iv) The term for the initial CAIR permit shall commence with the issuance of the revision containing the CAIR permit and shall be the remaining term for the FOP that incorporates the CAIR permit. Renewal of the initial CAIR permit shall coincide with the renewal of the FOP that incorporates the CAIR permit and subsequent terms shall be no more than five years from the date of renewal of the FOP and run concurrent with the permit term of the FOP.

B. Monitoring and Reporting Requirements

(i) The owners and operators, and the CAIR designated representative, of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements contained 40 CFR Part 96, Subpart HH.

(ii) The owners and operators, and the CAIR designated representative, of the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements contained 40 CFR Part 96, Subpart HHH.

(iii) The emissions measurements recorded and reported in accordance with 40 CFR Part 96, Subpart HH and any other credible evidence shall be used to determine compliance by the CAIR $NO_x$ source with the CAIR $NO_x$ emissions limitation.

(iv) The emissions measurements recorded and reported in accordance with 40 CFR Part 96, Subpart HHH and any other credible evidence shall be used to determine compliance by the CAIR $SO_2$ source with the CAIR $SO_2$ emissions limitation.

C. $NO_x$ emissions requirements

(i) As of the allowance transfer deadline for a control period, the owners and operators of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source shall hold, in the source's compliance account, CAIR $NO_x$ allowances available for compliance deductions for the control period under 40 CFR §96.154(a) in an amount not less than the tons of total nitrogen oxides emissions for the control period from all CAIR $NO_x$ units at the source, as determined in accordance the requirements 40 CFR Part 96, Subpart HH.

(ii) A CAIR $NO_x$ unit shall be subject to the requirements of paragraph C(i) of this CAIR Permit starting on the later of January 1, 2009, or the deadline for meeting the unit's monitor certification requirements under 40 CFR §§ 96.170(b)(1), (2), or (5).

(iii) A CAIR $NO_x$ allowance shall not be deducted, for compliance with the requirements of this permit, for a control period in a calendar year before the year for which the CAIR $NO_x$ allowance was allocated.

(iv) CAIR $NO_x$ allowances shall be held in, deducted from, or transferred into or among CAIR $NO_x$ Allowance Tracking System accounts in accordance with the requirements of 40 CFR Part 96, Subpart FF or Subpart GG.

(v) A CAIR $NO_x$ allowance is a limited authorization to emit one ton of nitrogen oxides in accordance with the CAIR $NO_x$ Annual Trading Program. No provision of the CAIR $NO_x$ Annual Trading Program, the CAIR permit application, the CAIR permit, or an exemption under 40 CFR § 96.105 and no provision of law shall be construed to limit the authority of the State or the United States to terminate or limit such authorization.

(vi) A CAIR $NO_x$ allowance does not constitute a property right.

(vii) Upon recordation by the Administrator under 40 CFR Part 96, Subpart FF or Subpart GG, every allocation, transfer, or deduction of a CAIR $NO_x$ allowance to or from a CAIR $NO_x$ unit's compliance account is incorporated automatically in this CAIR permit.

D. $NO_x$ excess emissions requirements

(i) If a CAIR $NO_x$ source emits nitrogen oxides during any control period in excess of the CAIR $NO_x$ emissions limitation, the owners and operators of the source and each CAIR $NO_x$ unit at the source shall surrender the CAIR $NO_x$ allowances required for deduction under 40 CFR § 96.154(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law.

(ii) Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 40 CFR Part 96, Subpart AA, the Clean Air Act, and applicable State law.

E. $SO_2$ emissions requirements

(i) As of the allowance transfer deadline for a control period, the owners and operators of the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall hold, in the source's compliance account, CAIR $SO_2$ allowances available for compliance deductions for the control period under 40 CFR § 96.254(a) and (b) in an amount not less than the tons of total sulfur dioxides emissions for the control period from all CAIR $SO_2$ units at the source, as determined in accordance the requirements 40 CFR Part 96, Subpart HHH.

(ii) A CAIR $SO_2$ unit shall be subject to the requirements of paragraph E(i) of this CAIR Permit starting on the later of January 1, 2010, or the deadline for meeting the unit's monitor certification requirements under 40 CFR § 96.270(b)(1), (2), or (5).

(iii) A CAIR $SO_2$ allowance shall not be deducted, for compliance with the requirements of this permit, for a control period in a calendar year before the year for which the CAIR $SO_2$ allowance was allocated.

(iv) CAIR $SO_2$ allowances shall be held in, deducted from, or transferred into or among CAIR $SO_2$ Allowance Tracking System accounts in accordance with the requirements of 40 CFR Part 96, Subpart FFF or Subpart GGG.

(v) A CAIR $SO_2$ allowance is a limited authorization to emit sulfur dioxide in accordance with the CAIR $SO_2$ Trading Program. No provision of the CAIR $SO_2$ Trading Program, the CAIR permit application, the CAIR permit, or an exemption under 40 CFR § 96.205 and no provision of law shall be construed to limit the authority of the State or the United States to terminate or limit such authorization.

(vi) A CAIR $SO_2$ allowance does not constitute a property right.

(vii) Upon recordation by the Administrator under 40 CFR Part 96, Subpart FFF or Subpart GGG, every allocation, transfer, or deduction of a CAIR $SO_2$ allowance to or from a CAIR $SO_2$ unit's compliance account is incorporated automatically in this CAIR permit.

F. $SO_2$ excess emissions requirements

(i) If a CAIR $SO_2$ source emits sulfur dioxides during any control period in excess of the CAIR $SO_2$ emissions limitation, the owners and operators of the source and each CAIR $SO_2$ unit at the source shall surrender the CAIR $SO_2$ allowances required for deduction under

40 CFR § 96.254(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law.

(ii) Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 40 CFR Part 96, Subpart AAA, the Clean Air Act, and applicable State law.

G. Recordkeeping and Reporting Requirements

(i) Unless otherwise provided, the owners and operators of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source and the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall keep on-site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time before the end of 5 years, in writing by the permitting authority or the Administrator.

1. The certificate of representation under 40 CFR §§ 96.113 and 96.213 for the CAIR $NO_x$ designated representative for the source and each CAIR $NO_x$ unit and the CAIR $SO_2$ designated representative for the source and each CAIR $SO_2$ unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation; provided that the certificate and documents shall be retained on-site at the source beyond such five-year period until such documents are superseded because of the submission of a new certificate of representation under 40 CFR §§ 96.113 and 96.213 changing the CAIR designated representative.

2. All emissions monitoring information, in accordance with 40 CFR Part 96, Subpart HH and Subpart HHH, provided that to the extent that these subparts provide for a three-year period for recordkeeping, the three-year period shall apply.

3. Copies of all reports, compliance certifications, and other submissions and all records made or required under the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program or relied upon for compliance determinations.

4. Copies of all documents used to complete a CAIR permit application and any other submission under the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program or to demonstrate compliance with the requirements of the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program.

(ii) The CAIR designated representative of a CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source and a CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall submit the reports required under the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program including those under 40 CFR Part 96, Subpart HH and Subpart HHH.

H. The CAIR $NO_x$ source and each CAIR $NO_x$ unit shall meet the requirements of the CAIR $NO_x$ Annual Trading Program contained in 40 CFR Part 96, Subparts AA through II.

I. The CAIR $SO_2$ source and each CAIR $SO_2$ unit shall meet the requirements of the CAIR $SO_2$ Trading Program contained in 40 CFR Part 96, Subparts AAA through III.

J. Any provision of the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program that applies to a CAIR $NO_x$ source or CAIR $SO_2$ source or the CAIR designated representative of a CAIR $NO_x$ source or CAIR $SO_2$ source shall also apply to the owners and operators of such source and the units at the source.

K. Any provision of the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program that applies to a CAIR $NO_x$ unit or CAIR $SO_2$ unit or the CAIR designated representative of a CAIR $NO_x$ unit or CAIR $SO_2$ unit shall also apply to the owners and operators of such unit.

L. No provision of the CAIR $NO_x$ Annual Trading Program, CAIR $SO_2$ Trading Program, a CAIR permit application, a CAIR permit, or an exemption under 40 CFR §§ 96.105 or 96.205 shall be construed as exempting or excluding the owners and operators, and the CAIR designated representative, of a CAIR $NO_x$ source or CAIR $NO_x$ unit or a CAIR $SO_2$ source or CAIR $SO_2$ unit from compliance with any other provision of the applicable, approved State implementation plan, a federally enforceable permit, or the Clean Air Act.

## ATTACHMENTS

Applicable Requirements Summary

Additional Monitoring Requirements

Permit Shield

New Source Review Authorization References

## Applicable Requirements Summary

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**Applicable Requirements Summary** ..... 23

Note: A "none" entry may be noted for some emission sources in this permit's "Applicable Requirements Summary" under the heading of "Monitoring and Testing Requirements" and/or "Recordkeeping Requirements" and/or "Reporting Requirements." Such a notation indicates that there are no requirements for the indicated emission source as identified under the respective column heading(s) for the stated portion of the regulation when the emission source is operating under the conditions of the specified SOP Index Number. However, other relevant requirements pursuant to 30 TAC Chapter 122 including Recordkeeping Terms and Conditions (30 TAC § 122.144), Reporting Terms and Conditions (30 TAC § 122.145), and Compliance Certification Terms and Conditions (30 TAC § 122.146) continue to apply.

## Unit Summary

| Unit/Group/ Process ID No. | Unit Type | Group/Inclusive Units | SOP Index No. | Regulation | Requirement driver |
|---|---|---|---|---|---|
| B-1 | Boilers/Steam Generators/Steam Generating Units | N/A | 60Dc-1 | 40 CFR Part 60, Subpart Dc | No changing attributes. |
| B-2 | Boilers/Steam Generators/Steam Generating Units | N/A | 60Dc-2 | 40 CFR Part 60, Subpart Dc | No changing attributes. |
| DG-2 | Stationary Reciprocating Int. Comb. Engines | N/A | 60IIII-1 | 40 CFR Part 60, Subpart IIII | No changing attributes. |
| HRSG-1 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-1 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-1 | Stationary Turbines | N/A | 60GG-1 | 40 CFR Part 60, Subpart GG | No changing attributes. |
| HRSG-2 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-1 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-2 | Stationary Turbines | N/A | 60GG-1 | 40 CFR Part 60, Subpart GG | No changing attributes. |
| HRSG-3 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-2 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-3 | Stationary Turbines | N/A | 60KKKK-1 | 40 CFR Part 60, Subpart KKKK | No changing attributes. |
| HRSG-4 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-2 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-4 | Stationary Turbines | N/A | 60KKKK-1 | 40 CFR Part 60, Subpart KKKK | No changing attributes. |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements (30 TAC § 122.144) | Reporting Requirements (30 TAC § 122.145) |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | | |
| B-1 | EU | 60Dc-1 | $SO_2$ | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-1 | EU | 60Dc-1 | PM | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-1 | EU | 60Dc-1 | PM (Opacity) | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | $SO_2$ | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | PM | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | PM (Opacity) | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |

# Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements | Reporting Requirements |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | (30 TAC § 122.144) | (30 TAC § 122.145) |
| HRSG-1 | EU | 60DA-1 | $NO_x$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-2 | EU | 60DA-1 | $NO_x$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-3 | EU | 60DA-2 | $NO_x$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-4 | EU | 60DA-2 | $NO_x$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements (30 TAC § 122.144) | Reporting Requirements (30 TAC § 122.145) |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | | |
| DG-2 | EU | 60IIII-1 | $NO_X$ | 40 CFR Part 60, Subpart IIII | § 60.4200(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart IIII |
| HRSG-1 | EU | 60GG-1 | $SO_2$ | 40 CFR Part 60, Subpart GG | § 60.333(a) | No stationary gas turbine shall cause to be discharged into the atmosphere any gases which contain sulfur dioxide in excess of 0.015% by volume at 15% $O_2$ dry basis. | § 60.334(h)<br>[G]§ 60.334(h)(3) | None | None |
| HRSG-1 | EU | 60GG-1 | $NO_X$ | 40 CFR Part 60, Subpart GG | § 60.332(a)(1)<br>§ 60.332(a)(3) | No owner or operator shall discharge into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of the amount as determined from the specified equation. | § 60.334(j)<br>§ 60.334(j)(1)<br>[G]§ 60.334(j)(1)(iii)<br>[G]§ 60.335(a)<br>§ 60.335(b)(2)<br>§ 60.335(b)(3)<br>** See CAM Summary | None | § 60.334(j)<br>§ 60.334(j)(5) |
| HRSG-2 | EU | 60GG-1 | $SO_2$ | 40 CFR Part 60, Subpart GG | § 60.333(a) | No stationary gas turbine shall cause to be discharged into the atmosphere any gases which contain sulfur dioxide in excess of 0.015% by volume at 15% $O_2$ dry basis. | § 60.334(h)<br>[G]§ 60.334(h)(3) | None | None |
| HRSG-2 | EU | 60GG-1 | $NO_X$ | 40 CFR Part 60, Subpart GG | § 60.332(a)(1)<br>§ 60.332(a)(3) | No owner or operator shall discharge into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of the amount as determined from the specified equation. | § 60.334(j)<br>§ 60.334(j)(1)<br>[G]§ 60.334(j)(1)(iii)<br>[G]§ 60.335(a)<br>§ 60.335(b)(2)<br>§ 60.335(b)(3)<br>** See CAM Summary | None | § 60.334(j)<br>§ 60.334(j)(5) |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition I.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements | Reporting Requirements |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | (30 TAC § 122.144) | (30 TAC § 122.145) |
| HRSG-3 | EU | 60KKKK-1 | $NO_x$ | 40 CFR Part 60, Subpart KKKK | § 60.4305 The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart KKKK |
| HRSG-4 | EU | 60KKKK-1 | $NO_x$ | 40 CFR Part 60, Subpart KKKK | § 60.4305 The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart KKKK |

## Additional Monitoring Requirements

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## CAM Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-1 | |
| Control Device ID No.: SCR1 | Control Device Type: Selective Catalytic Reduction (SCR) |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart GG | SOP Index No.: 60GG-1 |
| Pollutant: $NO_X$ | Main Standard: § 60.332(a)(1) |
| **MONITORING INFORMATION** | |
| Indicator: Nitrogen Oxides Concentration | |
| Minimum Frequency: four times per hour | |
| Averaging Period: one hour | |
| Deviation Limit: Maximum NOx concentration = 5 ppmvd (@ 15% oxygen) | |
| CAM Text: Use a continuous emission monitoring system (CEMS) to measure and record the concentration of nitrogen oxides and either oxygen or carbon dioxide in the exhaust stream of the control device. The CEMS shall be operated in accordance with the monitoring requirements of 40 CFR § 60.13 and the performance specifications of 40 CFR Part 60, Appendix B. NOx Emissions shall be corrected/calculated in units of the underlying applicable emission limitation (grams per horsepower-hour, pounds per MMBtu, pounds per hour). | |

## CAM Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-2 | |
| Control Device ID No.: SCR2 | Control Device Type: Selective Catalytic Reduction (SCR) |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart GG | SOP Index No.: 60GG-1 |
| Pollutant: $NO_X$ | Main Standard: § 60.332(a)(1) |
| **MONITORING INFORMATION** | |
| Indicator: Nitrogen Oxides Concentration | |
| Minimum Frequency: four times per hour | |
| Averaging Period: one hour | |
| Deviation Limit: Maximum NOx concentration = 5 ppmvd (@ 15% oxygen) | |
| CAM Text: Use a continuous emission monitoring system (CEMS) to measure and record the concentration of nitrogen oxides and either oxygen or carbon dioxide in the exhaust stream of the control device. The CEMS shall be operated in accordance with the monitoring requirements of 40 CFR § 60.13 and the performance specifications of 40 CFR Part 60, Appendix B. $NO_x$ Emissions shall be corrected/calculated in units of the underlying applicable emission limitation (grams per horsepower-hour, pounds per MMBtu, pounds per hour). | |

## Periodic Monitoring Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-1, HRSG-2, HRSG-3, HRSG-4 | |
| Control Device ID No.: N/A | Control Device Type: N/A |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart Da | SOP Index No.: 60DA-1, 60DA-2 |
| Pollutant: PM, PM(Opacity) | Main Standard: § 60.42Da(a)(1), § 60.42Da(b) |
| **MONITORING INFORMATION** | |
| Indicator: Fuel Type | |
| Minimum Frequency: N/A | |
| Averaging Period: N/A | |
| Deviation Limit: Fuel usage limited to pipeline-quality natural gas containing no more than 2.0 grains total sulfur per 100 dscf | |
| Periodic Monitoring Text: Record the type of fuel used by the unit. If an alternate fuel is fired, either alone or in combination with the specified gas, it shall be considered and reported as a deviation. | |

## Permit Shield

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## Permit Shield

The Executive Director of the TCEQ has determined that the permit holder is not required to comply with the specific regulation(s) identified for each emission unit, group, or process in this table.

| Unit/Group/Process | | Regulation | Basis of Determination |
|---|---|---|---|
| ID No. | Group/Inclusive Units | | |
| CP-2 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| CT-2 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| CV-1 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| DG-1 | N/A | 40 CFR Part 60, Subpart IIII | Generator engine constructed prior to 7/11/2005 |
| FWP-1 | N/A | 40 CFR Part 60, Subpart IIII | Fire water pump engine constructed prior to 7/11/2005 |
| GRP-CTV | CTV-1, CTV-10, CTV-2, CTV-3, CTV-4, CTV-5, CTV-6, CTV-7, CTV-8, CTV-9 | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| HRSG-1 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-1 | N/A | 40 CFR Part 60, Subpart Db | Facility is subject to NSPS Da and therefore is not subject to NSPS Db. |
| HRSG-1 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-1 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |
| HRSG-2 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-2 | N/A | 40 CFR Part 60, Subpart Db | Facility is subject to NSPS Da and therfore is not subject to NSPS Db. |
| HRSG-2 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-2 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |

## Permit Shield

The Executive Director of the TCEQ has determined that the permit holder is not required to comply with the specific regulation(s) identified for each emission unit, group, or process in this table.

| Unit/Group/Process | | Regulation | Basis of Determination |
|---|---|---|---|
| ID No. | Group/Inclusive Units | | |
| HRSG-3 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-3 | N/A | 40 CFR Part 60, Subpart Db | Source is subject to Subpart Da |
| HRSG-3 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-3 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |
| HRSG-4 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-4 | N/A | 40 CFR Part 60, Subpart Db | Source is subject to Subpart Da |
| HRSG-4 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-4 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |

## New Source Review Authorization References

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## New Source Review Authorization References

The New Source Review authorizations listed in the table below are applicable requirements under 30 TAC Chapter 122 and enforceable under this operating permit.

| PSD Permits | NA Permits |
|---|---|
| PSD Permit No.: PSDTX1026 | NA Permit No.: N/A |
| PSD Permit No.: PSDTX1117 | NA Permit No.: N/A |
| **Title 30 TAC Chapter 116 Permits, Special Permits, and Other Authorizations (Other Than Permits By Rule, PSD Permits, or NA Permits) for the Application Area.** | |
| Authorization No.: 52756 | Authorization No.: 83801 |
| **Permits By Rule (30 TAC Chapter 106) for the Application Area.** | |
| Number: 106.263 | Version No./Date: 11/01/2001 |
| **Municipal Solid Waste and Industrial Hazardous Waste Permits With an Air Addendum** | |
| Permit No.: N/A | Permit No.: N/A |

## New Source Review Authorization References by Emissions Unit

The following is a list of New Source Review (NSR) authorizations for emission units listed elsewhere in this operating permit. The NSR authorizations are applicable requirements under 30 TAC Chapter 122 and enforceable under this operating permit.

| Unit/Group/Process ID No. | Emission Unit Name /Description | New Source Review Authorization |
|---|---|---|
| B-1 | Aux Boiler 1 | 52756, PSDTX1026 |
| B-2 | Aux Boiler 2 | 83801, PSDTX1117 |
| CP-2 | Chiller No. 2 Cooling Tower Vents | 83801, PSDTX1117 |
| CT-2 | Cooling Tower No. 2 Vents | 83801, PSDTX1117 |
| CTV-10 | Cooling Tower Vent #10 | 52756, PSDTX1026 |
| CTV-1 | Cooling Tower Vent #1 | 52756, PSDTX1026 |
| CTV-2 | Cooling Tower Vent #2 | 52756, PSDTX1026 |
| CTV-3 | Cooling Tower Vent #3 | 52756, PSDTX1026 |
| CTV-4 | Cooling Tower Vent #4 | 52756, PSDTX1026 |
| CTV-5 | Cooling Tower Vent #5 | 52756, PSDTX1026 |
| CTV-6 | Cooling Tower Vent #6 | 52756, PSDTX1026 |
| CTV-7 | Cooling Tower Vent #7 | 52756, PSDTX1026 |
| CTV-8 | Cooling Tower Vent #8 | 52756, PSDTX1026 |
| CTV-9 | Cooling Tower Vent #9 | 52756, PSDTX1026 |
| CV-1 | Chiller Unit 1 | 52756, PSDTX1026 |
| DG-1 | Diesel Generator Engine 1 | 52756, PSDTX1026 |
| DG-2 | Emergency Diesel Generator Engine 2 | 83801, PSDTX1117 |
| FWP-1 | Diesel Fire Water Pump Engine | 52756, PSDTX1026 |
| HRSG-1 | Turbine/Duct Burner 1 | 52756, PSDTX1026 |
| HRSG-2 | Turbine/Duct Burner 2 | 52756, PSDTX1026 |
| HRSG-3 | Combined Cycle Turbine/Duct Burner 3 | 83801, PSDTX1117 |
| HRSG-4 | Combined Cycle Turbine/Duct Burner 4 | 83801, PSDTX1117 |

## APPENDIX A

Acronym List.....38

## Acronym List

The following abbreviations or acronyms may be used in this permit:

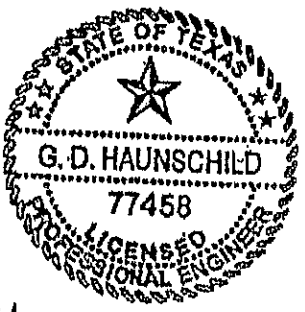
ACFM ..... actual cubic feet per minute
AMOC ..... alternate means of control
ARP ..... Acid Rain Program
ASTM ..... American Society of Testing and Materials
B/PA ..... Beaumont/Port Arthur (nonattainment area)
CAM ..... Compliance Assurance Monitoring
CD ..... control device
COMS ..... continuous opacity monitoring system
CVS ..... closed-vent system
D/FW ..... Dallas/Fort Worth (nonattainment area)
DR ..... Designated Representative
EIP ..... El Paso (nonattainment area)
EP ..... emission point
EPA ..... U.S. Environmental Protection Agency
EU ..... emission unit
FCAA Amendments ..... Federal Clean Air Act Amendments
FOP ..... federal operating permit
GF ..... grandfathered
gr/100 scf ..... grains per 100 standard cubic feet
HAP ..... hazardous air pollutant
H/G ..... Houston/Galveston (nonattainment area)
$H_2S$ ..... hydrogen sulfide
ID No. ..... identification number
lb/hr ..... pound(s) per hour
MMBtu/hr ..... Million British thermal units per hour
MRRT ..... monitoring, recordkeeping, reporting, and testing
NA ..... nonattainment
N/A ..... not applicable
NADB ..... National Allowance Data Base
$NO_x$ ..... nitrogen oxides
NSPS ..... New Source Performance Standard (40 CFR Part 60)
NSR ..... New Source Review
ORIS ..... Office of Regulatory Information Systems
Pb ..... lead
PBR ..... Permit By Rule
PM ..... particulate matter
ppmv ..... parts per million by volume
PSD ..... prevention of significant deterioration
RO ..... Responsible Official
$SO_2$ ..... sulfur dioxide
TSP ..... total suspended particulate
TVP ..... true vapor pressure
U.S.C. ..... United States Code
VOC ..... Volatile organic compound

# ATTACHMENT D

# BRAZOS ELECTRIC POWER COOPERATIVE, INC
# JACK COUNTY GENERATION FACILITY
# JACKSBORO, TEXAS
# CN600128821
# RN100221985
# ACCOUNT NO. JA-0068-E

## POWER PLANT EXPANSION PROJECT
## PSD/NSR AIR PERMIT APPLICATION

*Prepared for:*
Brazos Electric Power Cooperative, Inc.
2404 LaSalle Avenue
Waco, Texas 76702-2585




Gregory D. Haunschild, Registration No. 77458
Professional Engineer Name, License Number, Signature, Seal

January 2008

Argent Consulting Services, Inc.
11757 Katy Freeway, Suite 1000
Houston, TX 77079
(281) 759-9580

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# 1 Introduction

Brazos Electric Power Cooperative, Inc. (BEC) is submitting a PSD air permit application to the Texas Commission of Environmental Quality (TCEQ) for a permit to expand the existing Jack County Generation Facility. The existing BEC facility is permitted by the TCEQ under Permit No. 52756 and PSD-TX-1026.

The existing Jack County Generation Facility is authorized to operate the following primary sources:

- Two GE Combustion Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-1 and HRSG-2);
- One Gas-Fired Auxiliary Steam Boiler (B-1);
- One Diesel Generator Engine (DG-1);
- One Diesel Fire Water Pump Engine (FWP-1);
- One Cooling Tower (CT-1);
- One Chiller (CV1-CV16)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

BEC is now proposing to expand the power plant by installing two additional gas-fired combined cycle combustion turbines with duct burners (HRSG-3 and HRSG-4). The GE turbines are equipped with DLN technology and an SCR unit to reduce NOx emissions. The turbine generators are capable of generating 171.7 MW ISO under base load conditions. The steam turbine generator is rated for nominal 320 MW. The plant expansion project power generating capacity is approximately 663 MW.

As part of this plant expansion BEC is installing the following new sources:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

The TCEQ is the regulatory authority responsible for reviewing the application and issuing the preconstruction air quality permit. The existing power plant is currently

authorized under PSD (PSD-TX-1026) and NSR 52756 air permits. BEC is requesting a new PSD permit for the plant expansion.

The principal contact and applicant for the proposed permit is:

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Vice President Generation
Brazos Electric Power Cooperative, Inc.
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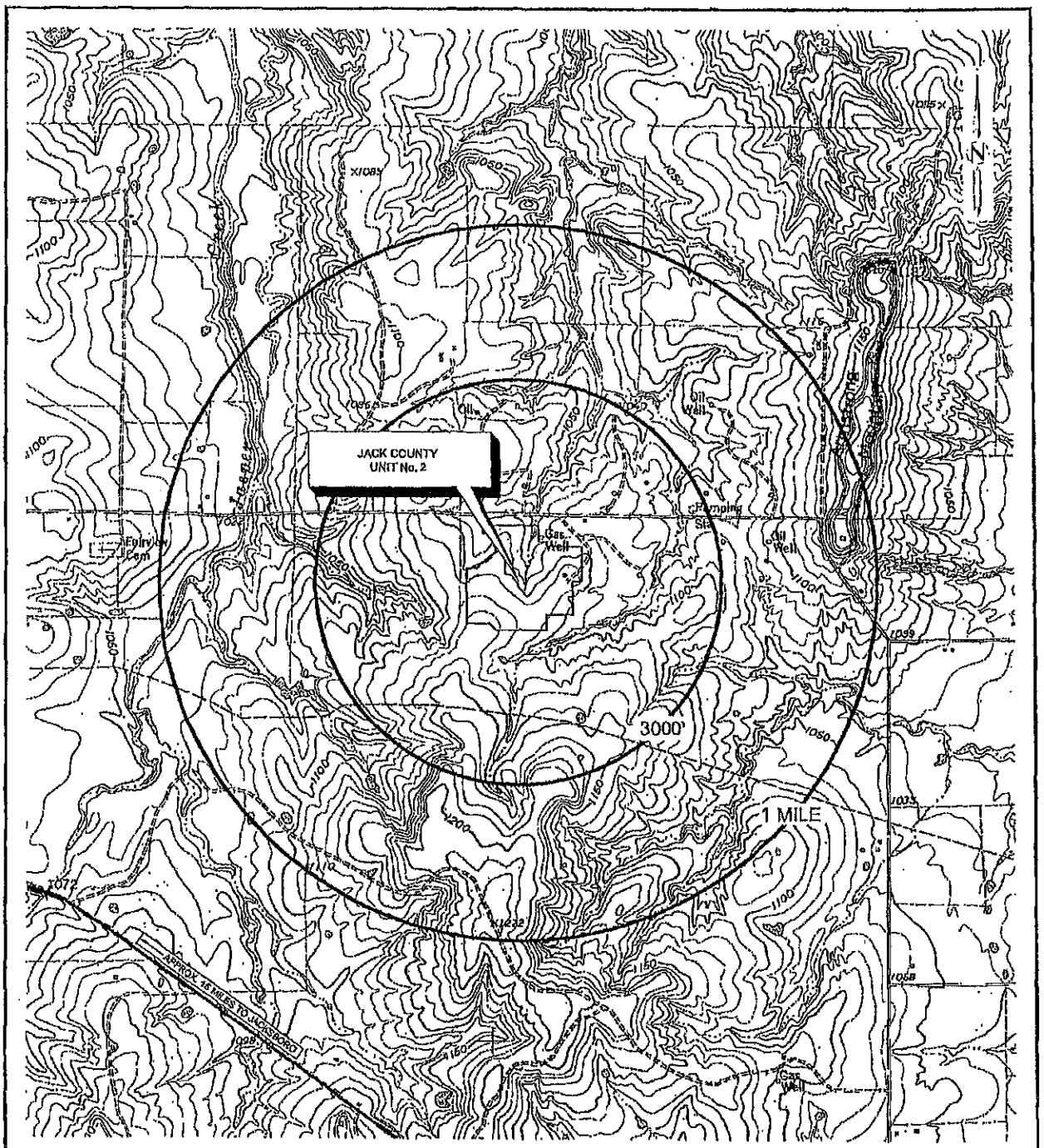
# 2 AREA MAPS AND PLOT PLAN

The following area maps, plot plans and diagrams show the location of the site and detail the layout of the site.

- Figure 2-1: Site Area Map
- Figure 2-2: Aerial Photograph of Site
- Figure 2-3: Facility Plot Plan
- Figure 2-4: Facility Process Flow Diagram

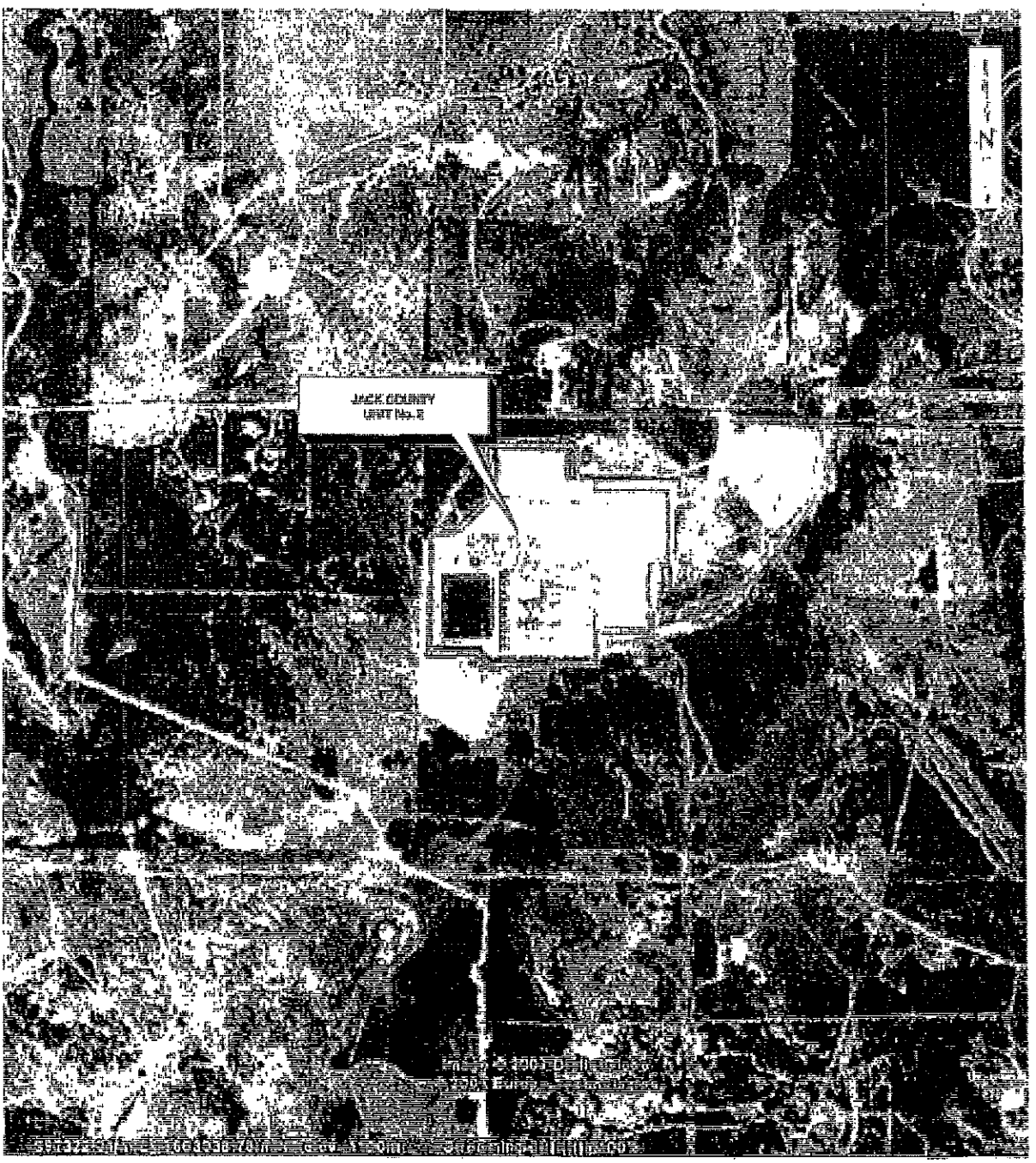
Figures 2-1 and 2-2 show the location of the facility in relation to the surrounding area. Figure 2-3 shows the entire facility, and identifies the key structures and emission sources at the proposed facility. Figure 2-4 provides a process flow diagram for the facility after the proposed expansion.




| | | |
|---|---|---|
| SITE LOCATION | BASE MAP INFO: USGS 7.5 QUADRANGLE(s)<br>GRITOWN, TEXAS USGS 7.5 MINUTE QUAD<br>DATA EXTRACTED FROM: www.topozone.com | BRAZOS ELECTRIC POWER COOPERATIVE, Inc<br>Jack County Unit No. 2<br>Jack County, Texas<br>Area Map |
| | 1 MILE (approx) | 1" = 2000 FT (approx) |

ARGENT CONSULTING SERVICES, INC.

Figure 2-2: Aerial Photograph of Site




| | | |
|---|---|---|
| SITE LOCATION | AERIAL PHOTO INFO:<br>EXTRACTED FROM: Google Earth | BRAZOS ELECTRIC POWER COOPERATIVE, Inc<br>Jack County Unit No. 2<br>Jack County, Texas<br>Aerial Photo |
| 1/2 MILE (approx) | 1" = 1000 FT (approx) | AGENT CONSULTING SERVICES, INC. |

Figure 2-3: Facility Plot Plan

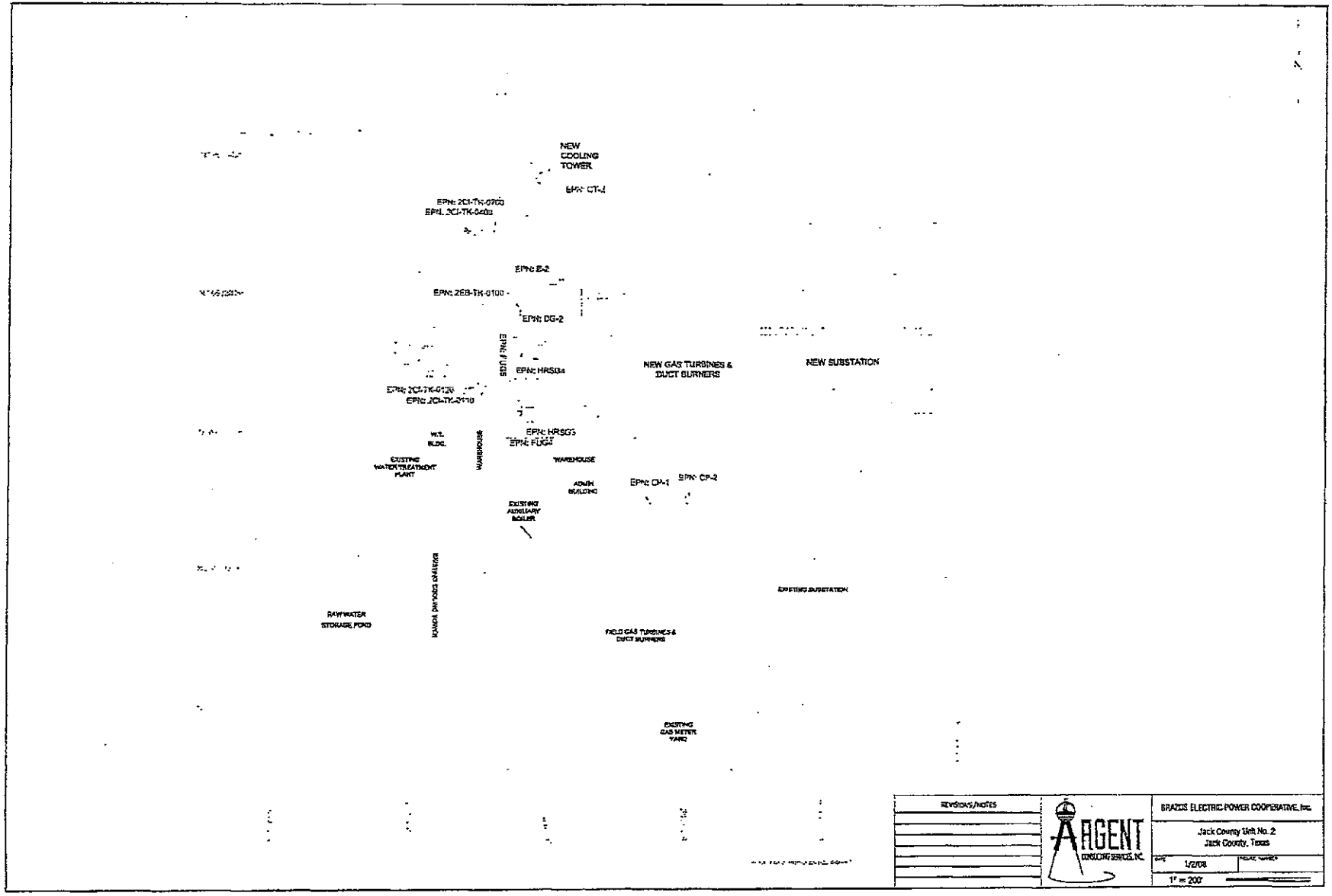
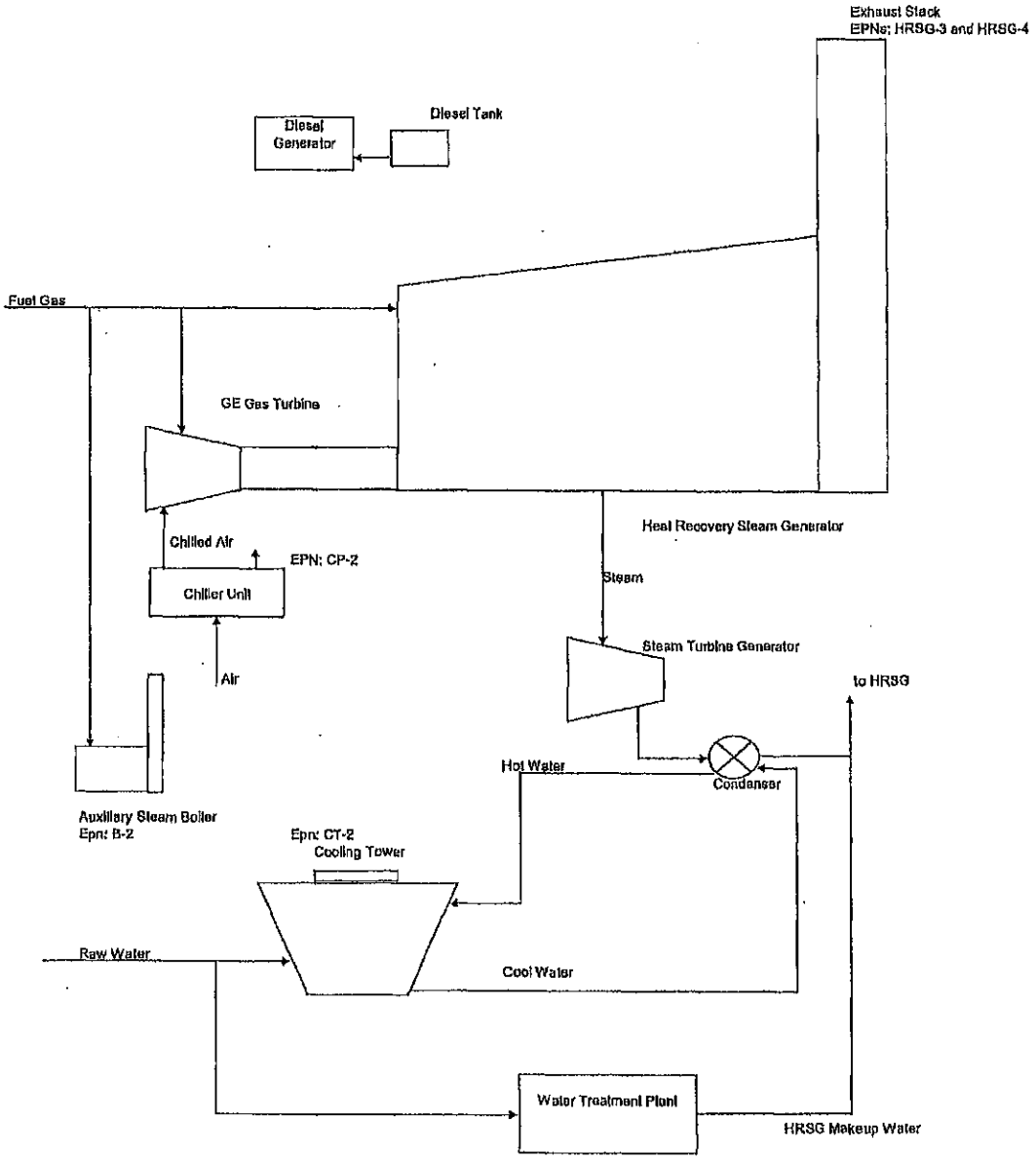

NEW COOLING TOWER
EPN: CT-1
EPN: 2CI-TK-0700
EPN: 2CI-TK-0400
EPN: B-2
EPN: 2EB-TK-0100
EPN: DG-2
EPN: HRSG4
NEW GAS TURBINES & DUCT BURNERS
NEW SUBSTATION
EPN: 2CI-TK-0120
EPN: 2CI-TK-0110
EPN: HRSG3
EPN: FUG4
WAREHOUSE
EXISTING WATER TREATMENT PLANT
ADMIN BUILDING
EPN: CP-1
EPN: CP-2
EXISTING AUXILIARY BOILER
EXISTING SUBSTATION
RAW WATER STORAGE POND
FIELD GAS TURBINES & DUCT BURNERS
EXISTING GAS METER YARD
REVISIONS/NOTES
AGENT CONSULTING SERVICES, INC.
BRAZOS ELECTRIC POWER COOPERATIVE, Inc.
Jack County Unit No. 2
Jack County, Texas
1/2/08
1" = 200'

Figure 2-4: Facility Process Flow Diagram

BRAZOS ELECTRIC COOPERATIVE, INC.
JACK COUNTY GENERATION FACILITY
EXPANSION PROJECT

SIMPLIFIED PROCES FLOW DIAGRAM



# 3 PROJECT OVERVIEW

## 3.1 Facility Location and Regional Attainment Status

The Jack County Generation Facility is located in Jack County approximately 15 miles southeast of Jacksboro. Currently, Jack County is classified as an attainment area for all criteria pollutants [sulfur oxides, measured as sulfur dioxide ($SO_2$); particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers ($PM_{10}$); particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$); carbon monoxide (CO); ozone ($O_3$); nitrogen dioxide ($NO_2$); and lead (Pb)].

## 3.2 Process Description

The Jack County Generation Facility is an existing 620 MW combined cycle power plant equipped with gas turbines, duct burners, and steam generator. BEC is proposing to expand the power plant by installing an additional nominal 663.4 MW of generating capacity.

The plant expansion will include two 171.7 MW General Electric 7FA-class natural gas fired combustion turbines (CTG) operating in combined-cycle mode with two supplementary fired heat recovery steam generators (HRSGs) and a reheat condensing steam turbine generator (STG). Steam generation in the HRSGs is augmented steam with supplementary natural gas-firing using duct burners. Each HRSG will produce high pressure steam for introduction into a steam turbine. The steam turbine will drive generators to increase the total plant output to approximately 510 MW without duct firing, or 663 MW with duct firing and inlet air chilling.

BEC will use combined cycle power generation technology to maximize generation efficiency and minimize fuel use. Efficient natural gas combustion combined with dry low-NOx technology and selective catalytic reduction (SCR) will minimize air pollutant emissions. Combined cycle technology is 50% more thermally efficient that vintage steam-electric plants. Since combined cycle plants burn less fossil fuel to generate an equivalent amount of power, they also emit substantially less air pollutants, including CO2.

Like the existing plant the expansion project will combine the Brayton and Rankine cycles to maximize thermal efficiency. Natural gas will be combusted in two Brayton cycle turbines, which will generate most of the electrical output. Instead of being discarded to the environment, the exhaust heat will be recovered in a Rankine cycle HRSG/steam turbine, and the heat will be extracted until the exhaust temperature is about 200 °F before being discarded through the stacks. This high-efficiency technology

combined with clean natural gas and BACT will yield a small fraction of air emissions compared to a conventional power plant.

Under the existing air permit BEC is authorized to operate the following equipment and emission sources:

- Two GE Combustion Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-1 and HRSG-2);
- One Gas-Fired Auxiliary Steam Boiler (B-1);
- One Diesel Generator Engine (DG-1);
- One Diesel Fire Water Pump Engine (FWP-1);
- One Cooling Tower (CT-1);
- One Chiller (CV1-CV16)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

The proposed expansion project will consist of the following new sources:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

### 3.2.1 Gas Turbine/HRSG Power Generators

BEC is proposing to install two 171.7 MW ISO General Electric 7FA gas turbines in combined cycle mode with duct-fired HRSGs and a common steam turbine generator (total 663 MW). The fuel will be exclusively pipeline quality natural gas. Each gas turbine power block will include an advanced combustion turbine, including an air compressor section, gas combustion system (utilizing advanced DLN combustors), power turbine, and a 60-hertz, 18 kilovolt (kV) generator.

Exhaust gas exiting the power turbine at approximately 1,100°F is ducted to a fired boiler commonly known as a heat recovery steam generator where steam is produced to generate additional electricity in a steam turbine generator. Natural gas fired duct burners located within the HRSGs are used for supplementary firing to increase steam output.

The combustion turbines are designed to operate in the dry low-NOx mode at loads from 50% up to base load rating and will normally be taken out of service only for scheduled maintenance, or as dictated by economic or electrical demand conditions.

A horizontal, natural circulation, three-pressure HRSG system will extract heat from the exhaust of each gas turbine. Exhaust gas entering the HRSG at approximately 1100°F will be cooled to approximately 200°F by the time it leaves the HRSG exhaust stack. Steam production in the HRSGs will be augmented using "low-NOx" duct burners that will be natural gas fired. The steam produced is used in the combined cycle plant for additional power and natural gas/feedwater heating. Each HRSG will include a high-pressure superheater, high-pressure evaporator, high-pressure economizer, reheat section, intermediate pressure superheater, intermediate pressure evaporator, intermediate pressure economizer, low pressure superheater, low pressure evaporator, and condensate/feedwater preheater. The surface condenser uses cooling tower water to condense the steam exhausting from the steam turbine.

### 3.2.2 Auxiliary Steam Boiler

A 36.6 MMBtu/hr nominally rated (at 105% load) package boiler will be located on site to supply heating steam for the steam turbine seals and for sparging of the HRSG steam drums during down periods. The boiler will be a fire-tube type and combust natural gas only. Make-up water will be received from the demineralizer system that feeds the auxiliary boiler deaerator.

The primary use of the auxiliary boiler will be to provide heat such that temperatures are elevated within the HRSG and steam turbine while the combustion turbines are off-line. By maintaining elevated temperatures in the turbine seals, piping, and HRSGs, the CTGs will be able to minimize the amount of startup time required to come back on line after a shut down. The steam from the auxiliary boiler will not be used to augment power generation of the CTGs or the steam turbine. BEC is proposing to limit the auxiliary boiler annual capacity factor to 20%. This limit effectively caps annual operating hours to no more than 1,752 hours per year if the boiler is operated at maximum capacity. By limiting the annual capacity factor rather than operating hours BEC can operate the boiler at lower loads while still establishing an emission cap based on an equivalent 1,752 hours/year.

### 3.2.3 Standby Generator Engine

A small 400 kW (600-hp) back-up diesel generator will be located on site. The back-up generator will provide power for turning gears, lube oil pumps and auxiliary cooling water pumps. BEC is proposing to limit operating hours to no more than 150 hours/year of non-emergency operations.

The final diesel engine selection has not been finalized but current plans are for a Cummins model or equivalent. BEC will insure that the final engine selection meets the emission requirements of 40 CFR 60 Subpart IIII for Tier 2 or Tier 3 engines.

### 3.2.4 Storage Tanks

BEC will install storage tanks for diesel fuel and for water treatment chemicals (caustics, acids, etc.). The only new volatile organic liquid tank is the diesel tank supporting the emergency generator engine.

### 3.2.5 Fuel Gas System

Pipeline quality natural gas will be delivered to the plant boundary at a pressure sufficient for use in the combustion turbines without additional fuel compression. The gas will be heated, if necessary, using hot water from the HRSGs.

Natural gas enters the plant through an existing meter skid that is already sized to handle the additional gas flow. The gas passes through a knockout drum for removal of any liquid which may have been carried through the pipeline. The gas is split into streams to supply each CTG/HRSG unit. The gas then passes through a series of filters and separator to remove particulate matter and entrained liquids.

### 3.2.6 Cooling Tower

A new cooling tower will be installed as part of the planned electric generating facility. The majority of the cooling water will be used in the surface condenser to absorb the heat rejected from the combined cycle. Water from the cooling tower is commonly referred to as "main" cooling water. A dedicated set of cooling water pumps is provided for this service. Additional cooling water will be required for auxiliary plant cooling. Cooling tower water is not used for direct cooling of plant auxiliaries; a closed loop auxiliary cooling system consisting of pumps, expansion tank, and heat exchangers is provided. Cooling tower water is circulated through a set of plate and frame heat exchangers to cool the closed loop coolant, usually a glycol/water mix. This is commonly referred to as "auxiliary" cooling water.

The cooling tower is designed to evaporate clean water, which is the mechanism that provides cooling. Some small droplets (referred to as drift) escape from the top of the tower and may liberate dissolved solids as they evaporate in the atmosphere.

### 3.2.7 Chillers

The turbines will employ an inlet chilling system to enhance the overall power output that would normally be lost due to lower air density at higher ambient temperatures. The process of cooling takes place at the cooling coils where inlet air is cooled before entering the CTG compressor. At lower temperatures, the air becomes denser and therefore more mass flows through the CTGs. The net increase in mass flow results in higher gross output for each of the CTGs. In addition to the output enhancement from the CTGs, the additional mass flow also increases output of the STG.

### 3.2.8 Buildings and Infrastructure

The following buildings will be constructed on site:

- Warehouse/Maintenance Building;
- Turbine Enclosures;
- Electrical Substation Buildings; and
- Standby Generator Shelter.

Access roads will be provided for operation, maintenance, and fire and emergency vehicles.

## 3.3 Emission Generating Equipment

Emission generating equipment at the expanded facility will consist of:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

### 3.3.1 Gas Turbine/HRSG Power Generators

The primary emissions sources for this project will be the two combustion turbines. The manufacturer (General Electric) provided hourly emission rates of criteria pollutants from the combustion turbines. Stack concentrations that result from these emission rates when combined with duct burning were determined by the project contractor with input from GE and the HRSG manufacturer. The NOx emissions were adjusted to account for the control effectiveness of the SCR system. Emissions of SO2 were calculated using expected turbine operational data and the maximum assumed sulfur content (2 gr/100 scf) of the pipeline quality natural gas.

Maximum hourly emission rates for each pollutant were established after reviewing the provided vendor data over the range of potential ambient temperatures and proposed operating loads. Annual emissions were based on the highest hourly emission rate over the proposed operating range and assuming both turbines would be operated continuously. These emissions do not include start-up and shut-down operations. BEC is proposing the following emissions rates for the CTG/HRSG units:

| Pollutant | lb/hr | tpy | Project (tpy) |
|---|---|---|---|
| NOx | 43.61 | 191.01 | 382.02 |
| CO | 58.72 | 257.19 | 514.39 |
| TSP/PM10 | 13.65 | 59.79 | 119.57 |
| SO2 | 13.01 | 14.25 | 28.50 |
| VOC | 5.36 | 23.48 | 46.95 |
| NH3 | 22.60 | 98.99 | 197.98 |

BEC is permitting these units as based load generators, not peaking units. BEC intends to normally operate the CTG/HRSG units no lower than a 50% load factor. However, there may be short periods when an extended down turn below 50% is necessary due to factors beyond the control of BEC. BEC proposes to include the following permit condition:

- Reduced load operation below 50 percent of base load not associated with start-up, shutdown, upset, or maintenance is authorized, provided that the $NO_x$ and CO maximum pounds per hour (lb/hr) emission rates for $NO_x$ and CO specified in the MAERT are not exceeded.

This condition will allow for low load (<50%) operations for short periods without having to shutdown the units for economic dispatch. The proposed permit condition insures that the mass emission rates for these contaminants are not exceeded while allowing BEC the flexibility to respond to market conditions in a cost efficient manner.

### 3.3.2 Auxiliary Steam Boiler

The project will utilize a 36.6 MMBtu/hr (HHV at 105% load) gas-fired auxiliary boiler to maintain minimal steam flow when the turbines are not in operation. Maximum emission rate factors for the boiler unit were provided by the manufacturer. The auxiliary boiler does not operate continuously. However, to maintain maximum flexibility BEC proposes to limit the annual capacity factor rather than a specific hourly limit in the permit.

| | |
|---|---|
| Max Rating: | 36.6 MMBtu/hr |
| Fuel Heat: | 1,020 Btu/scf (HHV) |
| Max Fuel Consumption: | 314.33 MMscf/yr |
| Limited Fuel Consumption: | 62.87 MMscf/yr |
| Annual Capacity Factor: | 20% |

BEC proposes to limit the annual capacity factor of the auxiliary boiler to 20%. This allows for approximately 1752 hours of operation annually at full load. Detailed emission calculations are included in this application.

### 3.3.3 Standby Diesel Generator

The plant expansion will include a single 400 kW diesel engine backup generator engine. New compression ignition engines are subject to the recently promulgated NSPS Subpart IIII regulation which cites Tier 2 and Tier 3 emission limits. The emission rates represented in this application are the Tier 3 limits. BEC is proposing to limit annual operating hours to 150 hours per year which will allow for up to 100 hours for maintenance and testing, plus an additional 50 hours for other operational requirements.

### 3.3.4 Storage Tanks

There are three (3) storage tanks included in the expansion project which store VOC or a regulated pollutant. These include a small diesel tank for the generator, an aqueous ammonia tank for the SCR system, and a sulfuric acid tank for the water treatment plant. The ammonia tank is pressurized with the only associated emissions resulting from fugitives.

EPA's Tank 4.1 was used to estimate emissions from the diesel tank and the sulfuric acid tank. Emissions from two additional inorganic liquids tanks are also included.

### 3.3.5 Fuel Gas System (Fugitives)

The main fugitive emission source is equipment (valves, flanges, etc.) leaks from the fuel handling system, a potential source of VOC. Emissions from these sources were estimated using TCEQ approved Oil and Gas factors and an estimated component count.

Fugitive emissions from the ammonia handling system were calculated in the same manner as VOC except that TCEQ approved SOCMI w/o ethylene factors were used.

### 3.3.6 Cooling Tower

The process cooling tower will be a source of $PM_{10}$ emissions. The emissions from the cooling tower are dependent upon several factors: (1) the dissolved solids content of the circulating water, and (2) the amount of drift that leaves the tower. The dissolved solids content of the circulating water is dependent on the quality of the makeup water and the average number of cycles the water is allowed to circulate before being discharge through the blowdown system. The amount of drift is dependent on the tower design.

The method used to estimate particulate matter emissions is based on the approach presented by the EPA AP-42 Section 13. Using the cooling tower preliminary design characteristics and a drift rate of 0.001%, the total particulate emissions from the tower can be calculated. Once the total PM is calculated it is necessary to estimate the portion of total PM that is $PM_{10}$.

**$PM_{10}$ Estimation Methodology**

The EPA AP-42 Section 13 contains a factor for estimating $PM_{10}$ emissions as a portion of total PM. However, the EPA indicates that this factor is overly conservative which results in an overestimation of $PM_{10}$. Therefore, BEC is utilizing a more detailed method for estimating these emissions. The method and support data is contained in a paper entitled, "Calculating PM10 Emissions from Cooling Towers." The paper is included in the cooling tower emission calculation section of this application.

*Basis*

Each water droplet that leaves the cooling tower can be assumed to liberate solid particulate upon evaporation of the water in the droplet. Based on this assumption, the mass of solids (dissolved and suspended) in the droplet must equal the mass of solids in the final particle.

From the reference paper the following formula can be used to calculate the diameter of the final particle upon evaporation of the water:

$$D_p = D_d \times [(P_d/P_p) \times (Solids \times C) / 1{,}000{,}000]^{1/3}$$

Where

| | |
|---|---|
| $D_p$ = | diameter of final particulate |
| $P_p$ = | density of the final particle |
| $D_d$ = | diameter of the droplet |
| $P_d$ = | density of the droplet |
| Solids = | total solids (suspended and dissolved) |
| C = | cycles of concentration |

The mass fraction of droplets that will form particulates 10 microns (PM10) and smaller can be estimated for a given droplet size distribution using the above approach. Specifically, the particle size ($D_p$) is calculated using the above equation for each droplet size for a given distribution. The mass fraction of droplets corresponding to 10 micron particles and small is then summed.

Detailed cooling tower emissions are included in this application.

### 3.3.7 Chillers

The turbine inlet chillers will be a source of $PM_{10}$ emissions. The operating principle behind the chiller units is similar to the cooling tower. Therefore, the emission calculation methodology described for the cooling tower are used for the chillers and adjusted only for the smaller water recirculation rates.

Detailed chiller emissions are included in this application.

# 4 REGULATORY OVERVIEW

The Jack County Generation Facility is subject to federal, state, and local regulations governing the construction of new facilities. The lead agency for all air permitting in Texas is the TCEQ, which implements all of its own regulations and incorporates United States Environmental Protection Agency (EPA) regulatory requirements into its own program.

For regulatory review purposes, emission sources associated with the proposed Jack County Generation Facility expansion will include the following:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

BEC will comply with all federal, state and local air quality control requirements. The following sections describe the applicable federal and state air quality control regulations associated with the construction and operation of the expanded Jack County Generation Facility. No local regulations were identified.

## 4.1 Federal Air Quality Regulations

The Clean Air Act (CAA) of 1970, 42 USC 7401 et seq. amended in 1977 and 1990 and 40 CFR Parts 50-99 are the basic federal statutes and regulations governing air pollution. The following federal requirements have been reviewed to determine their applicability to the proposed Jack County Generation Facility expansion.

### 4.1.1 New Source Review (NSR)

Separate pre-construction review procedures have been established for projects that are proposed to be built in attainment areas versus nonattainment areas. The pre-construction review process for new or modified major sources located in attainment areas is called New Source Review, and may include a Prevention of Significant Deterioration (PSD) review. This review process is intended to keep new air emission sources from causing existing air quality to deteriorate beyond acceptable levels codified in the Federal regulations.

#### 4.1.1.1 Prevention of Significant Deterioration (PSD)

The emission threshold for "major stationary sources" varies under PSD according to the type of facility. As defined by 40 CFR Part 52.21(b)(1)(i), a facility is considered major under PSD if it has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. The Jack County Generation Facility process was permitted to authorize fossil fuel fired boilers totaling more than 250 MMBtu/hr, which are a specified source category. Therefore, the PSD threshold for this facility is 100 tpy. The proposed facility expansion emissions will be above the PSD thresholds for three criteria air pollutants: NOx, CO, and $PM_{10}$. Therefore, the facility expansion must be authorized under the PSD permitting requirements.

For new major sources, PSD applicability is based upon the definition of "major" as found in the PSD rules at 40 CFR §§51.165(v), 51.166(2), and 52.21. A PSD looks at proposed increases in emissions of more pollutants (all criteria pollutants and some others) but the increase resulting from the project must be more than an allowable level of increase called "PSD significance levels". The definition is limited in that a "major" source must lead to a net increase in air emissions above PSD significance levels.

**PSD SIGNIFICANCE LEVELS**

| Pollutant | Rate (tpy) |
|---|---|
| PM10 | 15 |
| TSP | 25 |
| SO2 | 40 |
| NOX | 40 |
| VOC (ozone) | 40 |
| CO | 100 |
| Pb | 0.6 |

The proposed expansion project will result in the PSD significance levels being exceeded for NOx, CO, VOC and $PM_{10}$.

One of the factors considered in the PSD permit review process is potential impacts on protected Class I airsheds located throughout the country. Class I areas are specifically designated as pristine wilderness areas. The Project will not be located in a Class I area, nor will it be located within 100 kilometers of a Class I area, therefore a full Class I analysis will not be required to be included in the permit application. The closest Class I area to the project site is the Caney Creek Wilderness Area located approximately 300 kilometers east of the Project site.

Another factor considered in the PSD permit review is the potential impact of facility emissions on soil and vegetation and visibility. An additional impacts analysis addressing these factors will be submitted under separate cover as a part of the ambient air quality dispersion modeling impacts analysis.

#### 4.1.1.2 Nonattainment New Source Review (NNSR)

The federal pre-construction review for a new or modified major source located in a nonattainment area is commonly called Nonattainment New Source Review (NNSR). NNSR only applies to major sources of the pollutants that are classified as nonattainment; therefore a new facility could potentially undergo both types of review, depending on the emissions of the various pollutants and their respective attainment status. Jack County is classified as an attainment area for all criteria pollutants; therefore, the facility will not be subject to NNSR requirements.

### 4.1.2 Title V Operating Permit

The Title V Permit program, as described in 40 CFR Part 70, requires major sources of air emissions to obtain federal operating permits. In Texas, authority to issue Title V operating permits has been delegated, by the United States Environmental Protection Agency (EPA), to the TCEQ. The major source threshold levels for determining the need for a Title V operating permit are: 100 tpy of any criteria air pollutant, 10 tpy of any individual hazardous air pollutant (HAP) or 25 tpy of any combination of HAPs. Emissions of several criteria pollutants from the facility exceed 100 tpy; therefore, a Title V Operating Permit is required for this facility. The existing Jack County Generation Facility is operating under a Title V permit – BEC will modify the operating permit to include the new applicable requirements for the expanded facility by the deadline stipulated in 30 TAC 122.

### 4.1.3 New Source Performance Standards (NSPS)

40 CFR Part 60 establishes new source performance standards (NSPS) for specific emission sources. The following NSPS requirements were identified as potentially applicable to the specified sources at the facility.

40 CFR Part 60 Subpart Db: Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. Subpart Db lists affected emission sources as fuel fired steam-generating units with a heat input capacity of 100 MMBTU/hr to 250 MMBTU/hr. The definition of an applicable unit includes sources that produce steam or that heat water or any other heat transfer medium. The HRSG units are each rated in excess of 250 MMBtu/hr, therefore, these units are potentially subject to the requirements of Subpart Db. However, the new NSPS Subpart KKKK standard affects duct burners used in combined cycle systems. Therefore, the duct burners will comply with these standards.

40 CFR Part 60 Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. Subpart Dc lists affected emission sources is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr). The auxiliary boiler is rated in excess of 10 MMBtu/hr and is subject to the requirements of Subpart

Dc. Since this source will fire natural gas exclusively only recordkeeping and reporting requirements will apply.

40 CFR Part 60 Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels. Subpart Kb lists affected emission sources as storage vessels containing volatile organic liquids with regulatory applicability being dependent on the construction date of the storage vessel, the capacity, and the material stored. The expanded facility will have a single diesel fuel tank to support the generator engine. The diesel tank will not exceed 75 m3 (19,815 gallons) and are therefore not subject to this rule. This rule does not apply to inorganic storage tanks.

40 CFR 60 Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) as specified in the regulation. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. The expanded Jack County Generation Facility will be equipped with an additional diesel engine to drive a standby generator. BEC will insure that this source complies with all applicable requirements of this regulation.

40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines. Subpart KKKK establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that have a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel and that commenced construction, modification or reconstruction after February 18, 2005. The expanded Jack County Generation Facility will be equipped with two gas turbines that meet this qualification criteria. This subpart also applies to emissions from any associated HRSG and duct burners.

### 4.1.4 National Emissions Standards for Hazardous Air Pollutants (NESHAP)

40 CFR Part 61 contains the Federal emission standards that have been developed to address certain individual HAPs. The individual HAP rules are typically referred to as the national emission standards for hazardous air pollutants or NESHAP. The Jack County Generation Facility will not emit any of the individual HAPs included in the NESHAP rules; therefore the NESHAP regulations do not apply to this facility.

### 4.1.5 Maximum Achievable Control Technology (MACT) Standards

40 CFR Part 63, as incorporated by reference in TAC 113, contains the Federal emission standards that have been developed to address HAP emissions from a variety of source categories. The source category rules, commonly referred to as the MACT standards, apply to facilities that are classified as major sources of HAPs, and operate affected equipment as listed in each standard. A facility is a major source of HAPs if it emits any individual HAP in excess of 10 tpy or a combination of HAPs in excess of 25 tpy. The facility will not be a major source of HAPs, therefore the MACT standards do not apply.

### 4.1.6 Acid Rain Standards

40 CFR Part 70-75 contains the Federal emission standards that have been developed to address acid rain emissions from specified sources. BEC already complies with the acid rain program for the existing power generating facility. The expanded portion of the plant will be incorporated into the acid program as well. BEC will file the proper documents with the EPA and acquire an acid rain permit through the Texas federal operating permit program.

### 4.1.7 Clean Air Interstate Rule (CAIR)

40 CFR Part 96 contains the Federal emission standards that have been developed to address NOx and SO2 emissions from specified sources in the electric power generation category. BEC already complies with the CAIR program for the existing power generating facility. The expanded portion of the plant will be incorporated into the CAIR program as well. BEC will file the proper documents with the EPA and acquire a CAIR permit through the Texas federal operating permit program.

### 4.1.8 Risk Management Program

40 CFR Part 68, Chemical Accident Prevention Provisions, is a federal regulation designed to prevent the release of hazardous materials in the event of an accident and minimize impacts when releases do occur. The regulation contains a list of substances and threshold quantities for determining applicability of the rule to a facility. If a facility stores, handles, or processes one or more substances on this list and at a quantity equal to or greater than specified in the regulation, the facility must prepare and submit a risk management plan (RMP).

If a facility does not have a listed substance on site, or the quantity of a listed substance is below the applicability threshold, the facility does not have to prepare an RMP. However, it must still comply with requirements of the general duty provisions in Section 112(r)(1) of the 1990 Clean Air Act Amendments if it has any regulated substance or other extremely hazardous substance on-site.

The general duty provision is as follows:

*"The owners and operators of stationary sources producing, processing, handling and storing such substances have a general duty ... to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur."*

With the exception of natural gas constituents (e.g., methane, ethane, propane, etc.), no regulated substance will be handled or stored in quantities greater than the applicability threshold. Natural gas pipelines are not covered if the U.S. Department of Transportation (DOT) or an equivalent state natural gas program certified by DOT in accordance with 49 CFR §6010.5 regulates the pipeline.

The Jack County Generation Facility will not have on site any flammable or toxic materials that trigger the RMP rule. BEC will only store aqueous ammonia in solutions less than 20%.

## 4.2 State Air Quality Regulations

The TCEQ air permitting requirements are codified in the Texas Administrative Code (TAC) Title 30, Part I. These rules incorporate the federal program requirements listed in 40 CFR Parts 50-99, and establish permit review procedures for all facilities that can emit pollutants to the ambient air. All new facilities are required to obtain an air quality permit prior to initiating construction. Facilities can trigger additional review by EPA if emissions exceed the major source thresholds listed in 40 CFR §52.21. The proposed project will exceed these thresholds; therefore, EPA will be reviewing the permit application and TCEQ's proposed permit to ensure all federal program requirements are met.

The TCEQ has codified the federal PSD requirements in TAC 116.160. As indicated the emission threshold for a "major stationary source" varies under PSD according to the type of facility. As defined in 40 CFR 52, a facility is considered major under PSD if it emits or has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. There is more than 250 MMBtu/hr of fossil fuel fired boilers on-site; therefore, the PSD threshold for this facility is 100 tpy. The permitted facility emissions will exceed the 100 tpy threshold for NOx, CO and PM10; therefore the facility is a PSD major source and must be permitted under the PSD requirements.

The remainder of this section provides the information necessary to show the Jack County Generation Facility will comply with the requirements in TAC 30:I. The emissions and plant operations from the proposed new facility will comply with all rules and regulations of TCEQ and with the intent of the Texas Clean Air Act (TCAA), including the protection of the health and physical property of the people. A summary discussion on compliance with each applicable rule is included below.

### 4.2.1 Chapter 101 – General Air Quality Rules

Chapter 101 includes the general rules that are applicable to all sources. BEC will comply with the applicable requirements of this chapter. Some of the potentially applicable sections within this chapter are:

**§101.10 – Emission Inventory**
Specified sources are required to submit an annual emissions inventory to TCEQ. BEC will comply with this requirement.

**§101.24 – Inspection Fee**
Specified sources are required to submit an annual inspection fee to the TCEQ. BEC will comply with this requirement.

**§101.27 – Emissions Fee**
Specified sources are required to submit an annual emissions fee to the TCEQ. BEC will comply with this requirement.

**§101.201 – Emission Events**
This rule defines procedures to use in the event of an emission event resulting in an unauthorized emission. BEC will comply with these requirements.

**§101.211 – Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping Requirements**
This rule defines procedures to use in the event of a scheduled MSS event resulting in an unauthorized emission. BEC will comply with these requirements.

BEC will comply with all applicable requirements of this chapter.

### 4.2.2 Chapter 111 – Control of Visible Emissions and Particulate Matter

The potentially applicable sections within this chapter are:

**§111.111 – Requirements for Specified Sources**
This rule defines visible emission standards for specified sources. BEC will comply with these standards.

**§111.115 – Allowable Emission Limits**
This rule defines particulate matter emission standards for specified sources. BEC will comply with these standards.

### 4.2.3 Chapter 112 – Control of Emissions of Sulfur Compounds

The potentially applicable sections within this chapter are:

**§112.3 – Net Ground Level Concentrations**
The will not cause ground level concentrations of SO2 to exceed 0.4 ppmv averaged over any 30-minute period. The primary sources will fire sweet natural gas exclusively. Therefore, this standard will not be exceeded.

### 4.2.4 Chapter 113 – Standards of Performance for HAP (MACT)

This rule incorporates by reference applicable MACT regulations for which the EPA has delegated authority to the TCEQ. The Jack County Generation Facility will not be a major source of HAP emissions. Therefore, none of the potentially applicable MACT standards are applicable to this project.

### 4.2.5 Chapter 115 – Emission Standards for VOC

This rule establishes standards for a variety of VOC sources in specific geographic locations (i.e. nonattainment and covered attainment areas). Jack County is not a nonattainment area or a covered attainment area. Therefore, no Chapter 115 standards are currently applicable to sources at this account.

### 4.2.6 Chapter 117 – Control of Emissions of NOx

This rule establishes standards for a variety of NOx sources in specific geographic locations. Jack County is not a nonattainment area. Therefore, the requirements of Subchapter C are not applicable to sources at this account. Jack County is not located in the geographic area defined as East and Central Texas. Therefore, the requirements of Subchapter E are not applicable to sources at this account

### 4.2.7 Chapter 118 – Episodes

If the TCEQ declares a Level 1 or 2 emission episode that encompasses the Jack County Generation Facility BEC will strive to reduce emissions for the duration of the episode. An emission reduction plan is not required for sources located in Jack County.

### 4.2.8 Chapter 122 – Federal Operating Permits

The TCEQ implements the requirements of 40 CFR 70 through this chapter. The existing Jack County Generation Facility is already authorized by a FOP. BEC will revise this permit to include the applicable requirements for the expanded plant as well as obtaining both Acid Rain and CAIR permits.

# 5 EMISSIONS INVENTORY

This section provides a summary of emission rates for the proposed Jack County Generation Facility after completion of the proposed expansion project.

## 5.1 Operating Scenarios

Potential operations include both CTG/HRSG units operating 100% of the time, for 8760 hours per year. BEC will operate these sources from base load down to 50% load. BEC is seeking authorization to operate at lower loads (<50%) for short periods but will meet the short-term (lb/hr) mass emission rate limits of the permit. Potential operations for the standby diesel generator engine will be limited to 150 hours per year. The auxiliary steam boiler will operate with a limited annual capacity factor of 20%.

## 5.2 Criteria Pollutant Emissions

The following section summarizes the methodology used to determine potential emissions from the proposed Jack County Generation Facility, and estimates for criteria pollutants emitted from all operations.

### 5.2.1 Determination of Potential Emissions

#### 5.2.1.1 Turbine Generator/HRSG

The engineering contractor provided operating parameters and emission rates for the CTG/HRSG under different operating loads over a wide ambient temperature range. As would be expected worst-case emissions occur at lower ambient conditions.

Emissions of formaldehyde from the gas turbine were estimated using a factor obtained from the EPA MACT website. This factor represents the maximum formaldehyde emission rate records for a GE 7F unit. Recent formaldehyde testing by BEC for the existing GE turbines indicated formaldehyde emissions were below detectible limits.

Emissions of SO2 from the combined CTG/HRSG were estimated based on maximum fuel flow and a range of fuel gas sulfur content. Maximum short-term SO2 emissions were based on 2 grains total sulfur per 100 scf. Annual SO2 emissions were based on 0.5 grains total sulfur per 100 scf.

Emissions of H2SO4 were estimated assuming 10% of the SO2 emitted was actually H2SO4. BEC did not reduce the estimated SO2 emissions by 10% to be conservative. The 10% assumption was obtained from GE information.

Potential CTG/HRSG emission calculations are included in Appendix A.

# APPENDIX A – TCEQ FORMS

# Texas Commission on Environmental Quality
# Form PI-1 General Application for
# Air Preconstruction Permit and Amendments

Update: The TCEQ requires that a Core Data Form be submitted on all incoming applications unless a Regulated Entity and Customer Reference Number has been issued by the TCEQ and no core data information has changed. For more information regarding the Core Data Form, call (512) 239-5175 or go to the TCEQ Web site at www.tceq.state.tx.us/permitting/central_registry/guidance.html.

| | | | |
|---|---|---|---|
| **I. APPLICANT INFORMATION** | | | |
| A. Company or Other Legal Name: Brazos Electric Power Cooperative, Inc. | | | |
| Texas Secretary of State Charter/Registration Number (If Applicable): 17405247291 | | | |
| B. Company Official Contact Name: David Murphy, PE | | | Title: Vice President Generation |
| Mailing Address: P.O. Box 2585 | | | |
| City: Waco | State: TX | | Zip Code: 76702-2585 |
| Telephone No: 254 750 6213 | Fax No.: 254 750 6292 | | E-mail Address: dmurphy@brazoselectric.com |
| C. Technical Contact Name: Troy Cannon | | | Title: Operations Superintendent |
| Mailing Address: 3844 Henderson Ranch Road | | | |
| City: Bridgeport | State: TX | | Zip Code: 76426 |
| Telephone No.: 940 374 3022 | Fax No.: 940 374 3145 | | E-mail Address: tcannon@brazoselectric.com |
| D. Facility Location Information: | | | |
| Street Address: 3844 Henderson Ranch Road | | | |
| If no street address, provide clear driving directions to the site in writing: | | | |
| | | | |
| City: Bridgeport | County: Jack | | Zip Code: 76426 |
| E. TCEQ Account Identification Number (leave blank if new site or facility): | | | |
| F. Is a TCEQ Core Data Form (TCEQ Form #10400) attached? | | | ☐ YES ☑ NO |
| G. TCEQ Customer Reference Number *(leave blank if unknown)*: CN600128821 | | | |
| H. TCEQ Regulated Entity Number *(leave blank if unknown)*: RN100221985 | | | |
| **II. IMPORTANT GENERAL INFORMATION** | | | |
| A. Is confidential information submitted with this application? | | | ☐ YES ☑ NO |
| If "YES," is each "confidential" page marked "CONFIDENTIAL" in large red letters? | | | ☐ YES ☐ NO |
| B. Is this application in response to a TCEQ investigation or enforcement action? | | | ☐ YES ☑ NO |
| If "YES", attach a copy of any correspondence from the TCEQ | | | |
| C. Number of New Jobs: 0 | | | |
| D. Names of the State Senator and district number for this facility site: Craig Estes; District 30 | | | |
| Names of State Representative and district number for this facility site: Rick Hardcastle; District 68 | | | |
| E. For Concrete Batch Plants, name of the County Judge for this facility site: | | | |
| Mailing Address: | | | |
| City: | State: | | Zip Code: |
| F. For Concrete Batch Plants, is the facility located in a municipality or an extraterritorial jurisdiction of a municipality? If "YES," list the name(s) of the Presiding Officer(s) for this facility site: | | | ☐ YES ☐ NO |
| Mailing Address: | | | |
| City: | State: | | Zip Code: |

# Texas Commission on Environmental Quality
# Form PI-1 General Application for
# Air Preconstruction Permit and Amendments

| | | |
|---|---|---|
| **III. FACILITY AND SOURCE INFORMATION** | | |
| A. Site Name: Jack County Generation Facility II | | |
| B. Area Name/Type of Facility: Electric Power Plant | | ☑ PERMANENT ☐ PORTABLE |
| C. Principal Company Product or Business: Electric Power | Primary Standard Industrial Classification Code: 4911 | |
| D. Projected Start of Construction Date: January 2009 | Projected Start of Operation Date: April 2010 | |
| **IV. TYPE OF PERMIT ACTION REQUESTED** | | |
| A. Permit Number *(if existing)*: | | |
| B. Is this an initial permit application? | | ☑ YES ☐ NO |
| If "YES," check the type of permit requested *(check all that apply)*: | | |
| ☐ State Permit | ☐ Nonattainment Federal Permit | |
| ☐ Flexible Permit | ☑ Prevention of Significant Deterioration Federal Permit | |
| ☐ Multiple Plant Permit | ☐ Hazardous Air Pollutants Permit Federal Clean Air Act § 112(g) | |
| Other: | | |
| C. Is this a permit amendment? | | ☐ YES ☑ NO |
| If "YES," check the type of permit requested *(check all that apply)*: | | |
| ☐ State Permit Amendment | ☐ Nonattainment Major Modification | |
| ☐ Flexible Permit Amendment | ☐ Prevention of Significant Deterioration Major Modification | |
| ☐ Multiple Plant Permit Amendment | ☐ Hazardous Air Pollutants Permit Federal Clean Air Act § 112(g) Modification | |
| Other: | | |
| Is a permit renewal application being submitted in conjunction with this amendment in accordance with Senate Bill 1673? [THSC 382.055(a)(2)](80th Leg) | | ☐ YES ☑ NO |
| D. Is this application for a change in location of previously permitted facilities? If "YES," answer D. 1. and D. 2. | | ☐ YES ☑ NO |
| 1. Current location of facility. | | |
| Street Address *(If no street address, provide clear driving directions to the site in writing.)*: | | |
| City: | County: | Zip Code: |
| 2. Will the proposed facility, site and plot plan meet all current technical requirements of the permit special conditions? | | ☐ YES ☐ NO |
| If "NO," attach detailed information. | | |
| E. Are there any standard permits, exemptions or permits by rule to be consolidated into this permit? | | ☐ YES ☑ NO |
| F. Are you permitting a facility or group of facilities that have planned maintenance, startup and shutdown emissions that cannot be authorized by a permit by rule or standard permit or that are authorized by a permit by rule or standard permit and are being rolled into this permit If "YES," attach information on any changes to emissions under this application as specified in Section VIII. And Section IXX. If "YES," answer F. 1 through F. 3. | | ☑ YES ☐ NO |

TCEQ

# Texas Commission on Environmental Quality
## Form PI-1 General Application for
## Air Preconstruction Permit and Amendments

| IV. TYPE OF PERMIT ACTION REQUESTED *(continued)* | |
|---|---|
| 1. Are the activities to be included in this permit covered by any previously existing MSS authorizations?<br>If "YES," provide a listing of all other authorizations (permit by rule or standard permit and the associated registration number if any). | ☐ YES ☑ NO |
| 2. Have the emissions been previously submitted as part of an emissions inventory? | ☐ YES ☑ NO |
| 3. List which years the MSS activities were included in emissions inventory submittals: | |
| G. Is this facility located at a site required to obtain a federal operating permit under 30 TAC Chapter 122?<br>If "NO," go to Section V. | ☑ YES ☐ NO |
| 1. Is a site operating permit (SOP) or general operating permit (GOP) review pending for this source, area, or site? | ☐ YES ☑ NO |
| 2. Is and SOP or GOP issued for this source, area, or site? | ☑ YES ☐ NO |
| 3. List SOP or GOP number(s): O-2169 | |
| **V. PERMIT FEE INFORMATION** | |
| A. Fee paid for this application: | $ 75,000 |
| B. Is a copy of the check or money order attached to the original submittal of this application? | ☑ YES ☐ NO ☐ N/A |
| C. Is a Table 30 entitled, "Certification of estimated Capital Cost and Fee Verification," attached? | ☑ YES ☐ NO |
| **VI. PUBLIC NOTICE APPLICABILITY** | |
| A. Is this a new permit application? | ☑ YES ☐ NO |
| B. Is this an application for a major modification of a PSD, NA or 30 TAC § 112(g) permit? | ☑ YES ☐ NO |
| C. Is this a state permit amendment application?<br>If "YES," answer C. 1. through C. 3. | ☐ YES ☑ NO |
| 1a. Is there any change in character of emissions in this application? | ☐ YES ☐ NO |
| 1b. Is there a new air contaminant in this application? | ☐ YES ☐ NO |
| 2. Do the facilities handle, load, unload, dry, manufacture, or process grain, seed, legumes, or vegetables fibers (agricultural facilities)? | ☐ YES ☑ NO |
| 3. List the total annual emission increases associated with the application (*list all that apply*):<br>Volatile Organic Compounds (VOC): 47.83 tpy — Particulate Matter (PM): 125.29 tpy<br>Sulfur Dioxide ($SO_2$): 29.26 tpy — Lead (Pb): 0 tpy<br>Carbon Monoxide (CO): 514.65 tpy — Nitrogen oxides ($NO_x$): 382.32 tpy<br>Other air contaminants not listed above: ____ tpy — List: Ammonia 197.99 tpy | |
| D. Is this a change of location application?<br>If "YES," answer D. 1. through D. 3. | ☐ YES ☑ NO |
| 1. Is the new facility site located in or contiguous to the right-of-way of a public works project? | ☐ YES ☐ NO |
| 2. Is there a permitted facility occupying the new site? | ☐ YES ☐ NO |
| If "YES," please list the permit number: | |
| 3. Have portable facilities occupied the new site at any time in the last two years? | ☐ YES ☐ NO |

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendments

| VII. PUBLIC NOTICE INFORMATION *(complete if applicable)* | | | |
|---|---|---|---|
| A. Responsible Person: | | | |
| Name: David Murphy, PE | | Title: Vice President Generation | |
| Mailing Address: P.O. Box 2585 | | | |
| City: Waco | State: TX | | Zip Code: 76702-2585 |
| Telephone No.: 254 750 6213 | Fax No.: 254 750 6292 | | E-mail Address: dmurphy@brazoselectric.com |
| B. Technical Contact: | | | |
| Name: Troy Cannon | | Title: Operations Superintendent | |
| Mailing Address: 3844 Henderson Ranch Road | | | |
| City: Bridgeport | State: | | Zip Code: 76426 |
| Telephone No.: 940 374 3022 | Fax No.: 940 374 3145 | | E-mail Address: tcannon@brazoselectric.com |
| C. Application in Public Place: | | | |
| Name of Public Place: Jack County Court House | | | |
| Physical Address: 100 North Main Street | City: Jacksboro | | County: Jack |
| The public place has granted authorization to place the application for public viewing and copying? | | | ☑ YES ☐ NO |
| D. Small Business Classification: | | | |
| 1. Does this company (including parent companies and subsidiary companies) have fewer than 100 employees or less than $6 million in annual gross receipts? | | | ☐ YES ☑ NO |
| 2. Is the site a major source under 30 TAC Chapter 122, Federal Operating Permit Program? | | | ☑ YES ☐ NO |
| 3. Are the site emissions of any individual air contaminant greater than 50 tpy? | | | ☑ YES ☐ NO |
| 4. Are the site emissions of all air contaminants combined greater than 75 tpy? | | | ☑ YES ☐ NO |
| E. Bilingual notice confirmation: | | | |
| Is a bilingual program required by the Texas Education Code in the School District? | | | ☑ YES ☐ NO |
| Are the children who attend either the elementary school or the middle school closest to your facility eligible to be enrolled in a bilingual program provided by the district? | | | ☑ YES ☐ NO |
| If yes, which language is required by the bilingual program? Spanish | | | |
| VIII. TECHNICAL INFORMATION | | | |
| A. Is a current area map attached? | | | ☑ YES ☐ NO |
| Are any schools located within 3,000 feet of this facility? | | | ☐ YES ☑ NO |
| B. Is a plot plan of the plant property attached? | | | ☑ YES ☐ NO |
| C. Is a process flow diagram and a process description attached? | | | ☑ YES ☐ NO |
| D. Maximum Operating Schedule: _____ Hours/Day 24 | Days/Week 7 | | Weeks/Year 52 |
| Seasonal Operation? If "YES," please describe: | | | ☐ YES ☑ NO |
| E. Are worst-case emissions data and calculations attached? | | | ☑ YES ☐ NO |
| 1. Is a Table 1(a) entitled, "Emission Point Summary Table," attached? | | | ☑ YES ☐ NO |
| 2. Is a Table 2 entitled, "Material Balance Table," attached? | | | ☐ YES ☑ NO |
| 3. Are equipment, process or control device tables attached? | | | ☑ YES ☐ NO |
| F. Are actual emissions for the last two years (determination federal applicability) attached? | | | ☐ YES ☑ NO |

| IX. STATE REGULATORY REQUIREMENTS<br>Applicants must be in compliance with all applicable state regulations to obtain a permit or amendment | |
|---|---|
| A. The emissions from the proposed facility will comply with all rules and regulations of the TCEQ and details are attached? | ☑ YES ☐ NO |
| B. The proposed facility will be able to measure emissions of significant air contaminants and details are attached? | ☑ YES ☐ NO |
| C. A demonstration of Best Available Control Technology (BACT) is attached? | ☑ YES ☐ NO |
| D. The proposed facilities will achieve the performance in the permit application and compliance demonstration or record keeping information is attached? | ☑ YES ☐ NO |
| E. Is atmospheric dispersion modeling attached? | ☐ YES ☑ NO |
| F. Does this application involve any air contaminants for which a "disaster review" is required? | ☐ YES ☑ NO |
| If "YES," details must be attached.<br>*Note: For a list of air contaminants for which a "disaster review" will be required, refer to the NSRPD Disaster Review Guidance Document at www.tceq.state.tx.us/permitting/air/rules/federal/63/63hmpg.html.* | |
| G. Is this facility or group of facilities located at a site within the Houston/Galveston nonattainment area? (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, or Waller Counties) | ☐ YES ☑ NO |
| Does the facility or group of facilities located at this site have an uncontrolled design capacity to emit 10 tpy or more of $NO_X$? | ☐ YES ☑ NO |
| Is this site subject to 30 TAC Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade)? | ☐ YES ☑ NO |
| Does this action make the site subject to 30 TAC Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade)? | ☐ YES ☑ NO |
| Does this action require the site to obtain additional emission allowances? | ☐ YES ☑ NO |
| X. FEDERAL REGULATORY REQUIREMENTS<br>**Applicants must be in compliance with all applicable federal regulations to obtain a permit or amendment.** ***If any of the following questions is answered "YES," the application must contain detailed attachments addressing applicability, identify federal regulation Subparts, show how requirements are met, and include compliance information.*** | |
| A. Does a Title 40 Code of Federal Regulations Part 60, (40 CFR Part 60) New Source Performance Standard (NSPS) apply to a facility in this application? | ☑ YES ☐ NO |
| B. Does 40 CFR Part 61, National Emissions Standard for Hazardous Air Pollutants (NESHAP) apply to a facility in this application? | ☐ YES ☑ NO |
| C. Does a 40 CFR Part 63, Maximum Achievable Control Technology (MACT) standard apply to a facility in this application? | ☐ YES ☑ NO |
| D. Does nonattainment permitting requirements apply to this application? | ☐ YES ☑ NO |
| E. Does prevention of significant deterioration permitting requirements apply to this application? | ☑ YES ☐ NO |
| F. Does Hazardous Air Pollutant Major Source [FAA § 112(g)] requirements apply to this application? | ☐ YES ☑ NO |
| XI. COPIES OF THIS APPLICATION | |
| A. Has the required fee been sent separately with a copy of this Form PI-1 to the TCEQ Revenue Section? *(MC 214, P.O. Box 13088, Austin, Texas 78711).* | ☑ YES ☐ NO ☐ NA |
| B. Are the Core Data Form, Form PI-1, and all attachments being sent to the TCEQ in Austin? | ☑ YES ☐ NO |
| OPTIONAL: Has an extra copy of the Core Data Form, Form PI-1 and all attachments been sent to the TCEQ in Austin?<br>If "YES," please mark this application as "COPY". | ☑ YES ☐ NO |

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendments

| | |
|---|---|
| **XI. COPIES OF THIS APPLICATION *(continued)*** | |
| C. Is a copy of the Core Data Form, the Form PI-1, and all attachments being sent to the appropriate TCEQ regional office | ☑ YES ☐ NO |
| D. Is a copy of the Core Data Form, the Form PI-1, and all attachments being sent to each appropriate local air pollution control program(s)? | ☐ YES ☑ NO |
| List all local air pollution control program(s): None<br>None | |
| E. Is a copy of the Core Data Form, Form PI-1, and all attachments (without confidential information) being sent to the EPA Region 6 office in Dallas, Texas? (federal applications only) | ☑ YES ☐ NO |
| F. This facility is located within 100 kilometers of the Rio Grande River and a copy of the application was sent to the International Boundary Water Commission (IBWC): | ☐ YES ☑ NO |
| G. This facility is located within 100 kilometers of a federally-designated Class I area and a copy of the application was sent to the appropriate Federal Land Manager: | ☐ YES ☑ NO |
| **XII. PROFESSIONAL ENGINEER (P.E.) SEAL** | |
| Is the estimated capital cost of the project greater than $2 million dollars?<br>If "YES," the application must be submitted under the seal of a Texas licensed Professional Engineer (P.E.). | ☑ YES ☐ NO |
| **XIII. DELINQUENT FEES AND PENALTIES** | |
| Notice: This form will not be processed until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the "Delinquent Fee and Penalty Protocol." For more information regarding Delinquent Fees and Penalties, go to the TCEQ Web site at: www.tceq.state.tx.us/agency/delin/index.html. | |
| **XIV. SIGNATURE** | |
| The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7, Texas Clean Air Act (TCAA), as amended, or any of the air quality rules and regulations of the Texas Commission on Environmental Quality or any local governmental ordinance or resolution enacted pursuant to the TCAA. I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. I further state that I have read and understand TWC §§ 7.177-7.183, which defines CRIMINAL OFFENSES for certain violations, including intentionally or knowingly making or causing to be made false material statements or representations in this application, and TWC § 7.187, pertaining to CRIMINAL PENALTIES. | |
| NAME: David Murphy, PE SIGNATURE: _____ DATE: _____<br>Original Signature Required | |

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| B-2 | B-2 | Auxiliary Boiler 2 | NOx | 1.28 | 1.12 |
| | | | CO | 1.35 | 1.19 |
| | | | VOC | 0.59 | 0.51 |
| | | | PM10 | 0.37 | 0.32 |
| | | | SO2 | 0.20 | 0.04 |
| DG-2 | DG-2 | Diesel Generator Engine | NOx | 4.00 | 0.30 |
| | | | CO | 3.48 | 0.26 |
| | | | VOC | 4.00 | 0.30 |
| | | | PM10 | 0.20 | 0.02 |
| | | | SO2 | 0.80 | 0.06 |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| 2EBTK0100 | 2EBTK0100 | Diesel Tank | VOC | 0.01 | 0.02 |
| CT-2 | CT-2 | Cooling Tower 2 | TSP/PM10 | 2.67/1.26 | 11.71/5.50 |
| CP-2 | CP-2 | Chiller Package 2 | TSP/PM10 | 0.06/0.05 | 0.25/0.21 |
| FUG4 | FUG4 | Power Block 3 Fugitives | VOC | 0.07 | 0.29 |
| FUG5 | FUG5 | Power Block 4 Fugitives | VOC | 0.07 | 0.29 |
| 2CITK0700 | 2CITK0700 | Aqueous Ammonia Fugitives | NH3 | 0.01 | 0.01 |
| 2CITK0120 | 2CITK0120 | Sulfuric Acid Tank | H2SO4 | 0.01 | 0.01 |
| 2CITK0110 | 2CITK0110 | NaOH Tank | NaOH | 0.01 | 0.01 |
| 2CITK0400 | 2CITK0400 | Sodium Hypochlorite Tank | Sodium Hypochlorite | 1.56 | 0.08 |
| | | | | | |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| HRSG-3 | CTG3 | Gas turbine and HRSG 3 | NOx | 43.61 | 191.01 |
| | HRSG3 | | CO | 58.72 | 257.19 |
| HRSG-4 | CTG4 | Gas turbine and HRSG 4 | VOC | 5.36 | 23.48 |
| | HRSG4 | | PM10 | 13.65 | 59.79 |
| | | (emissions are per unit) | SO2 | 13.31 | 14.58 |
| | | | H2S04 | 1.33 | 1.46 |
| | | | Formaldehyde | 0.16 | 0.69 |
| | | | NH3 | 22.60 | 98.99 |
| | | | | | |
| | | | | | |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# ATTACHMENT E

# Section 1 - Document

Mr. Tim Goldman

Production Engineer

Brazos Electric Power Cooperative, Inc.

P.O. Box 2585

Waco, Texas 76702-2585

Re: Permit Numbers: 52756 and PSD-TX-1026

Electric Generating Facility

Jacksboro, Jack County

Regulated Entity Number: RN100221985

Customer Reference Number: CN600128821

Dear Mr. Goldman:

This is in response to your letter dated September 15, 2003 providing updated representations regarding the above-referenced site. We now understand that the cooling tower will be constructed at a different location inside the plant boundaries. As indicated in Title 30 Texas Administrative Code § 116.116(c) [30 TAC § 116.116(c)], and based on our review, your request is hereby approved.

Please reference the regulated entity number (RN), customer reference number (CN), and permit number noted in this document in all your future correspondence for the referenced facility or site. The RN replaces the former TCEQ account number for the facility (if portable) or site (if permanent). The CN is a unique number assigned to the company or corporation and applies to all facilities and sites owned or operated by this company or corporation.

Your cooperation in this matter is appreciated. If you need further information or have any questions, please contact Mr. Aaron Moon at (512) 239-1093 or write to the Texas Commission on Environmental Quality, Office of Permitting, Remediation, and Registration, Air Permits Division (MC-163), P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

Margaret Hoffman

Executive Director

MH/ATM/jls

cc: Mr. David Neleigh, Chief, New Source Review, Section (6PD-R), Environmental Protection Agency, Region 6, Dallas

Mr. Mike Burch, Air Section Manager, Region 3 - Abilene

Project Number: 101260

**Air Permits Division (MC-163)**

MR TIM GOLDMAN

PRODUCTION ENGINEER

BRAZOS ELECTRIC POWER COOP INC

PO BOX 2585

WACO TX 76702-2585

Published by GroupWise

# Section 1 - Document

## Permit Amendment

## Source Analysis & Technical Review

| | | | | |
|---|---|---|---|---|
| | Company | Brazos Electric Power Cooperative, Inc. | Permit Number | 52756 |
| | City | Bridgeport | Project Number | 162449 |
| | County | Jack | Account Number | JA-0068-E |
| | Project Type | Amend | Regulated Entity Number | RN100221985 |
| | Project Reviewer | Mr. Marc Sturdivant | Customer Reference Number | CN600128821 |
| Site Name | | Jack County Generation Facility | | |

### Project Overview

The Jack County Generation Facility is an electric generating station located at 3844 Henderson Ranch Road, Bridgeport, TX 76426, in Jack County and is owned and operated by Brazos Electric Power Cooperative, Inc. (BEPC). The plant has four combustion turbines, each equipped with heat recovery steam generators (HRSGs). Two of the units are authorized by Permit No. 52756/PSDTX1026. These Units are Emission Point Nos. (EPNs) HRSG-1 and HRSG-2. BEPC wishes to amend their permit to authorize emissions from planned maintenance, startup and shutdown (MSS) activities. BEPC would like special conditions added to the permit to reflect startup as beginning when fuel is first fed to the turbine and ending when the turbine reaches Mode 6 and shutdown as beginning when the turbines drop below Mode 6 and ends when fuel is no longer being fed. MSS emissions from the EPNs HRSG-1 and HRSG-2 will be added to the MAERT as well as a new EPN MSSFUG.

### Emission Summary

| Air Contaminant | Current Allowable Emission Rates (tpy) | Proposed Allowable Emission Rates (tpy) | Change in Allowable Emission Rates (tpy) |
|---|---|---|---|
| PM | 318.8 | 318.81 | 0.01 |
| $PM_{10}$ | 302.2 | 302.21 | 0.01 |
| $PM_{2.5}$ | 0.0* | <0.01 | <0.01 |
| $NH_3$ | 193.61 | 193.62 | 0.01 |
| VOC | 177.07 | 177.12 | 0.05 |
| $NO_X$ | 384.7 | 384.7 | 0.0 |
| CO | 736.3 | 736.3 | 0.0 |
| $SO_2$ | 118.6 | 118.6 | 0.0 |
| $H_2SO_4$ | <0.01 | <0.01 | 0.0 |

*Not previously represented on MAERT

### Compliance History Evaluation - 30 TAC Chapter 60 Rules

| | |
|---|---|
| A compliance history report was reviewed on: | April 27, 2011 |
| Compliance period: | April 27, 2006-April 27, 2011 |
| Site rating & classification: | 2.69, Average |

| | |
|---|---|
| Company rating & classification: | 0.19, Average |
| If the rating is 40<RATING<45, what was the outcome, if any, based on the findings in the formal report: | |
| Has the permit changed on the basis of the compliance history or rating? | No |

## Public Notice Information - 30 TAC Chapter 39 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 39.403 | Is Public Notice Required? | No |
| | If no, give reason: | There is no proposed change in character of emissions or the release of any new air contaminant. The emissions increases from all sources are less than the public notice de minimis levels of 30 TAC 39.402 (a)(3). |

## Construction Permit & Amendment Requirements - 30 TAC Chapter 116 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 116.111(a)(2)(G) | Is the facility expected to perform as represented in the application? | Yes |
| 116.111(a)(2)(A)(i) | Are emissions from this facility expected to comply with all TCEQ air quality Rules & Regulations, and the intent of the Texas Clean Air Act? | Yes |
| 116.111(a)(2)(B) | Emissions will be measured using the following method: | $NO_x$ and CO CEMs and $NH_3$ monitoring |
| | Comments on emission verification: | |
| 116.111(a)(2)(D) | Subject to NSPS? | Yes |
| | Subparts Da, Dc & GG | |
| 116.111(a)(2)(E) | Subject to NESHAP? | No |
| | Subparts & | |
| 116.111(a)(2)(F) | Subject to NESHAP (MACT) for source categories? | Yes |
| | Subparts ZZZZ & | |
| 116.111(a)(2)(H) | Is nonattainment review required? | No |
| | Is the site located in a nonattainment area? | No |
| | Is the site a federal major source for a nonattainment pollutant? | No |
| | Is the project a federal major source for a nonattainment pollutant by itself? | No |
| | Is the project a federal major modification for a nonattainment pollutant? | No |
| | Did the project emission increases for nonattainment pollutant minus the two-year average actual emissions trigger netting? | No |
| | If yes, attach Table 1N & 9N. If no, explain: | |
| | Is the contemporaneous increase significant? | N/A |
| | If the contemporaneous increase is significant a nonattainment review is required. | |
| 116.111(a)(2)(I) | Is PSD applicable? | Yes |
| | Is the site a federal major source (100/250 tons/yr)? | Yes |
| | Is the project a federal major source by itself? | No |
| | Is the project a federal major modification? | No |
| | Did project emission increases, without decreases, for pollutant of concern, minus the two- | No |

| | | | |
|---|---|---|---|
| | year average actual emissions trigger netting? | | |
| | Was the contemporaneous increase significant? | | N/A |
| | If yes, explain: | | |
| | Is the change excluded by 40 CFR 52.21(b)(2)(ii)? | | No |
| | If yes, explain: | | |
| 116.111(a)(2)(L) | Is Mass Emissions Cap and Trade applicable to the new or modified facilities? | | No |
| | If yes, did the proposed facility, group of facilities, or account obtain allowances to operate: | | |
| 116.140 - 141 | Permit Fee: $ 900.00 | Fee certification: | R111779 |

## Title V Applicability - 30 TAC Chapter 122 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 122.10 (13)(A) | Is the site a major source under FCAA Section 112(b)? | No |
| | Does the site emit 10 tons or more of any single HAP? | No |
| | Does the site emit 25 tons or more of a combination? | No |
| 122.10 (13)(C) | Does the site emit 100 tons or more of any air pollutant? | Yes |
| 122.10 (13)(D) | Is the site a non-attainment major source? | No |
| 122.602 | **Periodic Monitoring (PM) applicability:** Periodic monitoring is applicable because this site is subject to 30 TAC Chapter 122. Periodic monitoring of planned MSS activities in the form of recordkeeping is used for the ILE activities listed in Attachment A consisting of an annual confirmation of the estimated PTE represented for those ILE activities. Recordkeeping and CEMS are used for periodic monitoring of all other planned MSS activities in which emissions are determined based on the duration of each event and compared to the MAERT on a rolling 12 month basis. | |
| | | |
| 122.604 | **Compliance Assurance Monitoring (CAM) applicability:** The site is a major source; however there are no control devices in use during MSS. Therefore, CAM is not applicable. | |
| | | |

## Request for Comments

| Received From | Program/Area Name | Reviewed By | Comments |
|---|---|---|---|
| Region: | 3 | Charles Smith | No Comments |
| City: | Bridgeport | N/A | |
| County: | Jack | N/A | |
| Toxicology: | | | |
| Compliance: | | | |
| Legal: | | | |
| Comment resolution and/or unresolved issues: | | | |

## Process/Project Description

The plant is an electric generating facility which has four permitted General Electric (GE) 7FA combustion turbines, each equipped with a 550-600 MMBtu/hr HRSG. HRSG units 1 and 2 are authorized under Permit No. 52756. The gas turbines burn natural gas to produce electricity and hot exhaust, and the temperature of the turbine exhaust is further elevated with duct burning. The HRSG then captures the heat from the exhaust to produce steam, which is converted to electricity in a steam turbine.

Startups and shutdowns are regular and planned operations and during these periods, emissions of $NO_x$ and CO can exceed the lb/hr limits of the permit. Startup and shutdown are currently reflected in the MAERT for all combustion units with the exception of HRSG-1 and HRSG 2. BEPC is requesting an amendment to authorize the emissions of $NO_x$ and CO from HRSG-1 and HRSG-2 during these startup and shutdown periods.

Some of the site wide maintenance activities BEPC is requesting authorization for can be characterized as inherently low emitting (ILE) activities. These ILE activities and operations will be included in the permit under attachment A. A new EPN will also be added to the MAERT (EPN MSSFUG).

Some MSS- related maintenance activities with emissions that are too large to be considered ILE will also be considered in the amendment application. BEPC states that the emissions from these activities will not exceed emission limits now established under the current permit. No separate emission allowables for these activities are being proposed. Such activities include, but are not limited to, online turbine optimization activities and online SCR system maintenance.

## Pollution Prevention, Sources, Controls and BACT- [30 TAC 116.111(a)(2)(C)]

Emission sources are the turbine exhaust stacks and fugitive emissions associated with planned MSS. Controls consist of low sulfur fuels for $SO_2$, combustor design for CO, dry low $NO_x$ combustors for $NO_x$ and an aqueous ammonia-based selective catalytic reduction system. The CEMS will give a direct report of $NO_X$ and CO concentrations. During planned MSS when control devices or process equipment are operating outside the design optimal mode and it is technically infeasible to meet the primary BACT emission rates, secondary BACT limits are necessary. These secondary BACT limits are designed to limit emissions during planned MSS activities. Secondary BACT limits are identified in Special Condition Nos. 16 thru 20. These limitations include work practices limiting the duration of startup and shutdown for combustion equipment, minimizes the amount of time combustion equipment is outside the optimal performance mode (in which the process units and controls were designed to work most effectively). The specific maintenance activities identified in the application have been listed as ILE activities in Attachment A of the permit.

## Impacts Evaluation - 30 TAC 116.111(a)(2)(J)

| | | | |
|---|---|---|---|
| Was modeling conducted? | Yes | Type of Modeling: | Screen3 |
| Will GLC of any air contaminant cause violation of NAAQS? | | No | |
| Is this a sensitive location with respect to nuisance? | | No | |
| [§116.111(a)(2)(A)(ii)] Is the site within 3000 feet of any school? | | No | |
| Additional site/land use information: Land surrounding the facility is undeveloped. The closest residence is less than 1 mile northwest from the property line and another residence is less than 1 mile west of the property line. | | | |
| | | | |

## Summary of Modeling Results

Emissions from $NO_x$ were modeled using all $NO_x$ sources on site plus background concentrations. The concentrations from the site were predicted to be 118.55 $\mu g/m^3$ and the background was 68.7 $\mu g/m^3$. When added together, the total concentration was below the NAAQS of 188 $\mu g/m^3$. Modeled concentrations of all other pollutants (CO, $PM_{2.5}$, $SO_2$ and $NH_3$) for the project only fell below the SIL and/or ESL. Therefore emissions from the facility are not expected to have an impact on health or the environment. No further modeling required.

| Pollutant | Averaging Time | Predicted Concentration ($\mu g/m^3$) | SIL ($\mu g/m^3$) | SIL | Background ($\mu g/m^3$) | Total Conc ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) | NAAQS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $NO_x$ | 1-hr | 118.547 | 7.5 | No | 68.7 | 187.247 | 188 | Yes |
| $NO_x$ | Annual | 9.48376 | 1 | No | 68.7 | 78.18376 | 100 | Yes |
| CO | 1-hr | 468 | 500 | Yes | | | | |
| CO | 8-hr | 327.6 | 2000 | Yes | | | | |
| $PM_{10}$ | 24-hr | 0.00416 | 5 | Yes | | | | |
| $PM_{2.5}$ | 24-hr | 0.00416 | 1.2 | Yes | | | | |
| $PM_{2.5}$ | Annual | 0.000832 | 0.3 | Yes | | | | |
| $SO_2$ | 1-hr | 3.809 | 7.8 | Yes | | | | |
| $SO_2$ | 3-hr | 3.4281 | 25 | Yes | | | | |
| $SO_2$ | 24-hr | 1.5236 | 5 | Yes | | | | |
| $SO_2$ | Annual | 0.30472 | 1 | Yes | | | | |
| | | | | | | | | |
| | | $GLC_{max}$ ($\mu g/m^3$) | ESL | | | | | |
| $NH_3$ | | 0.2171 | 170 | Yes | | | | |

**Permit Concurrence and Related Authorization Actions**

| | |
|---|---|
| Is the applicant in agreement with special conditions? | **Yes** |
| Company representative(s): | **David Cabe and Mark Pavelka** |
| Contacted Via: | **Email** |
| Date of contact: | **August 15, 2011** |
| Other permit(s) or permits by rule affected by this action: | **No** |
| List permit and/or PBR number(s) and actions required or taken: | **N/A** |

| | | | |
|---|---|---|---|
| | | | |
| Project Reviewer | Date | Team Leader/Section Manager/Backup | Date |

# Headers

***Permit Amendment***

***Source Analysis & Technical Review***

Permit No. 52756 Regulated Entity No. RN100221985

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# Section 1 - Document

## Permit Amendment

## Source Analysis & Technical Review

| | | | | |
|---|---|---|---|---|
| | Company | Brazos Electric Power Cooperative, Inc. | Permit Number | 52756 |
| | City | Bridgeport | Project Number | 162449 |
| | County | Jack | Account Number | JA-0068-E |
| | Project Type | Amend | Regulated Entity Number | RN100221985 |
| | Project Reviewer | Mr. Marc Sturdivant | Customer Reference Number | CN600128821 |
| Site Name | | Jack County Generation Facility | | |

### Project Overview

The Jack County Generation Facility is an electric generating station located at 3844 Henderson Ranch Road, Bridgeport, TX 76426, in Jack County and is owned and operated by Brazos Electric Power Cooperative, Inc. (BEPC). The plant has four combustion turbines, each equipped with heat recovery steam generators (HRSGs). Two of the units are authorized by Permit No. 52756/PSDTX1026. These Units are Emission Point Nos. (EPN) HRSG-1 and HRSG-2. BEPC wishes to amend their permit to authorize emissions from planned maintenance, startup and shutdown (MSS) activities. BEPC would like special conditions added to the permit to reflect startup as beginning when fuel is first feed to the turbine and ending when the turbine reaches Mode 6, and shutdown as beginning when the turbines drop below Mode 6 and ends when fuel is no longer being feed. MSS emissions from the EPNs HRSG-1 and HRSG-2 will be added to the MAERT as well as a new EPN MSSFUG.

### Emission Summary

| Air Contaminant | Current Allowable Emission Rates (tpy) | Proposed Allowable Emission Rates (tpy) | Change in Allowable Emission Rates (tpy) |
|---|---|---|---|
| PM | 16.1 | - | - |
| $PM_{10}$ | 302.2 | - | - |
| $NH_3$ | 193.61 | 193.62 | 0.01 |
| VOC | 177.07 | 177.12 | 0.05 |
| $NO_X$ | 384.7 | - | - |
| CO | 736.3 | - | - |
| $SO_2$ | 118.6 | - | - |
| $H_2SO_4$ | <0.01 | - | - |

### Compliance History Evaluation - 30 TAC Chapter 60 Rules

| | |
|---|---|
| A compliance history report was reviewed on: | April 27, 2011 |
| Compliance period: | April 27, 2006-April 27, 2011 |
| Site rating & classification: | 2.69, Average |
| Company rating & classification: | .019, Average |
| | |

| | |
|---|---|
| If the rating is 40<RATING<45, what was the outcome, if any, based on the findings in the formal report: | |
| Has the permit changed on the basis of the compliance history or rating? | No |

## Public Notice Information - 30 TAC Chapter 39 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 39.403 | Is Public Notice Required? | No |
| | If no, give reason: | There is no proposed change in character of emissions or the release of any new air contaminant. The emissions increases from all sources are less than the public notice de minimis levels of 30 TAC 39.402 (a)(3). |

## Construction Permit & Amendment Requirements - 30 TAC Chapter 116 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 116.111(a)(2)(G) | Is the facility expected to perform as represented in the application? | Yes |
| 116.111(a)(2)(A)(i) | Are emissions from this facility expected to comply with all TCEQ air quality Rules & Regulations, and the intent of the Texas Clean Air Act? | Yes |
| 116.111(a)(2)(B) | Emissions will be measured using the following method: | $NO_x$ and CO CEMs and $NH_3$ monitoring |
| | Comments on emission verification: | |
| 116.111(a)(2)(D) | Subject to NSPS? | Yes |
| | Subparts Da, Dc & GG | |
| 116.111(a)(2)(E) | Subject to NESHAP? | No |
| | Subparts & | |
| 116.111(a)(2)(F) | Subject to NESHAP (MACT) for source categories? | Yes |
| | Subparts ZZZZ & | |
| 116.111(a)(2)(H) | Is nonattainment review required? | No |
| | Is the site located in a nonattainment area? | No |
| | Is the site a federal major source for a nonattainment pollutant? | No |
| | Is the project a federal major source for a nonattainment pollutant by itself? | No |
| | Is the project a federal major modification for a nonattainment pollutant? | No |
| | Did the project emission increases for nonattainment pollutant minus the two-year average actual emissions trigger netting? | No |
| | If yes, attach Table 1N & 9N. If no, explain: | |
| | Is the contemporaneous increase significant? | No |
| | If the contemporaneous increase is significant a nonattainment review is required. | |
| 116.111(a)(2)(I) | Is PSD applicable? | Yes |
| | Is the site a federal major source (100/250 tons/yr)? | Yes |
| | Is the project a federal major source by itself? | No |
| | Is the project a federal major modification? | No |
| | Did project emission increases, without decreases, for pollutant of concern, minus the two-year average actual emissions trigger netting? | No |

| | | | |
|---|---|---|---|
| | Was the contemporaneous increase significant? | | No |
| | If yes, explain: | | |
| | Is the change excluded by 40 CFR 52.21(b)(2)(iii)? | | No |
| | If yes, explain: | | |
| 116.111(a)(2)(L) | Is Mass Emissions Cap and Trade applicable to the new or modified facilities? | | No |
| | If yes, did the proposed facility, group of facilities, or account obtain allowances to operate: | | |
| 116.140 - 141 | Permit Fee: $ 900.00 | Fee certification: | R111779 |

## Title V Applicability - 30 TAC Chapter 122 Rules

| Rule Citation | Requirement | |
|---|---|---|
| 122.10(13)(A) | Is the site a major source under FCAA Section 112(b)? | Yes |
| | Does the site emit 10 tons or more of any single HAP? | No |
| | Does the site emit 25 tons or more of a combination? | No |
| 122.10(13)(C) | Does the site emit 100 tons or more of any air pollutant? | Yes |
| 122.10(13)(D) | Is the site a non-attainment major source? | No |
| 122.602 | **Periodic Monitoring (PM) applicability:** | |
| | | |
| 122.604 | **Compliance Assurance Monitoring (CAM) applicability:** | |
| | | |

## Request for Comments

| Received From | Program/Area Name | Reviewed By | Comments |
|---|---|---|---|
| Region: | 3 | | |
| City: | Bridgeport | | |
| County: | Jack | | |
| Toxicology: | | | |
| Compliance: | | | |
| Legal: | | | |
| Comment resolution and/or unresolved issues: | | | |

## Process/Project Description

The plant is an electric generating facility which has four permitted General Electric (GE) 7FA combustion turbines, each equipped with a 550-600 MMBtu/hr HRSG. HRSG units 1 and 2 are authorized under Permit No. 52756. The gas turbines burn natural gas to produce electricity and hot exhaust, and the temperature of the turbine exhaust is further elevated with duct burning. The HRSG then captures the heat from the exhaust to produce steam, which is converted to electricity in a steam turbine.

Startups and shutdowns are regular and planned operations and during these periods, emissions of $NO_x$ and CO can exceed the lb/hr limits of the permit. Startup and shutdown are currently reflected in the MAERT for all combustion units with the exception of HRSG-1 and HRSG 2. BEPC is requesting an amendment to authorize to emissions of $NO_x$ and CO from HRSG-1 and HRSG-2 during these startup and shutdown periods.

Some of the site wide maintenance activities BEPC is requesting authorization for can be characterized as inherently low emitting (ILE) activities. These ILE activities and operations will be included in the permit under attachment A.

Some MSS- related maintenance activities with emissions that are too large to be considered ILE will also be considered in the amendment application. BEPC states that the emissions from these activities will not exceed emission limits now established under the current permit. No separate emission allowables for these activities are being proposed.

**Pollution Prevention, Sources, Controls and BACT- [30 TAC 116.111(a)(2)(C)]**

**Impacts Evaluation - 30 TAC 116.111(a)(2)(J)**

| | | | |
|---|---|---|---|
| Was modeling conducted? | | Type of Modeling: | |
| Will GLC of any air contaminant cause violation of NAAQS? | | No | |
| Is this a sensitive location with respect to nuisance? | | No | |
| [§116.111(a)(2)(A)(ii)] Is the site within 3000 feet of any school? | | No | |
| Additional site/land use information: | | | |
| | | | |

**Summary of Modeling Results**

**Permit Concurrence and Related Authorization Actions**

| | |
|---|---|
| Is the applicant in agreement with special conditions? | |
| Company representative(s): | |
| Contacted Via: | |
| Date of contact: | |
| Other permit(s) or permits by rule affected by this action: | |
| List permit and/or PBR number(s) and actions required or taken: | |

| | | | |
|---|---|---|---|
| | | | |
| Project Reviewer | Date | Team Leader/Section Manager/Backup | Date |

Headers

*Permit Amendment*

*Source Analysis & Technical Review*

Permit No. 52756 Regulated Entity No. RN100221985

Page

Footers

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# ATTACHMENT F

# Attachment F, Use Calculation Using TCEQ-Mandated Inputs/Variables to Which BEPC Objects

TCEQ Use Determination Application Section 11 use:
**Company:** Brazos Electric Power Cooperative, Inc.
**Plant:** Jack County Generation Facility
**Unit:** Jack 2 - 600 MW 2 x 1 Configuration Combined Cycle Power Plant (2011)
**Address:** Bridgeport, Texas
**Project:** Tier III Cost Analysis Procedure
**Date:** 10-Feb-12

**I. Assumptions** (HRSG only + CCO + Operations Cost)

| Pollution Control Property (PC) | Input Variable | Source |
|---|---|---|
| Property Cost: | $43,225,585.41 | BEC Acctng |
| Capital Cost ($/KW): | 154.38 | PC/TC |
| Total Capacity (MW): | 600 | ∑ (CT1,CT2,ST) |
| CT1 Capacity (MW): | 160 | BEC 2010 RUS Form 12 |
| CT2 Capacity (MW): | 160 | BEC 2010 RUS Form 12 |
| ST Capacity (MW): | 280 | BEC 2010 RUS Form 12 |
| 2010 Net Annual ST Energy Production (kWh): | 1,308,271,000 | BEC 2010 RUS Form 12 |
| 2010 Net Annual ST Energy Production (MWh): | 1,308,271 | BEC 2010 RUS Form 12 |
| 2010 ST Capacity Factor: | 53.3379% | Energy/(TC * 8760) |
| 2010 Net Plant Heat Rate (Btu/kWh): | 6,900 | Design |
| 2010 Net Plant Heat Rate (MMBtu/kWh): | 0.006900 | NPHR/1E06 |
| 2010 Operating Hours | 7,643 | BEC 2010 RUS Form 12 |
| Capital Cost Old: | 134,400,000 | |
| Comparable Technology Cost: | 0 | |
| Comparable Technology: | 0 | |
| Design Capacity Factor: | 0 | |
| Capacity (MW): | 1 | |

| Conversion Factors | |
|---|---|
| hr/yr | 8,760 |
| kW/MW | 1,000 |
| lb/kg | 2.2 |
| s/hr | 3,600 |
| Btu/MMBtu | 1,000,000 |

| Economic Assumptions | Input Variable | Source |
|---|---|---|
| Discount Rate (%) | 10.00% | Standard project rate |
| Periods | 30 | RUS depreciation |
| PC Property Fixed O&M Cost ($) | $8,805,034.00 | BEC 2010 RUS Form 12 |
| CT1 Fixed O&M Costs ($) | $2,348,009.07 | Formula |
| CT2 Fixed O&M Costs ($) | $2,348,009.07 | Formula |
| ST Fixed O&M Costs ($) | $6,478,638.50 | Fuel Cost + Maint Cost - Spreads |
| Fuel Cost ($/MMBTU) | $4.28 | Note 1 |
| PC property Variable Cost ($/MWh) | $5.00 | Check with OSE |
| PC property Variable Cost ($/kWh) | $0.0050 | Formula |
| ERCOT N. Zone Price ($/MWh) | $41.92 | Note 2 |
| Interest Rate (%) | 10.00% | |

Note 1: Average cost for fuel (2009 - 2011) weighted by monthly steam turbine generation
Note 2: Average Settlement Point price for resource weighted by hourly steam turbine generation, reflected by North Load Zone Market Clearing Price for Energy (MCPE) for Jan 1, 2009 - Nov 30, 2010 and Real-time Resource Settlement Point Price (Nodal) for Dec 1, 2010 - Dec 31, 2011.

**II. Cost Analysis Procedure**

A. $$\frac{[(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{Marketable Product}]}{\text{Capital Cost New}}$$

| Levelized Cost of Energy (LCOE) Model Outputs | |
|---|---|
| Capitol Recovery Factor (%) | 10.61% |
| LCOE ($/KWh) | $0.03799 |

**B. Cost Analysis Procedure Formulas (TCEQ)**

Partial Use Determination

$$\frac{[(\text{Production Capacity Factor} \times \text{Capital Cost New}) - \text{Capital Cost Old} - \text{Marketable Product Value}]}{\text{Capital Cost New}}$$

where: Marketable Product Value = $\sum_{t=1}^{n} \frac{\text{Marketable Product Value - Production Cost}}{(1 + \text{Interest Rate})^n}$

n = estimated useful life in years of years equipment
t = year one
Interest Rate = 10%

**C. Cost Analysis Procedure for Pollution Control Property**

Marketable Product Value = Electricity Price ($/MWh) x MWh per Year
Direct Cost of Production = Levelized Cost of Energy x KWh per Year

$$\text{LCOE (\$/KWh)} = \frac{(\text{Capital Cost} \times \text{Capital Recovery Factor}) + \text{Fixed O\&M Costs}}{\text{Hours per Year} \times \text{Capcity Factor}} + (\text{Fuel Cost} \times \text{Heat Rate})$$

Capital Recovery Factor (CRF) $\frac{I \times (1+I)^n}{(1+I)^n - 1}$

| (PC) | (CRF) | | (Annual cost to carry) | | (FOM) | (Total Annual FC) | |
|---|---|---|---|---|---|---|---|
| $43,225,585.41 | 10.61% | = | $4,585,337.61 | + | $6,478,638.50 | $11,063,976.11 | |
| | | | | | | $0.0085 | /kWh |
| | | | | | (Fuel x NPHR) | $0.0295 | |
| | | | | | LCOE: | $0.03799 | ($/kWh) |

# Attachment F, cont'd

Formula: $\frac{(PCF \times CCN) - CCO - NPVMP}{CCN}$

**III. Cost Analysis Procedure Calculations For Jack County (Jack 2) HRSG3 and HRSG4**

**A. Marketable Product Value (MPV)**

Electricity Price $\frac{\$}{MWh} \times \frac{\text{Plant MWh}}{\text{Year}}$ = ($) MPV

$41.92 x 1,308,271 = $54,842,720.32

**B. Production Cost (PC)**

Levelized Cost Of Energy (LCOE) $\frac{\$}{KWh} \times \frac{\text{Plant kWh}}{\text{Year}}$ = ($) PC

$0.03799 x 1,308,271,000 = $49,699,835.28

Net Present Value Marketable Product (NPVMP) Calculation

$\sum_{t=1}^{n} \frac{\text{Product Value - Production Cost}}{(1 + \text{Interest Rate})^n}$ = NPVMP ($)

$\sum_{t=1}^{n} \frac{\$54,842,720.32 - \$49,699,835.28}{1.10}$ = NPVMP $28,774,661.00 | $28,774,661.00

If MP is <= 0, then MP = 0

**C. Production Capacity Factor (PCF)**

$\frac{\text{Production Capacity of Existing Equipment or Process}}{\text{Production Capacity of New Equipment or Process}}$ = PCF

$\frac{0}{300 \text{ MW} \times 56.21\%}$ = PCF 1.00

**D. Capital Cost New (CCN)**

Pollution Control Property (PC) = CCN $43,225,585.41

**E. Capital Cost Old (CCO)**

Comparable Technology = CCO $134,400,000.00

Partial Use Determination Calculation

$\frac{(PCF \times CCN) - CCO - MP}{CCN}$ = Partial Use Determination %

$\frac{\$43,225,585.41 - \$134,400,000.00 - \$28,774,661.00}{\$43,225,585.41}$ = -277.50%

Eligible HRSG Costs (Partial Use Determination % x PC Property) = -$119,949,075.60

| TCEQ Use Determination Application Section 11 use: | |
|---|---|
| Use Percent | -277.50% |
| Estimated Dollar Value | -$119,949,075.60 |

| |
|---|
| $5,142,885.04 |
| $2,829,280.37 |
| $2,829,280.37 |
| $2,829,280.37 |
| $2,829,280.37 |
| $2,829,280.37 |
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| $2,829,280.37 |
| $2,829,280.37 |
| $2,829,280.37 |
| $2,829,280.37 |

| Plant Area | System | Startup System | Description | Subsystem Total | Tag Number | Tag Description | Item Cost |
|---|---|---|---|---|---|---|---|
| HRSG # 3 | Fuel Gas | | | | | | |
| HRSG # 3 | | 2FG-12 | Fuel Gas HRSG #1 Duct Burners | 1,868,422.53 | | | |
| HRSG # 3 | | | | | 2FG-SCB-2100 | FUEL GAS SCRUBBER | 76,456.25 |
| HRSG # 3 | Heat Recovery | | | | | | |
| HRSG # 3 | | 2HR-11 | HRSG #1 Exhaust Gas Path | 19,744,370.18 | | | |
| HRSG # 3 | | | | | 2BS-HV-1230 | HRSG1 HRH MAIN STM MOV | 104,813.75 |
| HRSG # 3 | | | | | 2HR-MODULES-1100 | HRSG MODULES FOR HRSG# 3 | 4,956,645.35 |
| HRSG # 3 | | | | | 2HR-STACK-1100 | HRSG STACK FOR HRSG# 3 | 2,832,437.80 |
| HRSG # 3 | | | | | 2HR-CASING-1100 | HRSG CASING FOR HRSG# 3 | 7,789,324.75 |
| HRSG # 3 Total | | | | 21,612,792.70 | | | |
| HRSG # 4 | Fuel Gas | | | | | | |
| HRSG # 4 | | 2FG-22 | Fuel Gas HRSG #2 Duct Burners | 1,868,422.53 | | | |
| HRSG # 4 | Heat Recovery | | | | | | |
| HRSG # 4 | | 2HR-21 | HRSG #2 Exhaust Gas Path | 19,744,370.18 | | | |
| HRSG # 4 | | | | | 2HR-CASING-2100 | HRSG CASING FOR HRSG# 4 | 7,760,293.15 |
| HRSG # 4 | | | | | 2HR-STACK-2100 | HRSG STACK FOR HRSG# 4 | 2,825,179.90 |
| HRSG # 4 | | | | | 2BS-HV-2230 | HRSG2 HRH MAIN STM MOV | 104,813.75 |
| HRSG # 4 | | | | | 2HR-MODULES-2100 | HRSG MODULES FOR HRSG# 4 | 4,953,016.40 |
| HRSG # 4 Total | | | | 21,612,792.70 | | | |
| Grand Total | | | | 43,225,585.41 | | | |

| Plant Area | System | Startup System | Description | Subsystem Total | Tag Number | Tag Description | Item Cost |
|---|---|---|---|---|---|---|---|
| HRSG # 3 | Fuel Gas | | | | | | |
| HRSG # 3 | | 2FG-12 | Fuel Gas HRSG #1 Duct Burners | 1,868,422.53 | | | |
| HRSG # 3 | | | | | 2FG-SCB-2100 | FUEL GAS SCRUBBER | 76,456.25 |
| HRSG # 3 | Heat Recovery | | | | | | |
| HRSG # 3 | | 2HR-11 | HRSG #1 Exhaust Gas Path | 19,744,370.18 | | | |
| HRSG # 3 | | | | | 2BS-HV-1230 | HRSG1 HRH MAIN STM MOV | 104,813.75 |
| HRSG # 3 | | | | | 2HR-MODULES-1100 | HRSG MODULES FOR HRSG# 3 | 4,956,645.35 |
| HRSG # 3 | | | | | 2HR-STACK-1100 | HRSG STACK FOR HRSG# 3 | 2,832,437.80 |
| HRSG # 3 | | | | | 2HR-CASING-1100 | HRSG CASING FOR HRSG# 3 | 7,789,324.75 |
| HRSG # 3 Total | | | | 21,612,792.70 | | | |
| HRSG # 4 | Fuel Gas | | | | | | |
| HRSG # 4 | | 2FG-22 | Fuel Gas HRSG #2 Duct Burners | 1,868,422.53 | | | |
| HRSG # 4 | Heat Recovery | | | | | | |
| HRSG # 4 | | 2HR-21 | HRSG #2 Exhaust Gas Path | 19,744,370.18 | | | |
| HRSG # 4 | | | | | 2HR-CASING-2100 | HRSG CASING FOR HRSG# 4 | 7,760,293.15 |
| HRSG # 4 | | | | | 2HR-STACK-2100 | HRSG STACK FOR HRSG# 4 | 2,825,179.90 |
| HRSG # 4 | | | | | 2BS-HV-2230 | HRSG2 HRH MAIN STM MOV | 104,813.75 |
| HRSG # 4 | | | | | 2HR-MODULES-2100 | HRSG MODULES FOR HRSG# 4 | 4,953,016.40 |
| HRSG # 4 Total | | | | 21,612,792.70 | | | |
| Grand Total | | | | 43,225,585.41 | | | |

| Plant Area | System | Startup System | Description | Subsystem Total | Tag Number | Tag Description | Item Cost |
|---|---|---|---|---|---|---|---|
| HRSG # 3 | Fuel Gas | | | | | | |
| HRSG # 3 | | 2FG-12 | Fuel Gas HRSG #1 Duct Burners | 1,868,422.53 | | | |
| HRSG # 3 | | | | | 2FG-SCB-2100 | FUEL GAS SCRUBBER | 76,456.25 |
| HRSG # 3 | Heat Recovery | | | | | | |
| HRSG # 3 | | 2HR-11 | HRSG #1 Exhaust Gas Path | 19,744,370.18 | | | |
| HRSG # 3 | | | | | 2BS-HV-1230 | HRSG1 HRH MAIN STM MOV | 104,813.75 |
| HRSG # 3 | | | | | 2HR-MODULES-1100 | HRSG MODULES FOR HRSG# 3 | 4,956,645.35 |
| HRSG # 3 | | | | | 2HR-STACK-1100 | HRSG STACK FOR HRSG# 3 | 2,832,437.80 |
| HRSG # 3 | | | | | 2HR-CASING-1100 | HRSG CASING FOR HRSG# 3 | 7,789,324.75 |
| **HRSG # 3 Total** | | | | 21,612,792.70 | | | |
| HRSG # 4 | Fuel Gas | | | | | | |
| HRSG # 4 | | 2FG-22 | Fuel Gas HRSG #2 Duct Burners | 1,868,422.53 | | | |
| HRSG # 4 | Heat Recovery | | | | | | |
| HRSG # 4 | | 2HR-21 | HRSG #2 Exhaust Gas Path | 19,744,370.18 | | | |
| HRSG # 4 | | | | | 2HR-CASING-2100 | HRSG CASING FOR HRSG# 4 | 7,760,293.15 |
| HRSG # 4 | | | | | 2HR-STACK-2100 | HRSG STACK FOR HRSG# 4 | 2,825,179.90 |
| HRSG # 4 | | | | | 2BS-HV-2230 | HRSG2 HRH MAIN STM MOV | 104,813.75 |
| HRSG # 4 | | | | | 2HR-MODULES-2100 | HRSG MODULES FOR HRSG# 4 | 4,953,016.40 |
| **HRSG # 4 Total** | | | | 21,612,792.70 | | | |
| **Grand Total** | | | | 43,225,585.41 | | | |

NATURAL GAS FORWARD PRICES ($/MMBtu)

(Delivered Price, Henry Hub plus basis)

Quote Date
2/8/2012

| Price Source Key | |
|---|---|
| | Balance of the month equals Prompt Month Pric |
| | NYMEX Quoted basis plus Henry Hub |
| | Blend of NYMEX Henry Hub and Wood Macker |
| | Estimated Formula |
| | Wood Mackenzie Long-term Modeled |
| | Long-term Basis Modeled |
| | Inflation-escalated value |

| Forward-Month | NYMEX - Henry Hub | ANR LA | ANR OK | Centerpoint | Chicago City Gate | CIG Rocki |
|---|---|---|---|---|---|---|
| Feb-12 | 2.448 | 2.408 | 2.406 | 2.363 | 2.573 | 2.388 |
| Mar-12 | 2.448 | 2.408 | 2.406 | 2.363 | 2.573 | 2.388 |
| Apr-12 | 2.598 | 2.546 | 2.461 | 2.436 | 2.648 | 2.353 |
| May-12 | 2.716 | 2.664 | 2.579 | 2.554 | 2.766 | 2.471 |
| Jun-12 | 2.805 | 2.753 | 2.668 | 2.643 | 2.855 | 2.560 |
| Jul-12 | 2.884 | 2.832 | 2.747 | 2.722 | 2.934 | 2.639 |
| Aug-12 | 2.918 | 2.866 | 2.781 | 2.756 | 2.968 | 2.673 |
| Sep-12 | 2.929 | 2.877 | 2.792 | 2.767 | 2.979 | 2.684 |
| Oct-12 | 2.975 | 2.923 | 2.838 | 2.813 | 3.025 | 2.730 |
| Nov-12 | 3.135 | 3.103 | 3.015 | 2.980 | 3.240 | 2.953 |
| Dec-12 | 3.435 | 3.403 | 3.315 | 3.280 | 3.540 | 3.253 |
| Jan-13 | 3.568 | 3.568 | 3.448 | 3.413 | 3.673 | 3.386 |
| Feb-13 | 3.578 | 3.578 | 3.458 | 3.423 | 3.683 | 3.396 |
| Mar-13 | 3.562 | 3.522 | 3.442 | 3.407 | 3.667 | 3.380 |
| Apr-13 | 3.522 | 3.470 | 3.357 | 3.335 | 3.652 | 3.272 |
| May-13 | 3.552 | 3.500 | 3.387 | 3.365 | 3.582 | 3.302 |
| Jun-13 | 3.587 | 3.535 | 3.422 | 3.400 | 3.617 | 3.337 |
| Jul-13 | 3.630 | 3.578 | 3.465 | 3.443 | 3.660 | 3.380 |
| Aug-13 | 3.647 | 3.595 | 3.482 | 3.460 | 3.677 | 3.397 |
| Sep-13 | 3.648 | 3.596 | 3.483 | 3.461 | 3.678 | 3.398 |
| Oct-13 | 3.688 | 3.636 | 3.523 | 3.501 | 3.718 | 3.438 |
| Nov-13 | 3.788 | 3.766 | 3.648 | 3.616 | 3.886 | 3.598 |
| Dec-13 | 3.987 | 3.955 | 3.847 | 3.815 | 4.085 | 3.797 |
| Jan-14 | 4.096 | 4.096 | 3.956 | 3.924 | 4.201 | 3.906 |
| Feb-14 | 4.084 | 4.084 | 3.944 | 3.912 | 4.189 | 3.894 |
| Mar-14 | 4.046 | 4.006 | 3.906 | 3.874 | 4.151 | 3.856 |
| Apr-14 | 3.929 | 3.877 | 3.709 | 3.742 | 3.959 | 3.679 |
| May-14 | 3.944 | 3.892 | 3.724 | 3.757 | 3.974 | 3.694 |
| Jun-14 | 3.969 | 3.917 | 3.749 | 3.782 | 3.999 | 3.719 |
| Jul-14 | 4.005 | 3.953 | 3.785 | 3.818 | 4.035 | 3.755 |
| Aug-14 | 4.022 | 3.970 | 3.802 | 3.835 | 4.052 | 3.772 |
| Sep-14 | 4.022 | 3.970 | 3.802 | 3.835 | 4.052 | 3.772 |
| Oct-14 | 4.054 | 4.002 | 3.834 | 3.867 | 4.084 | 3.804 |
| Nov-14 | 4.135 | 4.103 | 3.920 | 3.963 | 4.233 | 3.965 |
| Dec-14 | 4.321 | 4.289 | 4.106 | 4.149 | 4.419 | 4.151 |
| Jan-15 | 4.419 | 4.419 | 4.204 | 4.247 | 4.524 | 4.249 |
| Feb-15 | 4.394 | 4.394 | 4.179 | 4.222 | 4.499 | 4.224 |
| Mar-15 | 4.320 | 4.280 | 4.105 | 4.148 | 4.425 | 4.150 |
| Apr-15 | 4.168 | 4.116 | 3.933 | 3.981 | 4.198 | 3.778 |
| May-15 | 4.178 | 4.126 | 3.943 | 3.991 | 4.208 | 3.788 |
| Jun-15 | 4.202 | 4.150 | 3.967 | 4.015 | 4.232 | 3.812 |
| Jul-15 | 4.237 | 4.185 | 4.002 | 4.050 | 4.267 | 3.847 |
| Aug-15 | 4.253 | 4.201 | 4.018 | 4.066 | 4.283 | 3.863 |
| Sep-15 | 4.256 | 4.204 | 4.021 | 4.069 | 4.286 | 3.866 |
| Oct-15 | 4.288 | 4.236 | 4.053 | 4.101 | 4.318 | 3.898 |
| Nov-15 | 4.373 | 4.341 | 4.153 | 4.201 | 4.471 | 4.203 |
| Dec-15 | 4.566 | 4.534 | 4.346 | 4.394 | 4.664 | 4.396 |
| Jan-16 | 4.663 | 4.663 | 4.443 | 4.491 | 4.768 | 4.493 |
| Feb-16 | 4.637 | 4.637 | 4.417 | 4.465 | 4.742 | 4.467 |
| Mar-16 | 4.561 | 4.521 | 4.341 | 4.389 | 4.666 | 4.391 |
| Apr-16 | 4.389 | 4.337 | 4.154 | 4.202 | 4.419 | 4.139 |
| May-16 | 4.399 | 4.347 | 4.164 | 4.212 | 4.429 | 4.149 |
| Jun-16 | 4.424 | 4.372 | 4.189 | 4.237 | 4.454 | 4.174 |
| Jul-16 | 4.459 | 4.407 | 4.224 | 4.272 | 4.489 | 4.209 |
| Aug-16 | 4.479 | 4.427 | 4.244 | 4.292 | 4.509 | 4.229 |
| Sep-16 | 4.484 | 4.432 | 4.249 | 4.297 | 4.514 | 4.234 |
| Oct-16 | 4.519 | 4.467 | 4.284 | 4.332 | 4.549 | 4.269 |
| Nov-16 | 4.611 | 4.579 | 4.391 | 4.439 | 4.709 | 4.431 |
| Dec-16 | 4.811 | 4.779 | 4.591 | 4.639 | 4.909 | 4.631 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Jan-17 | 4.907 | 4.907 | 4.687 | 4.735 | 5.012 | 4.737 |
| Feb-17 | 4.881 | 4.881 | 4.661 | 4.709 | 4.986 | 4.711 |
| Mar-17 | 4.805 | 4.765 | 4.585 | 4.633 | 4.910 | 4.635 |
| Apr-17 | 4.633 | 4.581 | 4.398 | 4.446 | 4.663 | 4.383 |
| May-17 | 4.643 | 4.591 | 4.408 | 4.456 | 4.673 | 4.393 |
| Jun-17 | 4.668 | 4.616 | 4.433 | 4.481 | 4.698 | 4.418 |
| Jul-17 | 4.703 | 4.651 | 4.468 | 4.516 | 4.733 | 4.453 |
| Aug-17 | 4.730 | 4.678 | 4.495 | 4.543 | 4.760 | 4.480 |
| Sep-17 | 4.736 | 4.684 | 4.501 | 4.549 | 4.766 | 4.486 |
| Oct-17 | 4.771 | 4.719 | 4.536 | 4.584 | 4.801 | 4.521 |
| Nov-17 | 4.872 | 4.840 | 4.652 | 4.700 | 4.970 | 4.692 |
| Dec-17 | 5.074 | 5.042 | 4.854 | 4.902 | 5.172 | 4.894 |
| Jan-18 | 5.179 | 5.179 | 4.959 | 5.007 | 5.284 | 5.009 |
| Feb-18 | 5.153 | 5.153 | 4.933 | 4.981 | 5.258 | 4.983 |
| Mar-18 | 5.077 | 5.037 | 4.857 | 4.905 | 5.182 | 4.907 |
| Apr-18 | 4.892 | 4.840 | 4.657 | 4.705 | 4.922 | 4.642 |
| May-18 | 4.902 | 4.850 | 4.667 | 4.715 | 4.932 | 4.652 |
| Jun-18 | 4.927 | 4.875 | 4.692 | 4.740 | 4.957 | 4.677 |
| Jul-18 | 4.962 | 4.910 | 4.727 | 4.775 | 4.992 | 4.712 |
| Aug-18 | 4.994 | 4.942 | 4.759 | 4.807 | 5.024 | 4.744 |
| Sep-18 | 5.004 | 4.952 | 4.769 | 4.817 | 5.034 | 4.754 |
| Oct-18 | 5.049 | 4.997 | 4.814 | 4.862 | 5.079 | 4.799 |
| Nov-18 | 5.160 | 5.128 | 4.940 | 4.988 | 5.258 | 4.980 |
| Dec-18 | 5.365 | 5.333 | 5.145 | 5.193 | 5.463 | 5.185 |
| Jan-19 | 5.479 | 5.479 | 5.259 | 5.307 | 5.584 | 5.309 |
| Feb-19 | 5.453 | 5.453 | 5.233 | 5.281 | 5.558 | 5.283 |
| Mar-19 | 5.377 | 5.337 | 5.157 | 5.205 | 5.482 | 5.207 |
| Apr-19 | 5.162 | 5.110 | 4.927 | 4.975 | 5.192 | 4.912 |
| May-19 | 5.172 | 5.120 | 4.937 | 4.985 | 5.202 | 4.922 |
| Jun-19 | 5.197 | 5.145 | 4.962 | 5.010 | 5.227 | 4.947 |
| Jul-19 | 5.233 | 5.181 | 4.998 | 5.046 | 5.263 | 4.983 |
| Aug-19 | 5.266 | 5.214 | 5.031 | 5.079 | 5.296 | 5.016 |
| Sep-19 | 5.276 | 5.224 | 5.041 | 5.089 | 5.306 | 5.026 |
| Oct-19 | 5.323 | 5.271 | 5.088 | 5.136 | 5.353 | 5.073 |
| Nov-19 | 5.466 | 5.414 | 5.226 | 5.274 | 5.544 | 5.266 |
| Dec-19 | 5.684 | 5.632 | 5.444 | 5.492 | 5.762 | 5.484 |
| Jan-20 | 5.796 | 5.796 | 5.576 | 5.623 | 5.901 | 5.626 |
| Feb-20 | 5.778 | 5.778 | 5.558 | 5.605 | 5.883 | 5.608 |
| Mar-20 | 5.708 | 5.668 | 5.488 | 5.536 | 5.813 | 5.538 |
| Apr-20 | 5.494 | 5.442 | 5.259 | 5.307 | 5.524 | 5.244 |
| May-20 | 5.515 | 5.463 | 5.280 | 5.328 | 5.545 | 5.265 |
| Jun-20 | 5.552 | 5.499 | 5.317 | 5.364 | 5.582 | 5.302 |
| Jul-20 | 5.604 | 5.551 | 5.369 | 5.416 | 5.634 | 5.354 |
| Aug-20 | 5.653 | 5.598 | 5.416 | 5.463 | 5.681 | 5.401 |
| Sep-20 | 5.669 | 5.616 | 5.434 | 5.481 | 5.699 | 5.419 |
| Oct-20 | 5.731 | 5.678 | 5.496 | 5.543 | 5.761 | 5.481 |
| Nov-20 | 5.885 | 5.832 | 5.645 | 5.692 | 5.962 | 5.685 |
| Dec-20 | 6.092 | 6.060 | 5.873 | 5.920 | 6.190 | 5.913 |
| Jan-21 | 6.207 | 6.207 | 5.987 | 6.035 | 6.312 | 6.037 |
| Feb-21 | 6.191 | 6.191 | 5.971 | 6.018 | 6.296 | 6.021 |
| Mar-21 | 6.119 | 6.079 | 5.899 | 5.946 | 6.224 | 5.949 |
| Apr-21 | 5.889 | 5.837 | 5.654 | 5.702 | 5.919 | 5.639 |
| May-21 | 5.911 | 5.860 | 5.678 | 5.725 | 5.943 | 5.663 |
| Jun-21 | 5.961 | 5.909 | 5.726 | 5.774 | 5.991 | 5.711 |
| Jul-21 | 6.024 | 5.972 | 5.789 | 5.837 | 6.054 | 5.774 |
| Aug-21 | 6.076 | 6.024 | 5.841 | 5.889 | 6.106 | 5.826 |
| Sep-21 | 6.086 | 6.034 | 5.851 | 5.899 | 6.116 | 5.836 |
| Oct-21 | 6.137 | 6.085 | 5.902 | 5.950 | 6.167 | 5.887 |
| Nov-21 | 6.293 | 6.242 | 6.054 | 6.102 | 6.372 | 6.094 |
| Dec-21 | 6.485 | 6.462 | 6.275 | 6.322 | 6.592 | 6.315 |
| Jan-22 | 6.639 | 6.639 | 6.419 | 6.467 | 6.744 | 6.469 |
| Feb-22 | 6.632 | 6.632 | 6.412 | 6.459 | 6.737 | 6.462 |
| Mar-22 | 6.516 | 6.473 | 6.293 | 6.341 | 6.618 | 6.343 |
| Apr-22 | 6.270 | 6.227 | 6.044 | 6.092 | 6.309 | 6.029 |
| May-22 | 6.291 | 6.248 | 6.066 | 6.113 | 6.331 | 6.051 |
| Jun-22 | 6.339 | 6.317 | 6.134 | 6.182 | 6.399 | 6.119 |
| Jul-22 | 6.458 | 6.401 | 6.218 | 6.266 | 6.483 | 6.203 |
| Aug-22 | 6.507 | 6.464 | 6.282 | 6.329 | 6.547 | 6.267 |
| Sep-22 | 6.480 | 6.437 | 6.255 | 6.302 | 6.520 | 6.240 |
| Oct-22 | 6.526 | 6.473 | 6.291 | 6.338 | 6.556 | 6.276 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Nov-22 | 6,668 | 6,636 | 6,448 | 6,496 | 6,766 | 6,488 |
| Dec-22 | 6,887 | 6,855 | 6,667 | 6,715 | 6,985 | 6,707 |
| Jan-23 | 7,049 | 6,829 | 6,877 | 7,154 | 6,879 | |
| Feb-23 | 7,041 | 7,041 | 6,821 | 6,868 | 7,146 | 6,871 |
| Mar-23 | 6,827 | 6,887 | 6,707 | 6,754 | 7,032 | 6,757 |
| Apr-23 | 6,720 | 6,668 | 6,485 | 6,533 | 6,750 | 6,470 |
| May-23 | 6,779 | 6,717 | 6,535 | 6,582 | 6,800 | 6,520 |
| Jun-23 | 6,858 | 6,806 | 6,623 | 6,671 | 6,888 | 6,608 |
| Jul-23 | 6,980 | 6,928 | 6,745 | 6,793 | 7,010 | 6,730 |
| Aug-23 | 7,066 | 7,004 | 6,821 | 6,869 | 7,086 | 6,806 |
| Sep-23 | 6,973 | 6,920 | 6,738 | 6,785 | 7,003 | 6,723 |
| Oct-23 | 6,998 | 6,945 | 6,763 | 6,810 | 7,028 | 6,748 |
| Nov-23 | 7,051 | 7,120 | 6,933 | 6,980 | 7,250 | 6,973 |
| Dec-23 | 7,351 | 7,321 | 7,134 | 7,181 | 7,451 | 7,174 |
| Jan-24 | 7,607 | 7,387 | 7,434 | 7,712 | 7,437 | |
| Feb-24 | 7,621 | 7,401 | 7,449 | 7,726 | 7,451 | |
| Mar-24 | 7,337 | 7,157 | 7,204 | 7,482 | 7,207 | |
| Apr-24 | 7,190 | 7,007 | 7,055 | 7,272 | 6,992 | |
| May-24 | 7,287 | 7,105 | 7,152 | 7,370 | 7,090 | |
| Jun-24 | 7,436 | 7,254 | 7,301 | 7,519 | 7,239 | |
| Jul-24 | 7,649 | 7,466 | 7,514 | 7,731 | 7,451 | |
| Aug-24 | 7,782 | 7,599 | 7,647 | 7,864 | 7,584 | |
| Sep-24 | 7,789 | 7,607 | 7,654 | 7,872 | 7,592 | |
| Oct-24 | 7,773 | 7,591 | 7,638 | 7,856 | 7,576 | |
| Nov-24 | 8,050 | 7,862 | 7,910 | 8,180 | 7,902 | |
| Dec-24 | 8,404 | 8,217 | 8,264 | 8,534 | 8,257 | |
| Jan-25 | 8,720 | 8,500 | 8,548 | 8,825 | 8,550 | |
| Feb-25 | 8,733 | 8,513 | 8,560 | 8,838 | 8,563 | |
| Mar-25 | 8,191 | 8,011 | 8,059 | 8,336 | 8,061 | |
| Apr-25 | 8,162 | 7,979 | 8,027 | 8,244 | 7,964 | |
| May-25 | 8,255 | 8,073 | 8,120 | 8,338 | 8,058 | |
| Jun-25 | 8,430 | 8,247 | 8,295 | 8,512 | 8,232 | |
| Jul-25 | 8,686 | 8,504 | 8,551 | 8,769 | 8,489 | |
| Aug-25 | 8,738 | 8,556 | 8,603 | 8,821 | 8,541 | |
| Sep-25 | 8,548 | 8,366 | 8,413 | 8,631 | 8,351 | |
| Oct-25 | 8,321 | 8,139 | 8,186 | 8,404 | 8,124 | |
| Nov-25 | 8,382 | 8,195 | 8,242 | 8,512 | 8,235 | |
| Dec-25 | 8,574 | 8,386 | 8,434 | 8,704 | 8,426 | |
| Jan-26 | 9,045 | 8,825 | 8,873 | 9,150 | 8,875 | |
| Feb-26 | 9,099 | 8,879 | 8,926 | 9,204 | 8,929 | |
| Mar-26 | 8,738 | 8,558 | 8,605 | 8,883 | 8,608 | |
| Apr-26 | 8,681 | 8,498 | 8,546 | 8,763 | 8,483 | |
| May-26 | 8,779 | 8,596 | 8,644 | 8,861 | 8,581 | |
| Jun-26 | 8,976 | 8,794 | 8,841 | 9,059 | 8,779 | |
| Jul-26 | 9,266 | 9,084 | 9,131 | 9,349 | 9,069 | |
| Aug-26 | 9,321 | 9,139 | 9,186 | 9,404 | 9,124 | |
| Sep-26 | 9,050 | 8,867 | 8,915 | 9,132 | 8,852 | |
| Oct-26 | 8,936 | 8,753 | 8,801 | 9,018 | 8,738 | |
| Nov-26 | 9,000 | 8,813 | 8,860 | 9,130 | 8,853 | |
| Dec-26 | 9,238 | 9,051 | 9,098 | 9,368 | 9,091 | |
| Jan-27 | 9,144 | 8,924 | 8,971 | 9,249 | 8,974 | |
| Feb-27 | 9,198 | 8,978 | 9,026 | 9,303 | 9,028 | |
| Mar-27 | 8,913 | 8,733 | 8,780 | 9,058 | 8,783 | |
| Apr-27 | 8,892 | 8,709 | 8,757 | 8,974 | 8,694 | |
| May-27 | 8,972 | 8,790 | 8,837 | 9,055 | 8,775 | |
| Jun-27 | 9,182 | 9,000 | 9,047 | 9,265 | 8,985 | |
| Jul-27 | 9,458 | 9,275 | 9,323 | 9,540 | 9,260 | |
| Aug-27 | 9,514 | 9,332 | 9,379 | 9,597 | 9,317 | |
| Sep-27 | 9,261 | 9,078 | 9,126 | 9,343 | 9,063 | |
| Oct-27 | 9,142 | 8,959 | 9,007 | 9,224 | 8,944 | |
| Nov-27 | 9,227 | 9,040 | 9,087 | 9,357 | 9,080 | |
| Dec-27 | 9,398 | 9,211 | 9,258 | 9,528 | 9,251 | |
| Jan-28 | 9,451 | 9,231 | 9,278 | 9,556 | 9,281 | |
| Feb-28 | 9,506 | 9,286 | 9,333 | 9,611 | 9,336 | |
| Mar-28 | 9,143 | 8,963 | 9,011 | 9,288 | 9,013 | |
| Apr-28 | 9,070 | 8,888 | 8,935 | 9,153 | 8,873 | |
| May-28 | 9,185 | 9,003 | 9,050 | 9,268 | 8,988 | |
| Jun-28 | 9,414 | 9,231 | 9,279 | 9,496 | 9,216 | |
| Jul-28 | 9,689 | 9,506 | 9,554 | 9,771 | 9,491 | |
| Aug-28 | 9,746 | 9,564 | 9,611 | 9,829 | 9,549 | |

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|---|---|---|---|---|---|---|
| Sep-28 | | 9.315 | 9.133 | 9.180 | 9.398 | 9.118 |
| Oct-28 | | 9.211 | 9.029 | 9.076 | 9.294 | 9.014 |
| Nov-28 | | 9.314 | 9.127 | 9.174 | 9.444 | 9.167 |
| Dec-28 | | 9.472 | 9.285 | 9.332 | 9.602 | 9.325 |
| Jan-29 | | 9.767 | 9.547 | 9.594 | 9.872 | 9.597 |
| Feb-29 | | 9.825 | 9.605 | 9.652 | 9.930 | 9.655 |
| Mar-29 | | 9.324 | 9.144 | 9.191 | 9.469 | 9.194 |
| Apr-29 | | 9.207 | 9.024 | 9.072 | 9.289 | 9.009 |
| May-29 | | 9.294 | 9.112 | 9.159 | 9.377 | 9.097 |
| Jun-29 | | 9.560 | 9.377 | 9.425 | 9.642 | 9.362 |
| Jul-29 | | 9.868 | 9.686 | 9.733 | 9.951 | 9.671 |
| Aug-29 | | 9.927 | 9.744 | 9.792 | 10.009 | 9.729 |
| Sep-29 | | 9.629 | 9.446 | 9.494 | 9.711 | 9.431 |
| Oct-29 | | 9.365 | 9.183 | 9.230 | 9.448 | 9.168 |
| Nov-29 | | 9.407 | 9.220 | 9.267 | 9.537 | 9.260 |
| Dec-29 | | 9.605 | 9.417 | 9.465 | 9.735 | 9.457 |
| Jan-30 | | 9.873 | 9.653 | 9.701 | 9.978 | 9.703 |
| Feb-30 | | 9.930 | 9.710 | 9.757 | 10.035 | 9.760 |
| Mar-30 | | 9.428 | 9.248 | 9.295 | 9.573 | 9.298 |
| Apr-30 | | 9.356 | 9.174 | 9.221 | 9.439 | 9.159 |
| May-30 | | 9.466 | 9.283 | 9.331 | 9.548 | 9.268 |
| Jun-30 | | 9.688 | 9.506 | 9.553 | 9.771 | 9.491 |
| Jul-30 | | 9.995 | 9.813 | 9.860 | 10.078 | 9.798 |
| Aug-30 | | 10.055 | 9.872 | 9.920 | 10.137 | 9.857 |
| Sep-30 | | 9.810 | 9.627 | 9.675 | 9.892 | 9.612 |
| Oct-30 | | 9.683 | 9.501 | 9.548 | 9.766 | 9.486 |
| Nov-30 | | 9.762 | 9.574 | 9.622 | 9.892 | 9.614 |
| Dec-30 | | 10.035 | 9.848 | 9.895 | 10.165 | 9.888 |
| Jan-31 | | 10.071 | 9.851 | 9.898 | 10.176 | 9.901 |
| Feb-31 | | 10.128 | 9.908 | 9.956 | 10.233 | 9.958 |
| Mar-31 | | 9.617 | 9.437 | 9.485 | 9.762 | 9.487 |
| Apr-31 | | 9.544 | 9.362 | 9.409 | 9.627 | 9.347 |
| May-31 | | 9.656 | 9.473 | 9.521 | 9.738 | 9.458 |
| Jun-31 | | 9.883 | 9.701 | 9.748 | 9.966 | 9.686 |
| Jul-31 | | 10.196 | 10.014 | 10.061 | 10.279 | 9.999 |
| Aug-31 | | 10.257 | 10.075 | 10.122 | 10.340 | 10.060 |
| Sep-31 | | 10.007 | 9.825 | 9.872 | 10.090 | 9.810 |
| Oct-31 | | 9.878 | 9.695 | 9.743 | 9.960 | 9.680 |
| Nov-31 | | 9.958 | 9.770 | 9.818 | 10.088 | 9.810 |
| Dec-31 | | 10.237 | 10.049 | 10.097 | 10.367 | 10.089 |
| Jan-32 | | 10.272 | 10.052 | 10.100 | 10.377 | 10.102 |
| Feb-32 | | 10.331 | 10.111 | 10.158 | 10.436 | 10.161 |
| Mar-32 | | 9.810 | 9.630 | 9.678 | 9.955 | 9.680 |
| Apr-32 | | 9.736 | 9.554 | 9.601 | 9.819 | 9.539 |
| May-32 | | 9.850 | 9.668 | 9.715 | 9.933 | 9.653 |
| Jun-32 | | 10.082 | 9.900 | 9.947 | 10.165 | 9.885 |
| Jul-32 | | 10.401 | 10.219 | 10.266 | 10.484 | 10.204 |
| Aug-32 | | 10.463 | 10.281 | 10.328 | 10.546 | 10.266 |
| Sep-32 | | 10.208 | 10.026 | 10.073 | 10.291 | 10.011 |
| Oct-32 | | 10.077 | 9.894 | 9.942 | 10.159 | 9.879 |
| Nov-32 | | 10.158 | 9.970 | 10.018 | 10.288 | 10.010 |
| Dec-32 | | 10.442 | 10.255 | 10.302 | 10.572 | 10.295 |
| Jan-33 | | 10.478 | 10.258 | 10.305 | 10.583 | 10.308 |
| Feb-33 | | 10.537 | 10.317 | 10.365 | 10.642 | 10.367 |
| Mar-33 | | 10.007 | 9.827 | 9.875 | 10.152 | 9.877 |
| Apr-33 | | 9.932 | 9.750 | 9.797 | 10.015 | 9.735 |
| May-33 | | 10.048 | 9.866 | 9.913 | 10.131 | 9.851 |
| Jun-33 | | 10.285 | 10.102 | 10.150 | 10.367 | 10.087 |
| Jul-33 | | 10.610 | 10.428 | 10.475 | 10.693 | 10.413 |
| Aug-33 | | 10.674 | 10.491 | 10.539 | 10.756 | 10.476 |
| Sep-33 | | 10.413 | 10.231 | 10.278 | 10.496 | 10.216 |
| Oct-33 | | 10.279 | 10.097 | 10.144 | 10.362 | 10.082 |
| Nov-33 | | 10.361 | 10.174 | 10.221 | 10.491 | 10.214 |
| Dec-33 | | 10.652 | 10.464 | 10.512 | 10.782 | 10.504 |
| Jan-34 | 10.765 | 10.765 | 10.545 | 10.592 | 10.870 | 10.595 |
| Feb-34 | 10.826 | 10.826 | 10.606 | 10.654 | 10.931 | 10.656 |
| Mar-34 | 10.322 | 10.282 | 10.102 | 10.150 | 10.427 | 10.152 |
| Apr-34 | 10.256 | 10.206 | 10.023 | 10.071 | 10.288 | 10.008 |
| May-34 | 10.377 | 10.325 | 10.142 | 10.190 | 10.407 | 10.127 |
| Jun-34 | 10.624 | 10.568 | 10.386 | 10.433 | 10.651 | 10.371 |

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|---|---|---|---|---|---|---|
| Jul-34 | 10.955 | 10.903 | 10.720 | 10.768 | 10.985 | 10.705 |
| Aug-34 | 11.020 | 10.968 | 10.785 | 10.833 | 11.050 | 10.770 |
| Sep-34 | 10.753 | 10.701 | 10.518 | 10.566 | 10.783 | 10.503 |
| Oct-34 | 10.615 | 10.563 | 10.380 | 10.428 | 10.645 | 10.365 |
| Nov-34 | 10.679 | 10.647 | 10.459 | 10.507 | 10.777 | 10.499 |
| Dec-34 | 10.977 | 10.945 | 10.757 | 10.805 | 11.075 | 10.797 |
| Jan-35 | 11.060 | 11.060 | 10.840 | 10.888 | 11.165 | 10.890 |
| Feb-35 | 11.129 | 11.123 | 10.903 | 10.951 | 11.228 | 10.953 |
| Mar-35 | 10.606 | 10.566 | 10.386 | 10.434 | 10.711 | 10.436 |
| Apr-35 | 10.540 | 10.487 | 10.305 | 10.352 | 10.570 | 10.290 |
| May-35 | 10.663 | 10.610 | 10.428 | 10.475 | 10.693 | 10.413 |
| Jun-35 | 10.913 | 10.860 | 10.678 | 10.725 | 10.943 | 10.663 |
| Jul-35 | 11.256 | 11.204 | 11.021 | 11.069 | 11.286 | 11.006 |
| Aug-35 | 11.323 | 11.271 | 11.088 | 11.136 | 11.353 | 11.073 |
| Sep-35 | 11.049 | 10.996 | 10.814 | 10.861 | 11.079 | 10.799 |
| Oct-35 | 10.907 | 10.855 | 10.672 | 10.720 | 10.937 | 10.657 |
| Nov-35 | 10.973 | 10.941 | 10.753 | 10.801 | 11.071 | 10.793 |
| Dec-35 | 11.280 | 11.247 | 11.060 | 11.107 | 11.377 | 11.100 |
| Jan-36 | 11.365 | 11.365 | 11.145 | 11.192 | 11.470 | 11.195 |
| Feb-36 | 11.430 | 11.430 | 11.210 | 11.257 | 11.535 | 11.260 |
| Mar-36 | 10.898 | 10.858 | 10.678 | 10.726 | 11.003 | 10.728 |
| Apr-36 | 10.830 | 10.778 | 10.595 | 10.643 | 10.860 | 10.580 |
| May-36 | 10.956 | 10.904 | 10.721 | 10.769 | 10.986 | 10.706 |
| Jun-36 | 11.213 | 11.161 | 10.978 | 11.026 | 11.243 | 10.963 |
| Jul-36 | 11.567 | 11.514 | 11.332 | 11.379 | 11.597 | 11.317 |
| Aug-36 | 11.636 | 11.583 | 11.401 | 11.448 | 11.666 | 11.386 |
| Sep-36 | 11.354 | 11.301 | 11.119 | 11.166 | 11.384 | 11.104 |
| Oct-36 | 11.208 | 11.156 | 10.973 | 11.021 | 11.238 | 10.958 |
| Nov-36 | 11.276 | 11.243 | 11.056 | 11.103 | 11.373 | 11.096 |
| Dec-36 | 11.591 | 11.558 | 11.371 | 11.418 | 11.688 | 11.411 |
| Jan-37 | 11.678 | 11.678 | 11.458 | 11.506 | 11.783 | 11.508 |
| Feb-37 | 11.745 | 11.745 | 11.525 | 11.573 | 11.850 | 11.575 |
| Mar-37 | 11.199 | 11.159 | 10.979 | 11.026 | 11.304 | 11.029 |
| Apr-37 | 11.129 | 11.077 | 10.894 | 10.942 | 11.159 | 10.879 |
| May-37 | 11.259 | 11.206 | 11.024 | 11.071 | 11.289 | 11.009 |
| Jun-37 | 11.523 | 11.470 | 11.288 | 11.335 | 11.553 | 11.273 |
| Jul-37 | 11.886 | 11.833 | 11.651 | 11.698 | 11.916 | 11.636 |
| Aug-37 | 11.956 | 11.904 | 11.721 | 11.769 | 11.986 | 11.706 |
| Sep-37 | 11.667 | 11.614 | 11.432 | 11.479 | 11.697 | 11.417 |
| Oct-37 | 11.517 | 11.464 | 11.282 | 11.329 | 11.547 | 11.267 |
| Nov-37 | 11.587 | 11.554 | 11.367 | 11.414 | 11.684 | 11.407 |
| Dec-37 | 11.910 | 11.878 | 11.690 | 11.738 | 12.008 | 11.730 |
| Jan-38 | 12.000 | 12.000 | 11.780 | 11.828 | 12.105 | 11.830 |
| Feb-38 | 12.069 | 12.069 | 11.849 | 11.896 | 12.174 | 11.899 |
| Mar-38 | 11.507 | 11.467 | 11.287 | 11.335 | 11.612 | 11.337 |
| Apr-38 | 11.436 | 11.383 | 11.201 | 11.248 | 11.466 | 11.186 |
| May-38 | 11.569 | 11.516 | 11.334 | 11.381 | 11.599 | 11.319 |
| Jun-38 | 11.840 | 11.788 | 11.605 | 11.653 | 11.870 | 11.590 |
| Jul-38 | 12.213 | 12.161 | 11.978 | 12.026 | 12.243 | 11.963 |
| Aug-38 | 12.286 | 12.233 | 12.051 | 12.098 | 12.316 | 12.036 |
| Sep-38 | 11.988 | 11.936 | 11.753 | 11.801 | 12.018 | 11.738 |
| Oct-38 | 11.834 | 11.782 | 11.599 | 11.647 | 11.864 | 11.584 |
| Nov-38 | 11.906 | 11.874 | 11.686 | 11.734 | 12.004 | 11.726 |
| Dec-38 | 12.239 | 12.206 | 12.019 | 12.066 | 12.336 | 12.059 |
| Jan-39 | 12.331 | 12.331 | 12.111 | 12.159 | 12.436 | 12.161 |
| Feb-39 | 12.402 | 12.402 | 12.182 | 12.229 | 12.507 | 12.232 |
| Mar-39 | 11.825 | 11.785 | 11.605 | 11.652 | 11.930 | 11.655 |
| Apr-39 | 11.751 | 11.699 | 11.516 | 11.564 | 11.781 | 11.501 |
| May-39 | 11.888 | 11.836 | 11.653 | 11.701 | 11.918 | 11.638 |
| Jun-39 | 12.167 | 12.115 | 11.932 | 11.980 | 12.197 | 11.917 |
| Jul-39 | 12.551 | 12.498 | 12.316 | 12.363 | 12.581 | 12.301 |
| Aug-39 | 12.625 | 12.573 | 12.390 | 12.438 | 12.655 | 12.375 |
| Sep-39 | 12.319 | 12.267 | 12.084 | 12.132 | 12.349 | 12.069 |
| Oct-39 | 12.162 | 12.109 | 11.927 | 11.974 | 12.192 | 11.912 |
| Nov-39 | 12.235 | 12.203 | 12.015 | 12.063 | 12.333 | 12.055 |
| Dec-39 | 12.577 | 12.544 | 12.357 | 12.404 | 12.674 | 12.397 |
| Jan-40 | 12.672 | 12.672 | 12.452 | 12.500 | 12.777 | 12.502 |
| Feb-40 | 12.745 | 12.745 | 12.525 | 12.572 | 12.850 | 12.575 |
| Mar-40 | 12.152 | 12.112 | 11.932 | 11.979 | 12.257 | 11.982 |
| Apr-40 | 12.077 | 12.024 | 11.842 | 11.889 | 12.107 | 11.827 |

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|---|---|---|---|---|---|---|
| May-40 | 12,217 | 12,165 | 11,982 | 12,030 | 12,247 | 11,967 |
| Jun-40 | 12,504 | 12,451 | 12,269 | 12,316 | 12,534 | 12,254 |
| Jul-40 | 12,898 | 12,845 | 12,663 | 12,710 | 12,928 | 12,648 |
| Aug-40 | 12,975 | 12,922 | 12,740 | 12,787 | 13,005 | 12,725 |
| Sep-40 | 12,661 | 12,608 | 12,426 | 12,473 | 12,691 | 12,411 |
| Oct-40 | 12,498 | 12,446 | 12,263 | 12,311 | 12,528 | 12,248 |
| Nov-40 | 12,574 | 12,542 | 12,354 | 12,402 | 12,672 | 12,394 |
| Dec-40 | 12,925 | 12,893 | 12,705 | 12,753 | 13,023 | 12,745 |

| Houston Ship Channel | Michigan Consolidated | NGPL Midcont | NGPL TX-OK | Northern, Demarc | NNG_Ventura | Panhandle East Pipeline |
|---|---|---|---|---|---|---|
| 2.408 | 2.676 | 2.398 | 2.398 | 2.518 | 2.523 | 2.376 |
| 2.408 | 2.676 | 2.398 | 2.398 | 2.518 | 2.523 | 2.376 |
| 2.543 | 2.748 | 2.458 | 2.523 | 2.551 | 2.543 | 2.426 |
| 2.661 | 2.866 | 2.571 | 2.641 | 2.669 | 2.661 | 2.544 |
| 2.750 | 2.955 | 2.660 | 2.730 | 2.758 | 2.750 | 2.633 |
| 2.829 | 3.034 | 2.739 | 2.809 | 2.837 | 2.829 | 2.712 |
| 2.863 | 3.068 | 2.773 | 2.843 | 2.871 | 2.863 | 2.746 |
| 2.874 | 3.079 | 2.784 | 2.854 | 2.882 | 2.874 | 2.757 |
| 2.920 | 3.125 | 2.830 | 2.900 | 2.928 | 2.920 | 2.803 |
| 3.043 | 3.260 | 3.010 | 3.040 | 3.135 | 3.165 | 2.975 |
| 3.343 | 3.560 | 3.310 | 3.340 | 3.435 | 3.465 | 3.275 |
| 3.476 | 3.693 | 3.443 | 3.473 | 3.601 | 3.598 | 3.408 |
| 3.486 | 3.703 | 3.453 | 3.483 | 3.611 | 3.608 | 3.418 |
| 3.470 | 3.687 | 3.437 | 3.467 | 3.595 | 3.592 | 3.402 |
| 3.457 | 3.655 | 3.350 | 3.435 | 3.442 | 3.440 | 3.315 |
| 3.487 | 3.685 | 3.380 | 3.466 | 3.472 | 3.470 | 3.345 |
| 3.522 | 3.720 | 3.415 | 3.500 | 3.507 | 3.505 | 3.380 |
| 3.565 | 3.763 | 3.458 | 3.543 | 3.550 | 3.548 | 3.423 |
| 3.582 | 3.780 | 3.475 | 3.560 | 3.567 | 3.565 | 3.440 |
| 3.583 | 3.781 | 3.476 | 3.561 | 3.568 | 3.566 | 3.441 |
| 3.623 | 3.821 | 3.516 | 3.601 | 3.608 | 3.606 | 3.481 |
| 3.708 | 3.896 | 3.641 | 3.681 | 3.806 | 3.801 | 3.606 |
| 3.907 | 4.095 | 3.840 | 3.880 | 4.005 | 4.000 | 3.805 |
| 4.016 | 4.204 | 3.949 | 3.989 | 4.129 | 4.109 | 3.914 |
| 4.004 | 4.192 | 3.937 | 3.977 | 4.117 | 4.097 | 3.902 |
| 3.966 | 4.154 | 3.899 | 3.939 | 4.079 | 4.059 | 3.864 |
| 3.867 | 4.034 | 3.674 | 3.829 | 3.849 | 3.842 | 3.717 |
| 3.882 | 4.049 | 3.689 | 3.844 | 3.864 | 3.857 | 3.732 |
| 3.907 | 4.074 | 3.714 | 3.869 | 3.889 | 3.887 | 3.757 |
| 3.943 | 4.110 | 3.750 | 3.905 | 3.925 | 3.923 | 3.793 |
| 3.960 | 4.127 | 3.767 | 3.922 | 3.942 | 3.940 | 3.810 |
| 3.960 | 4.127 | 3.767 | 3.922 | 3.942 | 3.940 | 3.810 |
| 3.992 | 4.159 | 3.799 | 3.954 | 3.974 | 3.972 | 3.842 |
| 4.055 | 4.243 | 4.005 | 4.020 | 4.153 | 4.148 | 3.943 |
| 4.241 | 4.429 | 4.191 | 4.206 | 4.339 | 4.334 | 4.129 |
| 4.339 | 4.527 | 4.272 | 4.304 | 4.452 | 4.374 | 4.227 |
| 4.314 | 4.502 | 4.247 | 4.279 | 4.427 | 4.349 | 4.202 |
| 4.240 | 4.428 | 4.173 | 4.205 | 4.353 | 4.275 | 4.128 |
| 4.076 | 4.273 | 3.913 | 4.063 | 4.088 | 4.123 | 3.833 |
| 4.086 | 4.283 | 3.923 | 4.073 | 4.098 | 4.133 | 3.843 |
| 4.110 | 4.307 | 3.947 | 4.097 | 4.122 | 4.157 | 3.867 |
| 4.145 | 4.342 | 3.982 | 4.132 | 4.157 | 4.192 | 3.902 |
| 4.161 | 4.358 | 3.998 | 4.148 | 4.173 | 4.208 | 3.918 |
| 4.164 | 4.361 | 4.001 | 4.151 | 4.176 | 4.211 | 3.921 |
| 4.196 | 4.393 | 4.033 | 4.183 | 4.208 | 4.243 | 3.953 |
| 4.261 | 4.481 | 4.243 | 4.243 | 4.391 | 4.328 | 4.098 |
| 4.454 | 4.674 | 4.436 | 4.436 | 4.584 | 4.521 | 4.291 |
| 4.583 | 4.771 | 4.493 | 4.533 | 4.696 | 4.618 | 4.388 |
| 4.557 | 4.745 | 4.467 | 4.507 | 4.670 | 4.592 | 4.362 |
| 4.481 | 4.669 | 4.391 | 4.431 | 4.594 | 4.516 | 4.286 |
| 4.297 | 4.494 | 4.109 | 4.212 | 4.309 | 4.344 | 4.054 |
| 4.307 | 4.504 | 4.119 | 4.222 | 4.319 | 4.354 | 4.064 |
| 4.332 | 4.529 | 4.144 | 4.247 | 4.344 | 4.379 | 4.089 |
| 4.367 | 4.564 | 4.179 | 4.282 | 4.379 | 4.414 | 4.124 |
| 4.387 | 4.584 | 4.199 | 4.302 | 4.399 | 4.434 | 4.144 |
| 4.392 | 4.589 | 4.204 | 4.307 | 4.404 | 4.439 | 4.149 |
| 4.427 | 4.624 | 4.239 | 4.342 | 4.439 | 4.474 | 4.184 |
| 4.499 | 4.719 | 4.316 | 4.391 | 4.629 | 4.566 | 4.336 |
| 4.699 | 4.919 | 4.516 | 4.591 | 4.829 | 4.766 | 4.536 |

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|---|---|---|---|---|---|---|
| 4.827 | 5.015 | 4.737 | 4.777 | 4.940 | 4.862 | 4.632 |
| 4.801 | 4.989 | 4.711 | 4.751 | 4.914 | 4.836 | 4.606 |
| 4.725 | 4.913 | 4.635 | 4.675 | 4.838 | 4.760 | 4.530 |
| 4.541 | 4.738 | 4.353 | 4.456 | 4.553 | 4.588 | 4.298 |
| 4.551 | 4.748 | 4.363 | 4.466 | 4.563 | 4.598 | 4.308 |
| 4.576 | 4.773 | 4.388 | 4.491 | 4.588 | 4.623 | 4.333 |
| 4.611 | 4.808 | 4.423 | 4.526 | 4.623 | 4.658 | 4.368 |
| 4.638 | 4.835 | 4.450 | 4.553 | 4.650 | 4.685 | 4.395 |
| 4.644 | 4.841 | 4.456 | 4.559 | 4.656 | 4.691 | 4.401 |
| 4.679 | 4.876 | 4.491 | 4.594 | 4.691 | 4.726 | 4.436 |
| 4.760 | 4.980 | 4.577 | 4.652 | 4.890 | 4.827 | 4.597 |
| 4.962 | 5.182 | 4.779 | 4.854 | 5.092 | 5.029 | 4.799 |
| 5.099 | 5.287 | 5.009 | 5.049 | 5.242 | 5.134 | 4.904 |
| 5.073 | 5.261 | 4.983 | 5.023 | 5.186 | 5.108 | 4.878 |
| 4.997 | 5.185 | 4.907 | 4.947 | 5.110 | 5.032 | 4.802 |
| 4.800 | 4.997 | 4.612 | 4.715 | 4.812 | 4.847 | 4.557 |
| 4.810 | 5.007 | 4.622 | 4.725 | 4.822 | 4.857 | 4.567 |
| 4.835 | 5.032 | 4.647 | 4.750 | 4.847 | 4.882 | 4.592 |
| 4.870 | 5.067 | 4.682 | 4.785 | 4.882 | 4.917 | 4.627 |
| 4.902 | 5.099 | 4.714 | 4.817 | 4.914 | 4.949 | 4.659 |
| 4.912 | 5.109 | 4.724 | 4.827 | 4.924 | 4.959 | 4.669 |
| 4.957 | 5.154 | 4.769 | 4.872 | 4.969 | 5.004 | 4.714 |
| 5.048 | 5.268 | 4.865 | 4.940 | 5.178 | 5.115 | 4.885 |
| 5.253 | 5.473 | 5.070 | 5.145 | 5.383 | 5.320 | 5.090 |
| 5.399 | 5.587 | 5.309 | 5.349 | 5.512 | 5.434 | 5.204 |
| 5.373 | 5.561 | 5.283 | 5.323 | 5.486 | 5.408 | 5.178 |
| 5.297 | 5.485 | 5.207 | 5.247 | 5.410 | 5.332 | 5.102 |
| 5.070 | 5.267 | 4.882 | 4.985 | 5.082 | 5.117 | 4.827 |
| 5.080 | 5.277 | 4.892 | 4.995 | 5.092 | 5.127 | 4.837 |
| 5.105 | 5.302 | 4.917 | 5.020 | 5.117 | 5.152 | 4.862 |
| 5.141 | 5.338 | 4.953 | 5.056 | 5.153 | 5.188 | 4.898 |
| 5.174 | 5.371 | 4.986 | 5.089 | 5.186 | 5.221 | 4.931 |
| 5.184 | 5.381 | 4.996 | 5.099 | 5.196 | 5.231 | 4.941 |
| 5.231 | 5.428 | 5.043 | 5.146 | 5.243 | 5.278 | 4.988 |
| 5.334 | 5.554 | 5.151 | 5.226 | 5.464 | 5.401 | 5.171 |
| 5.552 | 5.772 | 5.369 | 5.444 | 5.682 | 5.619 | 5.389 |
| 5.716 | 5.903 | 5.626 | 5.666 | 5.828 | 5.751 | 5.521 |
| 5.698 | 5.885 | 5.608 | 5.648 | 5.810 | 5.733 | 5.503 |
| 5.628 | 5.816 | 5.538 | 5.578 | 5.741 | 5.663 | 5.433 |
| 5.402 | 5.599 | 5.214 | 5.317 | 5.414 | 5.449 | 5.159 |
| 5.423 | 5.620 | 5.235 | 5.338 | 5.435 | 5.470 | 5.180 |
| 5.459 | 5.657 | 5.272 | 5.374 | 5.472 | 5.507 | 5.217 |
| 5.511 | 5.709 | 5.324 | 5.426 | 5.524 | 5.559 | 5.269 |
| 5.558 | 5.756 | 5.371 | 5.473 | 5.571 | 5.606 | 5.316 |
| 5.576 | 5.774 | 5.389 | 5.491 | 5.589 | 5.624 | 5.334 |
| 5.638 | 5.836 | 5.451 | 5.553 | 5.651 | 5.686 | 5.396 |
| 5.752 | 5.972 | 5.570 | 5.645 | 5.882 | 5.820 | 5.590 |
| 5.980 | 6.200 | 5.798 | 5.873 | 6.110 | 6.048 | 5.818 |
| 6.127 | 6.315 | 6.037 | 6.077 | 6.240 | 6.162 | 5.932 |
| 6.111 | 6.298 | 6.021 | 6.061 | 6.223 | 6.146 | 5.916 |
| 6.039 | 6.226 | 5.949 | 5.989 | 6.151 | 6.074 | 5.844 |
| 5.797 | 5.994 | 5.609 | 5.712 | 5.809 | 5.844 | 5.554 |
| 5.820 | 6.018 | 5.633 | 5.735 | 5.833 | 5.868 | 5.578 |
| 5.869 | 6.066 | 5.681 | 5.784 | 5.881 | 5.916 | 5.626 |
| 5.932 | 6.129 | 5.744 | 5.847 | 5.944 | 5.979 | 5.689 |
| 5.984 | 6.181 | 5.796 | 5.899 | 5.996 | 6.031 | 5.741 |
| 5.994 | 6.191 | 5.806 | 5.909 | 6.006 | 6.041 | 5.751 |
| 6.045 | 6.242 | 5.857 | 5.960 | 6.057 | 6.092 | 5.802 |
| 6.162 | 6.382 | 5.979 | 6.054 | 6.292 | 6.229 | 5.999 |
| 6.382 | 6.602 | 6.200 | 6.275 | 6.512 | 6.450 | 6.220 |
| 6.559 | 6.747 | 6.469 | 6.509 | 6.672 | 6.594 | 6.364 |
| 6.552 | 6.739 | 6.462 | 6.502 | 6.664 | 6.587 | 6.357 |
| 6.433 | 6.621 | 6.343 | 6.383 | 6.546 | 6.468 | 6.238 |
| 6.187 | 6.384 | 5.999 | 6.102 | 6.199 | 6.234 | 5.944 |
| 6.208 | 6.406 | 6.021 | 6.123 | 6.221 | 6.256 | 5.966 |
| 6.277 | 6.474 | 6.089 | 6.192 | 6.289 | 6.324 | 6.034 |
| 6.361 | 6.558 | 6.173 | 6.276 | 6.373 | 6.408 | 6.118 |
| 6.424 | 6.622 | 6.237 | 6.339 | 6.437 | 6.472 | 6.182 |
| 6.397 | 6.595 | 6.210 | 6.312 | 6.410 | 6.445 | 6.155 |
| 6.433 | 6.631 | 6.246 | 6.348 | 6.446 | 6.481 | 6.191 |

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|---|---|---|---|---|---|---|
| 6.556 | 6.776 | 6.373 | 6.448 | 6.686 | 6.623 | 6.393 |
| 6.775 | 6.995 | 6.592 | 6.667 | 6.905 | 6.842 | 6.612 |
| 6.969 | 7.157 | 6.879 | 6.919 | 7.082 | 7.004 | 6.774 |
| 6.951 | 7.148 | 6.871 | 6.911 | 7.073 | 6.996 | 6.766 |
| 6.847 | 7.034 | 6.757 | 6.797 | 6.959 | 6.882 | 6.652 |
| 6.628 | 6.825 | 6.440 | 6.543 | 6.640 | 6.675 | 6.385 |
| 6.677 | 6.875 | 6.490 | 6.592 | 6.690 | 6.725 | 6.435 |
| 6.766 | 6.963 | 6.578 | 6.681 | 6.778 | 6.813 | 6.523 |
| 6.888 | 7.085 | 6.700 | 6.803 | 6.900 | 6.935 | 6.645 |
| 6.964 | 7.161 | 6.776 | 6.879 | 6.976 | 7.011 | 6.721 |
| 6.880 | 7.078 | 6.693 | 6.795 | 6.893 | 6.928 | 6.638 |
| 6.905 | 7.103 | 6.718 | 6.820 | 6.918 | 6.953 | 6.663 |
| 7.040 | 7.260 | 6.858 | 6.933 | 7.170 | 7.108 | 6.878 |
| 7.241 | 7.461 | 7.059 | 7.134 | 7.371 | 7.309 | 7.079 |
| 7.627 | 7.714 | 7.437 | 7.477 | 7.639 | 7.562 | 7.332 |
| 7.541 | 7.729 | 7.451 | 7.491 | 7.654 | 7.576 | 7.346 |
| 7.297 | 7.484 | 7.207 | 7.247 | 7.409 | 7.332 | 7.102 |
| 7.150 | 7.347 | 6.962 | 7.065 | 7.162 | 7.197 | 6.907 |
| 7.247 | 7.445 | 7.060 | 7.162 | 7.260 | 7.295 | 7.005 |
| 7.396 | 7.594 | 7.209 | 7.311 | 7.409 | 7.444 | 7.154 |
| 7.609 | 7.806 | 7.421 | 7.524 | 7.621 | 7.656 | 7.366 |
| 7.742 | 7.939 | 7.554 | 7.657 | 7.754 | 7.789 | 7.499 |
| 7.749 | 7.947 | 7.562 | 7.664 | 7.762 | 7.797 | 7.507 |
| 7.783 | 7.931 | 7.546 | 7.648 | 7.746 | 7.781 | 7.491 |
| 7.970 | 8.190 | 7.787 | 7.862 | 8.100 | 8.037 | 7.807 |
| 8.324 | 8.544 | 8.142 | 8.217 | 8.454 | 8.392 | 8.162 |
| 8.640 | 8.828 | 8.550 | 8.590 | 8.753 | 8.675 | 8.445 |
| 8.653 | 8.840 | 8.563 | 8.603 | 8.765 | 8.688 | 8.458 |
| 8.151 | 8.339 | 8.061 | 8.101 | 8.264 | 8.186 | 7.956 |
| 8.122 | 8.319 | 7.934 | 8.037 | 8.134 | 8.169 | 7.879 |
| 8.215 | 8.413 | 8.028 | 8.130 | 8.228 | 8.263 | 7.973 |
| 8.390 | 8.587 | 8.202 | 8.305 | 8.402 | 8.437 | 8.147 |
| 8.646 | 8.844 | 8.459 | 8.561 | 8.659 | 8.694 | 8.404 |
| 8.698 | 8.896 | 8.511 | 8.613 | 8.711 | 8.746 | 8.456 |
| 8.508 | 8.706 | 8.321 | 8.423 | 8.521 | 8.556 | 8.266 |
| 8.281 | 8.479 | 8.094 | 8.196 | 8.294 | 8.329 | 8.039 |
| 8.302 | 8.522 | 8.120 | 8.195 | 8.432 | 8.370 | 8.140 |
| 8.494 | 8.714 | 8.311 | 8.386 | 8.624 | 8.561 | 8.331 |
| 8.965 | 9.153 | 8.875 | 8.915 | 9.078 | 9.000 | 8.770 |
| 9.019 | 9.206 | 8.929 | 8.969 | 9.131 | 9.054 | 8.824 |
| 8.698 | 8.885 | 8.608 | 8.648 | 8.810 | 8.733 | 8.503 |
| 8.641 | 8.838 | 8.453 | 8.556 | 8.653 | 8.688 | 8.398 |
| 8.739 | 8.936 | 8.551 | 8.654 | 8.751 | 8.786 | 8.496 |
| 8.936 | 9.134 | 8.749 | 8.851 | 8.949 | 8.984 | 8.694 |
| 9.226 | 9.424 | 9.039 | 9.141 | 9.239 | 9.274 | 8.984 |
| 9.281 | 9.479 | 9.094 | 9.196 | 9.294 | 9.329 | 9.039 |
| 9.010 | 9.207 | 8.822 | 8.925 | 9.022 | 9.057 | 8.767 |
| 8.896 | 9.093 | 8.708 | 8.811 | 8.908 | 8.943 | 8.653 |
| 8.920 | 9.140 | 8.738 | 8.813 | 9.050 | 8.988 | 8.758 |
| 9.158 | 9.378 | 8.976 | 9.051 | 9.288 | 9.226 | 8.996 |
| 9.064 | 9.251 | 8.974 | 9.014 | 9.176 | 9.099 | 8.869 |
| 9.118 | 9.306 | 9.028 | 9.068 | 9.231 | 9.153 | 8.923 |
| 8.873 | 9.060 | 8.783 | 8.823 | 8.985 | 8.908 | 8.678 |
| 8.852 | 9.049 | 8.664 | 8.767 | 8.864 | 8.899 | 8.609 |
| 8.932 | 9.130 | 8.745 | 8.847 | 8.945 | 8.980 | 8.690 |
| 9.142 | 9.340 | 8.955 | 9.057 | 9.155 | 9.190 | 8.900 |
| 9.418 | 9.615 | 9.230 | 9.333 | 9.430 | 9.465 | 9.175 |
| 9.474 | 9.672 | 9.287 | 9.389 | 9.487 | 9.522 | 9.232 |
| 9.221 | 9.418 | 9.033 | 9.136 | 9.233 | 9.268 | 8.978 |
| 9.102 | 9.299 | 8.914 | 9.017 | 9.114 | 9.149 | 8.859 |
| 9.147 | 9.367 | 8.965 | 9.040 | 9.277 | 9.215 | 8.985 |
| 9.318 | 9.538 | 9.136 | 9.211 | 9.448 | 9.386 | 9.156 |
| 9.371 | 9.558 | 9.281 | 9.321 | 9.483 | 9.406 | 9.176 |
| 9.426 | 9.613 | 9.336 | 9.376 | 9.538 | 9.461 | 9.231 |
| 9.103 | 9.291 | 9.013 | 9.053 | 9.216 | 9.138 | 8.908 |
| 9.030 | 9.228 | 8.843 | 8.945 | 9.043 | 9.078 | 8.788 |
| 9.145 | 9.343 | 8.958 | 9.060 | 9.158 | 9.193 | 8.903 |
| 9.374 | 9.571 | 9.186 | 9.289 | 9.386 | 9.421 | 9.131 |
| 9.649 | 9.846 | 9.461 | 9.564 | 9.661 | 9.696 | 9.406 |
| 9.706 | 9.904 | 9.519 | 9.621 | 9.719 | 9.754 | 9.464 |

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|---|---|---|---|---|---|---|
| 9.275 | 9.473 | 9.088 | 9.190 | 9.288 | 9.323 | 9.033 |
| 9.171 | 9.369 | 8.984 | 9.086 | 9.184 | 9.219 | 8.929 |
| 9.234 | 9.454 | 9.052 | 9.127 | 9.364 | 9.302 | 9.072 |
| 9.392 | 9.612 | 9.210 | 9.285 | 9.522 | 9.460 | 9.230 |
| 9.687 | 9.874 | 9.597 | 9.637 | 9.799 | 9.722 | 9.492 |
| 9.745 | 9.932 | 9.655 | 9.695 | 9.857 | 9.780 | 9.550 |
| 9.284 | 9.471 | 9.194 | 9.234 | 9.396 | 9.319 | 9.089 |
| 9.167 | 9.364 | 8.979 | 9.082 | 9.179 | 9.214 | 8.924 |
| 9.254 | 9.452 | 9.067 | 9.169 | 9.267 | 9.302 | 9.012 |
| 9.520 | 9.717 | 9.332 | 9.435 | 9.532 | 9.567 | 9.277 |
| 9.828 | 10.026 | 9.641 | 9.743 | 9.841 | 9.876 | 9.586 |
| 9.887 | 10.084 | 9.699 | 9.802 | 9.899 | 9.934 | 9.644 |
| 9.589 | 9.786 | 9.401 | 9.504 | 9.601 | 9.636 | 9.346 |
| 9.325 | 9.523 | 9.138 | 9.240 | 9.338 | 9.373 | 9.083 |
| 9.327 | 9.547 | 9.145 | 9.220 | 9.457 | 9.395 | 9.165 |
| 9.525 | 9.745 | 9.342 | 9.417 | 9.655 | 9.592 | 9.362 |
| 9.793 | 9.981 | 9.703 | 9.743 | 9.906 | 9.828 | 9.598 |
| 9.850 | 10.037 | 9.760 | 9.800 | 9.962 | 9.885 | 9.655 |
| 9.388 | 9.575 | 9.298 | 9.338 | 9.500 | 9.423 | 9.193 |
| 9.316 | 9.514 | 9.129 | 9.231 | 9.329 | 9.364 | 9.074 |
| 9.426 | 9.623 | 9.238 | 9.341 | 9.438 | 9.473 | 9.183 |
| 9.648 | 9.846 | 9.461 | 9.563 | 9.661 | 9.696 | 9.406 |
| 9.955 | 10.153 | 9.768 | 9.870 | 9.968 | 10.003 | 9.713 |
| 10.015 | 10.212 | 9.827 | 9.930 | 10.027 | 10.062 | 9.772 |
| 9.770 | 9.967 | 9.582 | 9.685 | 9.782 | 9.817 | 9.527 |
| 9.643 | 9.841 | 9.456 | 9.558 | 9.656 | 9.691 | 9.401 |
| 9.682 | 9.902 | 9.499 | 9.574 | 9.812 | 9.749 | 9.519 |
| 9.955 | 10.175 | 9.773 | 9.848 | 10.085 | 10.023 | 9.793 |
| 9.991 | 10.178 | 9.901 | 9.941 | 10.103 | 10.026 | 9.796 |
| 10.048 | 10.236 | 9.958 | 9.998 | 10.161 | 10.083 | 9.853 |
| 9.577 | 9.765 | 9.487 | 9.527 | 9.690 | 9.612 | 9.382 |
| 9.504 | 9.702 | 9.317 | 9.419 | 9.517 | 9.552 | 9.262 |
| 9.616 | 9.813 | 9.428 | 9.531 | 9.628 | 9.663 | 9.373 |
| 9.843 | 10.041 | 9.656 | 9.758 | 9.856 | 9.891 | 9.601 |
| 10.156 | 10.354 | 9.969 | 10.071 | 10.169 | 10.204 | 9.914 |
| 10.217 | 10.415 | 10.030 | 10.132 | 10.230 | 10.265 | 9.975 |
| 9.967 | 10.165 | 9.780 | 9.882 | 9.980 | 10.015 | 9.725 |
| 9.838 | 10.035 | 9.650 | 9.753 | 9.850 | 9.885 | 9.595 |
| 9.878 | 10.098 | 9.695 | 9.770 | 10.008 | 9.945 | 9.715 |
| 10.157 | 10.377 | 9.974 | 10.049 | 10.287 | 10.224 | 9.994 |
| 10.192 | 10.380 | 10.102 | 10.142 | 10.305 | 10.227 | 9.997 |
| 10.251 | 10.438 | 10.161 | 10.201 | 10.363 | 10.286 | 10.056 |
| 9.770 | 9.958 | 9.680 | 9.720 | 9.883 | 9.805 | 9.575 |
| 9.696 | 9.894 | 9.509 | 9.611 | 9.709 | 9.744 | 9.454 |
| 9.810 | 10.008 | 9.623 | 9.725 | 9.823 | 9.858 | 9.568 |
| 10.042 | 10.240 | 9.855 | 9.957 | 10.055 | 10.090 | 9.800 |
| 10.361 | 10.559 | 10.174 | 10.276 | 10.374 | 10.409 | 10.119 |
| 10.423 | 10.621 | 10.236 | 10.338 | 10.436 | 10.471 | 10.181 |
| 10.168 | 10.366 | 9.981 | 10.083 | 10.181 | 10.216 | 9.926 |
| 10.037 | 10.234 | 9.849 | 9.952 | 10.049 | 10.084 | 9.794 |
| 10.078 | 10.298 | 9.895 | 9.970 | 10.208 | 10.145 | 9.915 |
| 10.362 | 10.582 | 10.180 | 10.255 | 10.492 | 10.430 | 10.200 |
| 10.398 | 10.585 | 10.308 | 10.348 | 10.510 | 10.433 | 10.203 |
| 10.457 | 10.645 | 10.367 | 10.407 | 10.570 | 10.492 | 10.262 |
| 9.967 | 10.155 | 9.877 | 9.917 | 10.080 | 10.002 | 9.772 |
| 9.892 | 10.090 | 9.705 | 9.807 | 9.905 | 9.940 | 9.650 |
| 10.008 | 10.206 | 9.821 | 9.923 | 10.021 | 10.056 | 9.766 |
| 10.245 | 10.442 | 10.057 | 10.160 | 10.257 | 10.292 | 10.002 |
| 10.570 | 10.768 | 10.383 | 10.485 | 10.583 | 10.618 | 10.328 |
| 10.634 | 10.831 | 10.446 | 10.549 | 10.646 | 10.681 | 10.391 |
| 10.373 | 10.571 | 10.186 | 10.288 | 10.386 | 10.421 | 10.131 |
| 10.239 | 10.437 | 10.052 | 10.154 | 10.252 | 10.287 | 9.997 |
| 10.281 | 10.501 | 10.099 | 10.174 | 10.411 | 10.349 | 10.119 |
| 10.572 | 10.792 | 10.389 | 10.464 | 10.702 | 10.639 | 10.409 |
| 10.685 | 10.872 | 10.595 | 10.635 | 10.797 | 10.720 | 10.490 |
| 10.746 | 10.934 | 10.656 | 10.696 | 10.859 | 10.781 | 10.551 |
| 10.242 | 10.430 | 10.152 | 10.192 | 10.355 | 10.277 | 10.047 |
| 10.166 | 10.363 | 9.978 | 10.081 | 10.178 | 10.213 | 9.923 |
| 10.285 | 10.482 | 10.097 | 10.200 | 10.297 | 10.332 | 10.042 |
| 10.528 | 10.726 | 10.341 | 10.443 | 10.541 | 10.576 | 10.286 |

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|---|---|---|---|---|---|---|
| 10.863 | 11.060 | 10.675 | 10.778 | 10.875 | 10.910 | 10.620 |
| 10.928 | 11.125 | 10.740 | 10.843 | 10.940 | 10.975 | 10.685 |
| 10.661 | 10.858 | 10.473 | 10.576 | 10.673 | 10.708 | 10.418 |
| 10.523 | 10.720 | 10.335 | 10.438 | 10.535 | 10.570 | 10.280 |
| 10.567 | 10.787 | 10.384 | 10.459 | 10.697 | 10.634 | 10.404 |
| 10.865 | 11.085 | 10.682 | 10.757 | 10.995 | 10.932 | 10.702 |
| 10.980 | 11.168 | 10.890 | 10.930 | 11.093 | 11.015 | 10.785 |
| 11.043 | 11.231 | 10.953 | 10.993 | 11.156 | 11.078 | 10.848 |
| 10.526 | 10.714 | 10.436 | 10.476 | 10.639 | 10.561 | 10.331 |
| 10.447 | 10.645 | 10.260 | 10.362 | 10.460 | 10.495 | 10.205 |
| 10.570 | 10.768 | 10.383 | 10.485 | 10.583 | 10.618 | 10.328 |
| 10.820 | 11.018 | 10.633 | 10.735 | 10.833 | 10.868 | 10.578 |
| 11.164 | 11.361 | 10.976 | 11.079 | 11.176 | 11.211 | 10.921 |
| 11.231 | 11.428 | 11.043 | 11.146 | 11.243 | 11.278 | 10.988 |
| 10.956 | 11.154 | 10.769 | 10.871 | 10.969 | 11.004 | 10.714 |
| 10.815 | 11.012 | 10.627 | 10.730 | 10.827 | 10.862 | 10.572 |
| 10.861 | 11.081 | 10.678 | 10.753 | 10.991 | 10.928 | 10.698 |
| 11.187 | 11.387 | 10.985 | 11.060 | 11.297 | 11.235 | 11.005 |
| 11.285 | 11.472 | 11.195 | 11.235 | 11.397 | 11.320 | 11.090 |
| 11.350 | 11.537 | 11.260 | 11.300 | 11.462 | 11.385 | 11.155 |
| 10.818 | 11.006 | 10.728 | 10.768 | 10.931 | 10.853 | 10.623 |
| 10.738 | 10.935 | 10.550 | 10.653 | 10.750 | 10.785 | 10.495 |
| 10.864 | 11.061 | 10.676 | 10.779 | 10.876 | 10.911 | 10.621 |
| 11.121 | 11.318 | 10.933 | 11.036 | 11.133 | 11.168 | 10.878 |
| 11.474 | 11.672 | 11.287 | 11.389 | 11.487 | 11.522 | 11.232 |
| 11.543 | 11.741 | 11.356 | 11.458 | 11.556 | 11.591 | 11.301 |
| 11.261 | 11.459 | 11.074 | 11.176 | 11.274 | 11.309 | 11.019 |
| 11.116 | 11.313 | 10.928 | 11.031 | 11.128 | 11.163 | 10.873 |
| 11.163 | 11.383 | 10.981 | 11.056 | 11.293 | 11.231 | 11.001 |
| 11.478 | 11.698 | 11.296 | 11.371 | 11.608 | 11.546 | 11.316 |
| 11.598 | 11.786 | 11.508 | 11.548 | 11.711 | 11.633 | 11.403 |
| 11.665 | 11.853 | 11.575 | 11.615 | 11.778 | 11.700 | 11.470 |
| 11.119 | 11.306 | 11.029 | 11.069 | 11.231 | 11.154 | 10.924 |
| 11.037 | 11.234 | 10.849 | 10.952 | 11.049 | 11.084 | 10.794 |
| 11.166 | 11.364 | 10.979 | 11.081 | 11.179 | 11.214 | 10.924 |
| 11.430 | 11.628 | 11.243 | 11.345 | 11.443 | 11.478 | 11.188 |
| 11.793 | 11.991 | 11.606 | 11.708 | 11.806 | 11.841 | 11.551 |
| 11.864 | 12.061 | 11.676 | 11.779 | 11.876 | 11.911 | 11.621 |
| 11.574 | 11.772 | 11.387 | 11.489 | 11.587 | 11.622 | 11.332 |
| 11.424 | 11.622 | 11.237 | 11.339 | 11.437 | 11.472 | 11.182 |
| 11.474 | 11.694 | 11.292 | 11.367 | 11.604 | 11.542 | 11.312 |
| 11.798 | 12.018 | 11.615 | 11.690 | 11.928 | 11.865 | 11.635 |
| 11.920 | 12.108 | 11.830 | 11.870 | 12.033 | 11.955 | 11.725 |
| 11.989 | 12.176 | 11.899 | 11.939 | 12.101 | 12.024 | 11.794 |
| 11.427 | 11.615 | 11.337 | 11.377 | 11.540 | 11.462 | 11.232 |
| 11.343 | 11.541 | 11.156 | 11.258 | 11.356 | 11.391 | 11.101 |
| 11.476 | 11.674 | 11.289 | 11.391 | 11.489 | 11.524 | 11.234 |
| 11.748 | 11.945 | 11.560 | 11.663 | 11.760 | 11.795 | 11.505 |
| 12.121 | 12.318 | 11.933 | 12.036 | 12.133 | 12.168 | 11.878 |
| 12.193 | 12.391 | 12.006 | 12.108 | 12.206 | 12.241 | 11.951 |
| 11.896 | 12.093 | 11.708 | 11.811 | 11.908 | 11.943 | 11.653 |
| 11.742 | 11.939 | 11.554 | 11.657 | 11.754 | 11.789 | 11.499 |
| 11.794 | 12.014 | 11.611 | 11.686 | 11.924 | 11.861 | 11.631 |
| 12.126 | 12.346 | 11.944 | 12.019 | 12.256 | 12.194 | 11.964 |
| 12.251 | 12.439 | 12.161 | 12.201 | 12.364 | 12.286 | 12.056 |
| 12.322 | 12.509 | 12.232 | 12.272 | 12.434 | 12.357 | 12.127 |
| 11.745 | 11.932 | 11.655 | 11.695 | 11.857 | 11.780 | 11.550 |
| 11.659 | 11.856 | 11.471 | 11.574 | 11.671 | 11.706 | 11.416 |
| 11.796 | 11.993 | 11.608 | 11.711 | 11.808 | 11.843 | 11.553 |
| 12.075 | 12.272 | 11.887 | 11.990 | 12.087 | 12.122 | 11.832 |
| 12.458 | 12.656 | 12.271 | 12.373 | 12.471 | 12.506 | 12.216 |
| 12.533 | 12.730 | 12.346 | 12.448 | 12.545 | 12.580 | 12.290 |
| 12.227 | 12.424 | 12.039 | 12.142 | 12.239 | 12.274 | 11.984 |
| 12.069 | 12.267 | 11.882 | 11.984 | 12.082 | 12.117 | 11.827 |
| 12.123 | 12.343 | 11.940 | 12.015 | 12.253 | 12.190 | 11.960 |
| 12.464 | 12.684 | 12.282 | 12.357 | 12.594 | 12.532 | 12.302 |
| 12.592 | 12.780 | 12.502 | 12.542 | 12.705 | 12.627 | 12.397 |
| 12.665 | 12.852 | 12.575 | 12.615 | 12.777 | 12.700 | 12.470 |
| 12.072 | 12.259 | 11.982 | 12.022 | 12.184 | 12.107 | 11.877 |
| 11.984 | 12.182 | 11.797 | 11.899 | 11.997 | 12.032 | 11.742 |

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|---|---|---|---|---|---|---|
| 12.125 | 12.322 | 11.937 | 12.040 | 12.137 | 12.172 | 11.882 |
| 12.411 | 12.609 | 12.224 | 12.326 | 12.424 | 12.459 | 12.169 |
| 12.805 | 13.003 | 12.618 | 12.720 | 12.818 | 12.853 | 12.563 |
| 12.882 | 13.080 | 12.695 | 12.797 | 12.895 | 12.930 | 12.640 |
| 12.568 | 12.766 | 12.381 | 12.483 | 12.581 | 12.616 | 12.326 |
| 12.406 | 12.603 | 12.218 | 12.321 | 12.418 | 12.453 | 12.163 |
| 12.462 | 12.682 | 12.279 | 12.354 | 12.592 | 12.529 | 12.299 |
| 12.813 | 13.033 | 12.630 | 12.705 | 12.943 | 12.880 | 12.650 |

| TETCO ELA | TETCO M3 | TETCO STX | Texas Gas Zn SL | Transco Zn3 | Transco Zn4 | Transco Zn5 D |
|---|---|---|---|---|---|---|
| 2.408 | 2.683 | 2.341 | 2.448 | 2.441 | 2.458 | 2.846 |
| 2.408 | 2.683 | 2.341 | 2.448 | 2.441 | 2.458 | 2.846 |
| 2.548 | 2.771 | 2.451 | 2.533 | 2.596 | 2.611 | 2.782 |
| 2.666 | 2.889 | 2.569 | 2.651 | 2.714 | 2.729 | 2.900 |
| 2.755 | 2.978 | 2.658 | 2.740 | 2.803 | 2.818 | 2.989 |
| 2.834 | 3.057 | 2.737 | 2.819 | 2.882 | 2.897 | 3.068 |
| 2.868 | 3.091 | 2.771 | 2.853 | 2.916 | 2.931 | 3.102 |
| 2.879 | 3.102 | 2.782 | 2.864 | 2.927 | 2.942 | 3.113 |
| 2.925 | 3.148 | 2.828 | 2.910 | 2.973 | 2.988 | 3.159 |
| 3.085 | 3.303 | 2.983 | 3.080 | 3.135 | 3.155 | 3.465 |
| 3.385 | 4.080 | 3.283 | 3.380 | 3.435 | 3.455 | 4.668 |
| 3.568 | 4.673 | 3.461 | 3.513 | 3.568 | 3.588 | 5.697 |
| 3.578 | 4.674 | 3.578 | 3.523 | 3.578 | 3.598 | 5.496 |
| 3.522 | 3.565 | 3.455 | 3.507 | 3.562 | 3.582 | 3.950 |
| 3.472 | 3.642 | 3.375 | 3.457 | 3.515 | 3.535 | 3.643 |
| 3.502 | 3.672 | 3.405 | 3.487 | 3.545 | 3.565 | 3.673 |
| 3.537 | 3.707 | 3.440 | 3.522 | 3.580 | 3.600 | 3.708 |
| 3.580 | 3.750 | 3.483 | 3.565 | 3.623 | 3.643 | 3.751 |
| 3.597 | 3.767 | 3.500 | 3.582 | 3.640 | 3.660 | 3.768 |
| 3.598 | 3.768 | 3.501 | 3.583 | 3.641 | 3.661 | 3.769 |
| 3.638 | 3.808 | 3.541 | 3.623 | 3.681 | 3.701 | 3.809 |
| 3.738 | 3.601 | 3.636 | 3.733 | 3.776 | 3.801 | 3.908 |
| 3.937 | 4.460 | 3.835 | 3.932 | 3.975 | 4.000 | 4.937 |
| 4.096 | 5.196 | 3.989 | 4.041 | 4.096 | 4.109 | 5.917 |
| 4.084 | 5.032 | 4.084 | 4.029 | 4.084 | 4.097 | 5.662 |
| 4.006 | 3.984 | 3.939 | 3.991 | 4.046 | 4.059 | 4.349 |
| 3.879 | 3.984 | 3.782 | 3.864 | 3.917 | 3.942 | 4.009 |
| 3.894 | 3.999 | 3.797 | 3.879 | 3.932 | 3.957 | 4.024 |
| 3.919 | 4.024 | 3.822 | 3.904 | 3.957 | 3.982 | 4.049 |
| 3.955 | 4.060 | 3.858 | 3.940 | 3.993 | 4.018 | 4.085 |
| 3.972 | 4.077 | 3.875 | 3.957 | 4.010 | 4.035 | 4.102 |
| 3.972 | 4.077 | 3.875 | 3.957 | 4.010 | 4.035 | 4.102 |
| 4.004 | 4.109 | 3.907 | 3.989 | 4.042 | 4.067 | 4.134 |
| 4.085 | 4.460 | 3.983 | 4.080 | 4.123 | 4.148 | 4.514 |
| 4.271 | 5.276 | 4.169 | 4.266 | 4.309 | 4.334 | 5.525 |
| 4.419 | 5.519 | 4.312 | 4.364 | 4.419 | 4.432 | 6.240 |
| 4.394 | 5.342 | 4.394 | 4.339 | 4.394 | 4.407 | 5.072 |
| 4.280 | 4.258 | 4.213 | 4.265 | 4.320 | 4.333 | 4.623 |
| 4.118 | 4.223 | 4.021 | 4.103 | 4.156 | 4.181 | 4.248 |
| 4.128 | 4.233 | 4.031 | 4.113 | 4.166 | 4.191 | 4.258 |
| 4.152 | 4.257 | 4.055 | 4.137 | 4.190 | 4.215 | 4.282 |
| 4.187 | 4.292 | 4.090 | 4.172 | 4.225 | 4.250 | 4.317 |
| 4.203 | 4.308 | 4.106 | 4.188 | 4.241 | 4.266 | 4.333 |
| 4.206 | 4.311 | 4.109 | 4.191 | 4.244 | 4.269 | 4.336 |
| 4.238 | 4.343 | 4.141 | 4.223 | 4.276 | 4.301 | 4.368 |
| 4.323 | 4.698 | 4.221 | 4.318 | 4.361 | 4.386 | 4.752 |
| 4.516 | 5.521 | 4.414 | 4.511 | 4.554 | 4.579 | 5.770 |
| 4.663 | 5.763 | 4.556 | 4.608 | 4.663 | 4.676 | 6.484 |
| 4.637 | 5.585 | 4.637 | 4.582 | 4.637 | 4.650 | 6.215 |
| 4.521 | 4.499 | 4.454 | 4.506 | 4.561 | 4.574 | 4.864 |
| 4.339 | 4.444 | 4.242 | 4.324 | 4.377 | 4.402 | 4.469 |
| 4.349 | 4.454 | 4.252 | 4.334 | 4.387 | 4.412 | 4.479 |
| 4.374 | 4.479 | 4.277 | 4.359 | 4.412 | 4.437 | 4.504 |
| 4.409 | 4.514 | 4.312 | 4.394 | 4.447 | 4.472 | 4.539 |
| 4.429 | 4.534 | 4.332 | 4.414 | 4.467 | 4.492 | 4.559 |
| 4.434 | 4.539 | 4.337 | 4.419 | 4.472 | 4.497 | 4.564 |
| 4.469 | 4.574 | 4.372 | 4.454 | 4.507 | 4.532 | 4.599 |
| 4.561 | 4.936 | 4.459 | 4.556 | 4.599 | 4.624 | 4.990 |
| 4.761 | 5.766 | 4.659 | 4.756 | 4.799 | 4.824 | 6.015 |

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|---|---|---|---|---|---|---|
| 4.907 | 6.007 | 4.800 | 4.852 | 4.907 | 4.920 | 6.728 |
| 4.881 | 5.829 | 4.881 | 4.826 | 4.881 | 4.894 | 6.459 |
| 4.765 | 4.743 | 4.698 | 4.750 | 4.805 | 4.818 | 5.108 |
| 4.583 | 4.688 | 4.486 | 4.568 | 4.621 | 4.646 | 4.713 |
| 4.593 | 4.698 | 4.496 | 4.578 | 4.631 | 4.656 | 4.723 |
| 4.618 | 4.723 | 4.521 | 4.603 | 4.656 | 4.681 | 4.748 |
| 4.653 | 4.758 | 4.556 | 4.638 | 4.691 | 4.716 | 4.783 |
| 4.680 | 4.785 | 4.583 | 4.665 | 4.718 | 4.743 | 4.810 |
| 4.686 | 4.791 | 4.589 | 4.671 | 4.724 | 4.749 | 4.816 |
| 4.721 | 4.826 | 4.624 | 4.706 | 4.759 | 4.784 | 4.851 |
| 4.822 | 5.197 | 4.720 | 4.817 | 4.860 | 4.885 | 5.251 |
| 5.024 | 6.029 | 4.922 | 5.019 | 5.062 | 5.087 | 6.278 |
| 5.179 | 6.279 | 5.072 | 5.124 | 5.179 | 5.192 | 7.000 |
| 5.153 | 6.101 | 5.153 | 5.098 | 5.153 | 5.166 | 6.731 |
| 5.037 | 5.015 | 4.970 | 5.022 | 5.077 | 5.090 | 5.380 |
| 4.842 | 4.947 | 4.745 | 4.827 | 4.880 | 4.905 | 4.972 |
| 4.852 | 4.957 | 4.755 | 4.837 | 4.890 | 4.915 | 4.982 |
| 4.877 | 4.982 | 4.780 | 4.862 | 4.915 | 4.940 | 5.007 |
| 4.912 | 5.017 | 4.815 | 4.897 | 4.950 | 4.975 | 5.042 |
| 4.944 | 5.049 | 4.847 | 4.929 | 4.982 | 5.007 | 5.074 |
| 4.954 | 5.059 | 4.857 | 4.939 | 4.992 | 5.017 | 5.084 |
| 4.999 | 5.104 | 4.902 | 4.984 | 5.037 | 5.062 | 5.129 |
| 5.110 | 5.485 | 5.008 | 5.105 | 5.148 | 5.173 | 5.539 |
| 5.315 | 6.320 | 5.213 | 5.310 | 5.353 | 5.378 | 6.569 |
| 5.479 | 6.579 | 5.372 | 5.424 | 5.479 | 5.492 | 7.300 |
| 5.453 | 6.401 | 5.453 | 5.398 | 5.453 | 5.466 | 7.031 |
| 5.337 | 5.315 | 5.270 | 5.322 | 5.377 | 5.390 | 5.680 |
| 5.112 | 5.217 | 5.015 | 5.097 | 5.150 | 5.175 | 5.242 |
| 5.122 | 5.227 | 5.025 | 5.107 | 5.160 | 5.185 | 5.252 |
| 5.147 | 5.252 | 5.050 | 5.132 | 5.185 | 5.210 | 5.277 |
| 5.183 | 5.288 | 5.086 | 5.168 | 5.221 | 5.246 | 5.313 |
| 5.216 | 5.321 | 5.119 | 5.201 | 5.254 | 5.279 | 5.346 |
| 5.226 | 5.331 | 5.129 | 5.211 | 5.264 | 5.289 | 5.356 |
| 5.273 | 5.378 | 5.176 | 5.258 | 5.311 | 5.336 | 5.403 |
| 5.396 | 5.771 | 5.294 | 5.391 | 5.434 | 5.459 | 5.825 |
| 5.614 | 6.619 | 5.512 | 5.609 | 5.652 | 5.677 | 6.868 |
| 5.796 | 6.896 | 5.688 | 5.741 | 5.796 | 5.808 | 7.617 |
| 5.778 | 6.725 | 5.778 | 5.723 | 5.778 | 5.790 | 7.356 |
| 5.668 | 5.648 | 5.601 | 5.653 | 5.708 | 5.721 | 6.011 |
| 5.444 | 5.549 | 5.347 | 5.429 | 5.482 | 5.507 | 5.574 |
| 5.465 | 5.570 | 5.368 | 5.450 | 5.503 | 5.528 | 5.595 |
| 5.502 | 5.607 | 5.404 | 5.487 | 5.539 | 5.564 | 5.632 |
| 5.554 | 5.659 | 5.456 | 5.539 | 5.591 | 5.616 | 5.684 |
| 5.601 | 5.706 | 5.503 | 5.586 | 5.638 | 5.663 | 5.731 |
| 5.619 | 5.724 | 5.521 | 5.604 | 5.656 | 5.681 | 5.749 |
| 5.681 | 5.786 | 5.583 | 5.666 | 5.718 | 5.743 | 5.811 |
| 5.815 | 6.190 | 5.712 | 5.810 | 5.852 | 5.877 | 6.244 |
| 6.043 | 7.048 | 5.940 | 6.038 | 6.080 | 6.105 | 7.296 |
| 6.207 | 7.307 | 6.100 | 6.152 | 6.207 | 6.220 | 8.029 |
| 6.191 | 7.138 | 6.191 | 6.136 | 6.191 | 6.203 | 7.768 |
| 6.079 | 6.056 | 6.011 | 6.064 | 6.119 | 6.131 | 6.421 |
| 5.839 | 5.944 | 5.742 | 5.824 | 5.877 | 5.902 | 5.969 |
| 5.863 | 5.968 | 5.765 | 5.848 | 5.900 | 5.925 | 5.993 |
| 5.911 | 6.016 | 5.814 | 5.896 | 5.949 | 5.974 | 6.041 |
| 5.974 | 6.079 | 5.877 | 5.959 | 6.012 | 6.037 | 6.104 |
| 6.026 | 6.131 | 5.929 | 6.011 | 6.064 | 6.089 | 6.156 |
| 6.036 | 6.141 | 5.939 | 6.021 | 6.074 | 6.099 | 6.166 |
| 6.087 | 6.192 | 5.990 | 6.072 | 6.125 | 6.150 | 6.217 |
| 6.224 | 6.599 | 6.122 | 6.219 | 6.262 | 6.287 | 6.653 |
| 6.445 | 7.450 | 6.342 | 6.440 | 6.482 | 6.507 | 7.698 |
| 6.639 | 7.739 | 6.532 | 6.584 | 6.639 | 6.652 | 8.460 |
| 6.632 | 7.579 | 6.632 | 6.577 | 6.632 | 6.644 | 8.209 |
| 6.473 | 6.451 | 6.406 | 6.458 | 6.513 | 6.526 | 6.816 |
| 6.229 | 6.334 | 6.132 | 6.214 | 6.267 | 6.292 | 6.959 |
| 6.251 | 6.356 | 6.153 | 6.236 | 6.288 | 6.313 | 6.381 |
| 6.319 | 6.424 | 6.222 | 6.304 | 6.357 | 6.382 | 6.449 |
| 6.403 | 6.508 | 6.306 | 6.388 | 6.441 | 6.466 | 6.583 |
| 6.467 | 6.572 | 6.369 | 6.452 | 6.504 | 6.529 | 6.597 |
| 6.440 | 6.545 | 6.342 | 6.425 | 6.477 | 6.502 | 6.570 |
| 6.476 | 6.581 | 6.378 | 6.461 | 6.513 | 6.538 | 6.606 |

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|---|---|---|---|---|---|---|
| 6.618 | 6.993 | 6.516 | 6.613 | 6.656 | 6.681 | 7.047 |
| 6.837 | 7.842 | 6.735 | 6.832 | 6.875 | 6.900 | 8.091 |
| 7.049 | 8.149 | 6.942 | 6.994 | 7.049 | 7.062 | 8.870 |
| 7.041 | 7.988 | 7.041 | 6.986 | 7.041 | 7.053 | 8.618 |
| 6.887 | 6.864 | 6.819 | 6.872 | 6.927 | 6.939 | 7.229 |
| 6.670 | 6.775 | 6.573 | 6.655 | 6.708 | 6.733 | 6.800 |
| 6.720 | 6.825 | 6.622 | 6.705 | 6.757 | 6.782 | 6.850 |
| 6.808 | 6.913 | 6.711 | 6.793 | 6.846 | 6.871 | 6.938 |
| 6.930 | 7.035 | 6.833 | 6.915 | 6.968 | 6.993 | 7.060 |
| 7.006 | 7.111 | 6.909 | 6.991 | 7.044 | 7.069 | 7.136 |
| 6.923 | 7.028 | 6.825 | 6.908 | 6.960 | 6.985 | 7.053 |
| 6.948 | 7.053 | 6.850 | 6.933 | 6.985 | 7.010 | 7.078 |
| 7.103 | 7.478 | 7.000 | 7.098 | 7.140 | 7.165 | 7.531 |
| 7.304 | 8.309 | 7.201 | 7.299 | 7.341 | 7.366 | 8.558 |
| 7.607 | 8.707 | 7.499 | 7.552 | 7.607 | 7.619 | 9.428 |
| 7.621 | 8.569 | 7.621 | 7.566 | 7.621 | 7.634 | 9.199 |
| 7.337 | 7.314 | 7.269 | 7.322 | 7.377 | 7.389 | 7.679 |
| 7.192 | 7.297 | 7.095 | 7.177 | 7.230 | 7.255 | 7.322 |
| 7.290 | 7.395 | 7.192 | 7.275 | 7.327 | 7.352 | 7.420 |
| 7.439 | 7.544 | 7.341 | 7.424 | 7.476 | 7.501 | 7.569 |
| 7.651 | 7.756 | 7.554 | 7.636 | 7.689 | 7.714 | 7.781 |
| 7.784 | 7.889 | 7.687 | 7.769 | 7.822 | 7.847 | 7.914 |
| 7.792 | 7.897 | 7.694 | 7.777 | 7.829 | 7.854 | 7.922 |
| 7.776 | 7.881 | 7.678 | 7.761 | 7.813 | 7.838 | 7.906 |
| 8.032 | 8.407 | 7.930 | 8.027 | 8.070 | 8.095 | 8.461 |
| 8.387 | 9.392 | 8.284 | 8.382 | 8.424 | 8.449 | 9.641 |
| 8.720 | 9.820 | 8.613 | 8.665 | 8.720 | 8.733 | 10.541 |
| 8.733 | 9.680 | 8.733 | 8.678 | 8.733 | 8.745 | 10.310 |
| 8.191 | 8.169 | 8.124 | 8.176 | 8.231 | 8.244 | 8.534 |
| 8.164 | 8.269 | 8.067 | 8.149 | 8.202 | 8.227 | 8.294 |
| 8.258 | 8.363 | 8.160 | 8.243 | 8.295 | 8.320 | 8.388 |
| 8.432 | 8.537 | 8.335 | 8.417 | 8.470 | 8.495 | 8.562 |
| 8.689 | 8.794 | 8.591 | 8.674 | 8.726 | 8.751 | 8.819 |
| 8.741 | 8.846 | 8.643 | 8.726 | 8.778 | 8.803 | 8.871 |
| 8.551 | 8.656 | 8.453 | 8.536 | 8.588 | 8.613 | 8.681 |
| 8.324 | 8.429 | 8.226 | 8.309 | 8.361 | 8.386 | 8.454 |
| 8.365 | 8.740 | 8.262 | 8.360 | 8.402 | 8.427 | 8.794 |
| 8.556 | 9.561 | 8.454 | 8.551 | 8.594 | 8.619 | 9.830 |
| 9.045 | 10.145 | 8.938 | 8.990 | 9.045 | 9.058 | 10.887 |
| 9.099 | 10.046 | 9.099 | 9.044 | 9.099 | 9.111 | 10.676 |
| 8.738 | 8.715 | 8.670 | 8.723 | 8.778 | 8.790 | 9.080 |
| 8.683 | 8.788 | 8.586 | 8.668 | 8.721 | 8.746 | 8.813 |
| 8.781 | 8.886 | 8.684 | 8.766 | 8.819 | 8.844 | 8.911 |
| 8.979 | 9.084 | 8.881 | 8.964 | 9.016 | 9.041 | 9.109 |
| 9.269 | 9.374 | 9.171 | 9.254 | 9.306 | 9.331 | 9.399 |
| 9.324 | 9.429 | 9.226 | 9.309 | 9.361 | 9.386 | 9.454 |
| 9.052 | 9.157 | 8.955 | 9.037 | 9.090 | 9.115 | 9.182 |
| 8.938 | 9.043 | 8.841 | 8.923 | 8.976 | 9.001 | 9.068 |
| 8.983 | 9.358 | 8.880 | 8.978 | 9.020 | 9.045 | 9.411 |
| 9.221 | 10.226 | 9.118 | 9.216 | 9.258 | 9.283 | 10.475 |
| 9.144 | 10.244 | 9.036 | 9.089 | 9.144 | 9.156 | 10.965 |
| 9.198 | 10.146 | 9.198 | 9.143 | 9.198 | 9.211 | 10.776 |
| 8.913 | 8.890 | 8.845 | 8.898 | 8.953 | 8.965 | 9.255 |
| 8.894 | 8.999 | 8.797 | 8.879 | 8.932 | 8.957 | 9.024 |
| 8.975 | 9.080 | 8.877 | 8.960 | 9.012 | 9.037 | 9.105 |
| 9.185 | 9.290 | 9.087 | 9.170 | 9.222 | 9.247 | 9.315 |
| 9.460 | 9.565 | 9.363 | 9.445 | 9.498 | 9.523 | 9.590 |
| 9.517 | 9.622 | 9.419 | 9.502 | 9.554 | 9.579 | 9.647 |
| 9.263 | 9.368 | 9.166 | 9.248 | 9.301 | 9.326 | 9.393 |
| 9.144 | 9.249 | 9.047 | 9.129 | 9.182 | 9.207 | 9.274 |
| 9.210 | 9.585 | 9.107 | 9.205 | 9.247 | 9.272 | 9.639 |
| 9.381 | 10.386 | 9.278 | 9.376 | 9.418 | 9.443 | 10.634 |
| 9.451 | 10.551 | 9.343 | 9.396 | 9.451 | 9.463 | 11.272 |
| 9.506 | 10.453 | 9.506 | 9.451 | 9.506 | 9.518 | 11.083 |
| 9.143 | 9.121 | 9.076 | 9.128 | 9.183 | 9.196 | 9.486 |
| 9.073 | 9.178 | 8.975 | 9.058 | 9.110 | 9.135 | 9.203 |
| 9.188 | 9.293 | 9.090 | 9.173 | 9.225 | 9.250 | 9.318 |
| 9.416 | 9.521 | 9.319 | 9.401 | 9.454 | 9.479 | 9.546 |
| 9.691 | 9.796 | 9.594 | 9.676 | 9.729 | 9.754 | 9.821 |
| 9.749 | 9.854 | 9.651 | 9.734 | 9.786 | 9.811 | 9.879 |

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|---|---|---|---|---|---|---|
| 9.318 | 9.423 | 9.220 | 9.303 | 9.355 | 9.380 | 9.448 |
| 9.214 | 9.319 | 9.116 | 9.199 | 9.251 | 9.276 | 9.344 |
| 9.297 | 9.672 | 9.194 | 9.292 | 9.334 | 9.359 | 9.726 |
| 9.455 | 10.460 | 9.352 | 9.450 | 9.492 | 9.517 | 10.708 |
| 9.767 | 10.867 | 9.659 | 9.712 | 9.767 | 9.779 | 11.588 |
| 9.825 | 10.772 | 9.825 | 9.770 | 9.825 | 9.837 | 11.402 |
| 9.324 | 9.301 | 9.256 | 9.309 | 9.364 | 9.376 | 9.666 |
| 9.209 | 9.314 | 9.112 | 9.194 | 9.247 | 9.272 | 9.339 |
| 9.297 | 9.402 | 9.199 | 9.282 | 9.334 | 9.359 | 9.427 |
| 9.562 | 9.667 | 9.465 | 9.547 | 9.600 | 9.625 | 9.692 |
| 9.871 | 9.976 | 9.773 | 9.856 | 9.908 | 9.933 | 10.001 |
| 9.929 | 10.034 | 9.832 | 9.914 | 9.967 | 9.992 | 10.059 |
| 9.631 | 9.736 | 9.534 | 9.616 | 9.669 | 9.694 | 9.761 |
| 9.368 | 9.473 | 9.270 | 9.353 | 9.405 | 9.430 | 9.498 |
| 9.390 | 9.765 | 9.287 | 9.385 | 9.427 | 9.452 | 9.818 |
| 9.587 | 10.592 | 9.485 | 9.582 | 9.625 | 9.650 | 10.841 |
| 9.873 | 10.973 | 9.766 | 9.818 | 9.873 | 9.886 | 11.695 |
| 9.930 | 10.877 | 9.930 | 9.875 | 9.930 | 9.942 | 11.507 |
| 9.428 | 9.405 | 9.360 | 9.413 | 9.468 | 9.480 | 9.770 |
| 9.359 | 9.464 | 9.261 | 9.344 | 9.396 | 9.421 | 9.489 |
| 9.468 | 9.573 | 9.371 | 9.453 | 9.506 | 9.531 | 9.598 |
| 9.691 | 9.796 | 9.593 | 9.676 | 9.728 | 9.753 | 9.821 |
| 9.998 | 10.103 | 9.900 | 9.983 | 10.035 | 10.060 | 10.128 |
| 10.057 | 10.162 | 9.960 | 10.042 | 10.095 | 10.120 | 10.187 |
| 9.812 | 9.917 | 9.715 | 9.797 | 9.850 | 9.875 | 9.942 |
| 9.686 | 9.791 | 9.588 | 9.671 | 9.723 | 9.748 | 9.816 |
| 9.744 | 10.119 | 9.642 | 9.739 | 9.782 | 9.807 | 10.173 |
| 10.018 | 11.023 | 9.915 | 10.013 | 10.055 | 10.080 | 11.272 |
| 10.071 | 11.171 | 9.963 | 10.016 | 10.071 | 10.083 | 11.892 |
| 10.128 | 11.076 | 10.128 | 10.073 | 10.128 | 10.141 | 11.706 |
| 9.617 | 9.595 | 9.550 | 9.602 | 9.657 | 9.670 | 9.960 |
| 9.547 | 9.652 | 9.449 | 9.532 | 9.584 | 9.609 | 9.677 |
| 9.658 | 9.763 | 9.561 | 9.643 | 9.696 | 9.721 | 9.788 |
| 9.886 | 9.991 | 9.788 | 9.871 | 9.923 | 9.948 | 10.016 |
| 10.199 | 10.304 | 10.101 | 10.184 | 10.236 | 10.261 | 10.329 |
| 10.260 | 10.365 | 10.162 | 10.245 | 10.297 | 10.322 | 10.390 |
| 10.010 | 10.115 | 9.912 | 9.995 | 10.047 | 10.072 | 10.140 |
| 9.880 | 9.985 | 9.783 | 9.865 | 9.918 | 9.943 | 10.010 |
| 9.940 | 10.315 | 9.838 | 9.935 | 9.978 | 10.003 | 10.369 |
| 10.219 | 11.224 | 10.117 | 10.214 | 10.257 | 10.282 | 11.473 |
| 10.272 | 11.372 | 10.165 | 10.217 | 10.272 | 10.285 | 12.094 |
| 10.331 | 11.278 | 10.331 | 10.276 | 10.331 | 10.343 | 11.908 |
| 9.810 | 9.788 | 9.743 | 9.795 | 9.850 | 9.863 | 10.153 |
| 9.739 | 9.844 | 9.641 | 9.724 | 9.776 | 9.801 | 9.869 |
| 9.853 | 9.958 | 9.755 | 9.838 | 9.890 | 9.915 | 9.983 |
| 10.085 | 10.190 | 9.987 | 10.070 | 10.122 | 10.147 | 10.215 |
| 10.404 | 10.509 | 10.306 | 10.389 | 10.441 | 10.466 | 10.534 |
| 10.466 | 10.571 | 10.368 | 10.451 | 10.503 | 10.528 | 10.596 |
| 10.211 | 10.316 | 10.113 | 10.196 | 10.248 | 10.273 | 10.341 |
| 10.079 | 10.184 | 9.982 | 10.064 | 10.117 | 10.142 | 10.209 |
| 10.140 | 10.515 | 10.038 | 10.135 | 10.178 | 10.203 | 10.569 |
| 10.425 | 11.430 | 10.322 | 10.420 | 10.462 | 10.487 | 11.678 |
| 10.478 | 11.578 | 10.370 | 10.423 | 10.478 | 10.490 | 12.299 |
| 10.537 | 11.485 | 10.537 | 10.482 | 10.537 | 10.550 | 12.115 |
| 10.007 | 9.985 | 9.940 | 9.992 | 10.047 | 10.060 | 10.350 |
| 9.935 | 10.040 | 9.837 | 9.920 | 9.972 | 9.997 | 10.065 |
| 10.051 | 10.156 | 9.953 | 10.036 | 10.088 | 10.113 | 10.181 |
| 10.287 | 10.392 | 10.190 | 10.272 | 10.325 | 10.350 | 10.417 |
| 10.613 | 10.718 | 10.515 | 10.598 | 10.650 | 10.675 | 10.743 |
| 10.676 | 10.781 | 10.579 | 10.661 | 10.714 | 10.739 | 10.806 |
| 10.416 | 10.521 | 10.318 | 10.401 | 10.453 | 10.478 | 10.546 |
| 10.282 | 10.387 | 10.184 | 10.267 | 10.319 | 10.344 | 10.412 |
| 10.344 | 10.719 | 10.241 | 10.339 | 10.381 | 10.406 | 10.773 |
| 10.634 | 11.639 | 10.532 | 10.629 | 10.672 | 10.697 | 11.888 |
| 10.765 | 11.865 | 10.657 | 10.710 | 10.765 | 10.777 | 12.586 |
| 10.826 | 11.774 | 10.826 | 10.771 | 10.826 | 10.839 | 12.404 |
| 10.282 | 10.260 | 10.215 | 10.267 | 10.322 | 10.335 | 10.625 |
| 10.208 | 10.313 | 10.111 | 10.193 | 10.246 | 10.271 | 10.338 |
| 10.327 | 10.432 | 10.230 | 10.312 | 10.365 | 10.390 | 10.457 |
| 10.571 | 10.676 | 10.473 | 10.556 | 10.608 | 10.633 | 10.701 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10.905 | 11.010 | 10.808 | 10.890 | 10.943 | 10.968 | 11.035 |
| 10.970 | 11.075 | 10.873 | 10.955 | 11.008 | 11.033 | 11.100 |
| 10.703 | 10.808 | 10.606 | 10.688 | 10.741 | 10.766 | 10.833 |
| 10.565 | 10.670 | 10.468 | 10.550 | 10.603 | 10.628 | 10.695 |
| 10.629 | 11.004 | 10.527 | 10.624 | 10.667 | 10.692 | 11.058 |
| 10.927 | 11.932 | 10.825 | 10.922 | 10.965 | 10.990 | 12.181 |
| 11.060 | 12.160 | 10.953 | 11.005 | 11.060 | 11.079 | 12.881 |
| 11.123 | 12.071 | 11.123 | 11.068 | 11.123 | 11.136 | 12.701 |
| 10.566 | 10.544 | 10.499 | 10.551 | 10.606 | 10.619 | 10.909 |
| 10.490 | 10.595 | 10.392 | 10.475 | 10.527 | 10.552 | 10.620 |
| 10.613 | 10.718 | 10.515 | 10.598 | 10.650 | 10.675 | 10.743 |
| 10.863 | 10.968 | 10.765 | 10.848 | 10.900 | 10.925 | 10.993 |
| 11.206 | 11.311 | 11.109 | 11.191 | 11.244 | 11.269 | 11.336 |
| 11.273 | 11.378 | 11.176 | 11.258 | 11.311 | 11.336 | 11.403 |
| 10.999 | 11.104 | 10.901 | 10.984 | 11.036 | 11.061 | 11.129 |
| 10.857 | 10.962 | 10.760 | 10.842 | 10.895 | 10.920 | 10.987 |
| 10.923 | 11.298 | 10.821 | 10.918 | 10.961 | 10.986 | 11.352 |
| 11.230 | 12.235 | 11.127 | 11.225 | 11.267 | 11.292 | 12.483 |
| 11.365 | 12.465 | 11.257 | 11.310 | 11.365 | 11.377 | 13.186 |
| 11.430 | 12.377 | 11.430 | 11.375 | 11.430 | 11.442 | 13.007 |
| 10.858 | 10.836 | 10.791 | 10.843 | 10.898 | 10.911 | 11.201 |
| 10.780 | 10.885 | 10.683 | 10.765 | 10.818 | 10.843 | 10.910 |
| 10.906 | 11.011 | 10.809 | 10.891 | 10.944 | 10.969 | 11.036 |
| 11.163 | 11.268 | 11.066 | 11.148 | 11.201 | 11.226 | 11.293 |
| 11.517 | 11.622 | 11.419 | 11.502 | 11.554 | 11.579 | 11.647 |
| 11.586 | 11.691 | 11.488 | 11.571 | 11.623 | 11.648 | 11.716 |
| 11.304 | 11.409 | 11.206 | 11.289 | 11.341 | 11.366 | 11.434 |
| 11.158 | 11.263 | 11.061 | 11.143 | 11.196 | 11.221 | 11.288 |
| 11.226 | 11.601 | 11.128 | 11.221 | 11.263 | 11.288 | 11.655 |
| 11.541 | 12.546 | 11.438 | 11.536 | 11.578 | 11.603 | 12.795 |
| 11.678 | 12.778 | 11.571 | 11.623 | 11.678 | 11.691 | 13.500 |
| 11.745 | 12.693 | 11.745 | 11.690 | 11.745 | 11.758 | 13.323 |
| 11.159 | 11.136 | 11.091 | 11.144 | 11.199 | 11.211 | 11.501 |
| 11.079 | 11.184 | 10.982 | 11.064 | 11.117 | 11.142 | 11.209 |
| 11.209 | 11.314 | 11.111 | 11.194 | 11.246 | 11.271 | 11.339 |
| 11.473 | 11.578 | 11.375 | 11.458 | 11.510 | 11.535 | 11.603 |
| 11.836 | 11.941 | 11.738 | 11.821 | 11.873 | 11.898 | 11.966 |
| 11.906 | 12.011 | 11.809 | 11.891 | 11.944 | 11.969 | 12.036 |
| 11.617 | 11.722 | 11.519 | 11.602 | 11.654 | 11.679 | 11.747 |
| 11.467 | 11.572 | 11.369 | 11.452 | 11.504 | 11.529 | 11.597 |
| 11.537 | 11.912 | 11.434 | 11.532 | 11.574 | 11.599 | 11.965 |
| 11.860 | 12.865 | 11.758 | 11.855 | 11.898 | 11.923 | 13.114 |
| 12.000 | 13.100 | 11.893 | 11.945 | 12.000 | 12.013 | 13.821 |
| 12.069 | 13.016 | 12.069 | 12.014 | 12.069 | 12.081 | 13.646 |
| 11.467 | 11.445 | 11.400 | 11.452 | 11.507 | 11.520 | 11.810 |
| 11.386 | 11.491 | 11.288 | 11.371 | 11.423 | 11.448 | 11.516 |
| 11.619 | 11.624 | 11.421 | 11.504 | 11.556 | 11.581 | 11.649 |
| 11.790 | 11.895 | 11.693 | 11.775 | 11.828 | 11.853 | 11.920 |
| 12.163 | 12.268 | 12.066 | 12.148 | 12.201 | 12.226 | 12.293 |
| 12.236 | 12.341 | 12.138 | 12.221 | 12.273 | 12.298 | 12.366 |
| 11.938 | 12.043 | 11.841 | 11.923 | 11.976 | 12.001 | 12.068 |
| 11.784 | 11.889 | 11.687 | 11.769 | 11.822 | 11.847 | 11.914 |
| 11.856 | 12.231 | 11.754 | 11.851 | 11.894 | 11.919 | 12.285 |
| 12.189 | 13.194 | 12.086 | 12.184 | 12.226 | 12.251 | 13.442 |
| 12.331 | 13.431 | 12.224 | 12.276 | 12.331 | 12.344 | 14.152 |
| 12.402 | 13.349 | 12.402 | 12.347 | 12.402 | 12.414 | 13.979 |
| 11.785 | 11.762 | 11.717 | 11.770 | 11.825 | 11.837 | 12.127 |
| 11.701 | 11.806 | 11.604 | 11.686 | 11.739 | 11.764 | 11.831 |
| 11.838 | 11.943 | 11.741 | 11.823 | 11.876 | 11.901 | 11.968 |
| 12.117 | 12.222 | 12.020 | 12.102 | 12.155 | 12.180 | 12.247 |
| 12.501 | 12.606 | 12.403 | 12.486 | 12.538 | 12.563 | 12.631 |
| 12.575 | 12.680 | 12.478 | 12.560 | 12.613 | 12.638 | 12.705 |
| 12.269 | 12.374 | 12.172 | 12.254 | 12.307 | 12.332 | 12.399 |
| 12.112 | 12.217 | 12.014 | 12.097 | 12.149 | 12.174 | 12.242 |
| 12.185 | 12.560 | 12.083 | 12.180 | 12.223 | 12.248 | 12.614 |
| 12.527 | 13.532 | 12.424 | 12.522 | 12.564 | 12.589 | 13.781 |
| 12.672 | 13.772 | 12.565 | 12.617 | 12.672 | 12.685 | 14.493 |
| 12.745 | 13.692 | 12.745 | 12.690 | 12.745 | 12.757 | 14.322 |
| 12.112 | 12.089 | 12.044 | 12.097 | 12.152 | 12.164 | 12.454 |
| 12.027 | 12.132 | 11.929 | 12.012 | 12.064 | 12.089 | 12.157 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12.167 | 12.272 | 12.070 | 12.152 | 12.205 | 12.230 | 12.297 |
| 12.454 | 12.559 | 12.356 | 12.439 | 12.491 | 12.516 | 12.584 |
| 12.848 | 12.953 | 12.750 | 12.833 | 12.885 | 12.910 | 12.978 |
| 12.925 | 13.030 | 12.827 | 12.910 | 12.962 | 12.987 | 13.055 |
| 12.611 | 12.716 | 12.513 | 12.596 | 12.648 | 12.673 | 12.741 |
| 12.448 | 12.553 | 12.351 | 12.433 | 12.486 | 12.511 | 12.578 |
| 12.524 | 12.899 | 12.422 | 12.519 | 12.562 | 12.587 | 12.953 |
| 12.875 | 13.880 | 12.773 | 12.870 | 12.913 | 12.938 | 14.129 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-12 | 23.39 | 17.82 | 19.31 | 18.36 | 20.76 |
| Mar-12 | 24.75 | 16.87 | 18.33 | 17.41 | 20.89 |
| Apr-12 | 27.18 | 17.52 | 20.05 | 18.47 | 22.53 |
| May-12 | 31.21 | 16.57 | 20.33 | 17.95 | 24.22 |
| Jun-12 | 38.04 | 17.78 | 23.78 | 20.03 | 28.43 |
| Jul-12 | 58.75 | 19.98 | 26.68 | 22.61 | 38.93 |
| Aug-12 | 59.44 | 20.98 | 26.56 | 22.88 | 40.96 |
| Sep-12 | 36.06 | 17.76 | 23.33 | 20.12 | 26.85 |
| Oct-12 | 29.33 | 17.06 | 20.74 | 18.31 | 23.76 |
| Nov-12 | 26.84 | 18.41 | 20.76 | 19.29 | 22.81 |
| Dec-12 | 29.58 | 20.03 | 22.71 | 21.14 | 24.77 |
| Jan-13 | 33.68 | 25.22 | 28.96 | 26.59 | 29.94 |
| Feb-13 | 33.78 | 25.88 | 28.05 | 26.67 | 30.06 |
| Mar-13 | 31.99 | 22.55 | 24.58 | 23.35 | 27.26 |
| Apr-13 | 31.73 | 22.04 | 25.06 | 23.09 | 27.31 |
| May-13 | 35.38 | 22.13 | 27.16 | 23.98 | 29.37 |
| Jun-13 | 42.36 | 23.41 | 31.74 | 26.74 | 33.68 |
| Jul-13 | 61.93 | 28.18 | 37.13 | 31.47 | 45.88 |
| Aug-13 | 62.22 | 28.67 | 36.70 | 31.62 | 46.10 |
| Sep-13 | 39.18 | 23.29 | 30.23 | 26.07 | 31.90 |
| Oct-13 | 31.31 | 22.13 | 26.91 | 23.76 | 27.49 |
| Nov-13 | 32.16 | 23.18 | 26.27 | 24.41 | 27.85 |
| Dec-13 | 33.85 | 24.46 | 27.59 | 25.69 | 29.38 |
| Jan-14 | 33.62 | 29.96 | 31.27 | 30.44 | 31.94 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-14 | 33.72 | 29.77 | 31.36 | 30.35 | 31.95 |
| Mar-14 | 29.96 | 25.67 | 27.86 | 26.53 | 28.08 |
| Apr-14 | 30.27 | 24.60 | 27.97 | 25.77 | 27.97 |
| May-14 | 36.32 | 24.51 | 30.36 | 26.80 | 31.10 |
| Jun-14 | 44.29 | 26.13 | 34.93 | 29.43 | 36.36 |
| Jul-14 | 63.97 | 31.25 | 41.18 | 34.90 | 48.65 |
| Aug-14 | 63.94 | 31.41 | 40.67 | 35.04 | 48.09 |
| Sep-14 | 40.66 | 25.65 | 32.90 | 28.37 | 34.11 |
| Oct-14 | 32.88 | 24.19 | 29.42 | 25.97 | 29.39 |
| Nov-14 | 33.53 | 25.01 | 28.49 | 26.48 | 29.45 |
| Dec-14 | 35.04 | 26.49 | 29.73 | 27.68 | 31.16 |
| Jan-15 | 36.82 | 32.13 | 34.24 | 32.96 | 34.70 |
| Feb-15 | 36.86 | 31.91 | 34.28 | 32.77 | 34.72 |
| Mar-15 | 32.39 | 27.76 | 30.12 | 28.63 | 30.41 |
| Apr-15 | 32.69 | 26.36 | 29.98 | 27.62 | 30.10 |
| May-15 | 37.08 | 26.25 | 32.82 | 28.98 | 32.46 |
| Jun-15 | 43.99 | 28.09 | 37.93 | 31.20 | 37.45 |
| Jul-15 | 68.51 | 33.56 | 43.66 | 37.90 | 52.59 |
| Aug-15 | 68.46 | 33.29 | 43.11 | 37.14 | 51.28 |
| Sep-15 | 40.28 | 27.08 | 34.73 | 29.95 | 34.77 |
| Oct-15 | 31.81 | 25.90 | 29.58 | 27.25 | 29.41 |
| Nov-15 | 32.44 | 26.39 | 29.90 | 27.79 | 29.85 |
| Dec-15 | 33.87 | 27.76 | 31.16 | 29.01 | 31.31 |
| Jan-16 | 42.21 | 28.63 | 33.28 | 30.56 | 35.57 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-16 | 43.07 | 29.92 | 32.39 | 30.80 | 36.72 |
| Mar-16 | 41.59 | 29.16 | 31.56 | 29.98 | 35.73 |
| Apr-16 | 44.02 | 29.56 | 33.82 | 31.16 | 37.16 |
| May-16 | 49.78 | 30.64 | 37.95 | 33.50 | 40.85 |
| Jun-16 | 49.44 | 30.35 | 40.02 | 33.72 | 41.40 |
| Jul-16 | 54.79 | 31.79 | 43.01 | 36.45 | 44.34 |
| Aug-16 | 57.02 | 34.21 | 43.29 | 37.30 | 47.05 |
| Sep-16 | 48.83 | 30.32 | 38.88 | 33.53 | 40.67 |
| Oct-16 | 45.25 | 29.23 | 36.22 | 31.97 | 37.97 |
| Nov-16 | 44.07 | 31.23 | 35.20 | 32.72 | 38.01 |
| Dec-16 | 41.82 | 31.23 | 35.23 | 32.80 | 36.87 |
| Jan-17 | 43.43 | 29.90 | 34.55 | 31.72 | 37.01 |
| Feb-17 | 44.68 | 31.16 | 33.78 | 32.11 | 38.10 |
| Mar-17 | 43.43 | 30.72 | 33.25 | 31.56 | 37.45 |
| Apr-17 | 46.60 | 31.62 | 36.39 | 33.53 | 38.89 |
| May-17 | 51.52 | 33.67 | 41.32 | 36.48 | 43.60 |
| Jun-17 | 51.98 | 33.59 | 44.29 | 37.32 | 44.48 |
| Jul-17 | 56.57 | 35.32 | 47.78 | 40.49 | 47.41 |
| Aug-17 | 59.27 | 38.36 | 48.54 | 41.82 | 50.45 |
| Sep-17 | 50.21 | 33.54 | 43.54 | 37.54 | 43.17 |
| Oct-17 | 47.41 | 33.57 | 41.20 | 36.37 | 41.60 |
| Nov-17 | 46.86 | 36.09 | 40.69 | 37.81 | 42.03 |
| Dec-17 | 45.27 | 36.25 | 41.99 | 38.26 | 41.27 |
| Jan-18 | 47.14 | 35.78 | 41.10 | 37.73 | 42.18 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-18 | 50.42 | 37.19 | 40.31 | 38.32 | 44.08 |
| Mar-18 | 48.88 | 37.49 | 40.72 | 38.68 | 43.51 |
| Apr-18 | 53.44 | 34.98 | 40.02 | 36.87 | 44.60 |
| May-18 | 55.65 | 39.10 | 47.98 | 42.36 | 48.65 |
| Jun-18 | 59.75 | 41.71 | 55.57 | 46.90 | 52.90 |
| Jul-18 | 63.99 | 45.85 | 59.52 | 51.21 | 56.98 |
| Aug-18 | 68.83 | 49.61 | 62.79 | 54.10 | 61.38 |
| Sep-18 | 62.65 | 46.35 | 58.27 | 51.39 | 56.15 |
| Oct-18 | 55.59 | 43.23 | 51.70 | 46.11 | 50.80 |
| Nov-18 | 57.55 | 44.93 | 50.65 | 47.07 | 51.96 |
| Dec-18 | 62.00 | 51.89 | 57.66 | 54.28 | 57.60 |
| Jan-19 | 65.87 | 51.10 | 58.68 | 53.88 | 59.55 |
| Feb-19 | 67.33 | 51.37 | 55.68 | 52.94 | 59.79 |
| Mar-19 | 68.67 | 45.22 | 49.29 | 46.82 | 56.70 |
| Apr-19 | 72.58 | 51.82 | 58.93 | 54.30 | 63.24 |
| May-19 | 75.01 | 53.59 | 65.76 | 58.06 | 66.08 |
| Jun-19 | 78.73 | 58.49 | 73.22 | 64.38 | 70.76 |
| Jul-19 | 84.34 | 62.91 | 78.44 | 68.62 | 76.06 |
| Aug-19 | 87.91 | 65.39 | 81.76 | 71.40 | 79.21 |
| Sep-19 | 77.33 | 58.26 | 71.92 | 63.72 | 69.77 |
| Oct-19 | 68.57 | 45.65 | 55.52 | 49.01 | 58.68 |
| Nov-19 | 66.26 | 49.71 | 56.33 | 52.35 | 58.52 |
| Dec-19 | 66.50 | 53.54 | 60.39 | 56.22 | 60.86 |
| Jan-20 | 69.59 | 54.77 | 62.90 | 57.75 | 63.35 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-20 | 71.65 | 53.46 | 58.10 | 55.24 | 62.78 |
| Mar-20 | 73.62 | 45.08 | 48.97 | 46.51 | 59.36 |
| Apr-20 | 75.45 | 53.08 | 60.36 | 55.61 | 65.31 |
| May-20 | 78.63 | 57.51 | 71.91 | 63.49 | 70.00 |
| Jun-20 | 83.06 | 61.90 | 77.25 | 67.24 | 74.98 |
| Jul-20 | 89.51 | 66.18 | 83.24 | 71.99 | 80.65 |
| Aug-20 | 92.69 | 68.26 | 86.20 | 75.29 | 83.15 |
| Sep-20 | 79.96 | 61.15 | 74.36 | 66.10 | 72.57 |
| Oct-20 | 71.97 | 54.23 | 66.56 | 58.76 | 65.01 |
| Nov-20 | 70.35 | 51.97 | 58.90 | 54.74 | 61.67 |
| Dec-20 | 69.01 | 58.35 | 64.18 | 60.49 | 64.52 |
| Jan-21 | 70.72 | 55.80 | 64.87 | 59.57 | 64.37 |
| Feb-21 | 69.66 | 54.24 | 58.79 | 55.90 | 62.45 |
| Mar-21 | 76.43 | 43.25 | 46.81 | 44.46 | 60.30 |
| Apr-21 | 78.42 | 52.11 | 59.26 | 54.60 | 66.24 |
| May-21 | 80.83 | 58.24 | 72.82 | 64.29 | 71.40 |
| Jun-21 | 85.71 | 63.19 | 79.71 | 68.94 | 77.14 |
| Jul-21 | 91.58 | 67.33 | 85.17 | 74.32 | 82.12 |
| Aug-21 | 94.32 | 68.79 | 87.72 | 75.74 | 84.53 |
| Sep-21 | 80.33 | 63.34 | 74.71 | 67.60 | 73.54 |
| Oct-21 | 74.13 | 54.48 | 67.44 | 59.53 | 66.13 |
| Nov-21 | 70.98 | 52.21 | 58.85 | 54.69 | 62.28 |
| Dec-21 | 68.86 | 58.88 | 64.04 | 60.64 | 64.70 |
| Jan-22 | 75.29 | 58.27 | 67.33 | 61.82 | 67.91 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-22 | 73.84 | 56.94 | 61.71 | 58.68 | 65.90 |
| Mar-22 | 77.94 | 48.46 | 47.03 | 44.68 | 61.15 |
| Apr-22 | 79.06 | 57.51 | 65.79 | 60.61 | 69.22 |
| May-22 | 83.57 | 61.31 | 75.94 | 67.05 | 74.51 |
| Jun-22 | 87.78 | 64.98 | 81.64 | 70.77 | 79.09 |
| Jul-22 | 93.92 | 71.38 | 87.35 | 78.01 | 84.85 |
| Aug-22 | 96.74 | 71.06 | 89.93 | 77.48 | 87.01 |
| Sep-22 | 81.29 | 63.59 | 75.60 | 68.09 | 74.25 |
| Oct-22 | 75.21 | 52.00 | 64.42 | 56.87 | 65.15 |
| Nov-22 | 72.23 | 52.61 | 59.80 | 55.11 | 63.09 |
| Dec-22 | 69.50 | 61.53 | 64.63 | 62.75 | 65.80 |
| Jan-23 | 74.90 | 60.06 | 69.40 | 63.72 | 68.77 |
| Feb-23 | 74.43 | 55.25 | 59.88 | 56.93 | 65.26 |
| Mar-23 | 78.93 | 44.91 | 48.60 | 46.17 | 62.40 |
| Apr-23 | 80.47 | 58.05 | 66.81 | 61.55 | 69.96 |
| May-23 | 85.68 | 68.83 | 78.34 | 69.16 | 76.98 |
| Jun-23 | 89.67 | 67.16 | 83.40 | 72.81 | 81.05 |
| Jul-23 | 96.41 | 73.44 | 89.67 | 80.18 | 87.16 |
| Aug-23 | 98.43 | 72.84 | 91.54 | 79.20 | 88.71 |
| Sep-23 | 82.94 | 63.37 | 77.14 | 68.88 | 75.13 |
| Oct-23 | 76.56 | 56.88 | 69.82 | 61.63 | 68.69 |
| Nov-23 | 71.98 | 57.17 | 64.44 | 59.89 | 65.53 |
| Dec-23 | 70.99 | 63.27 | 66.02 | 64.41 | 67.24 |
| Jan-24 | 74.68 | 60.72 | 69.46 | 63.93 | 69.02 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-24 | 76.95 | 61.24 | 66.30 | 63.04 | 69.75 |
| Mar-24 | 78.36 | 50.54 | 55.09 | 52.33 | 64.10 |
| Apr-24 | 83.69 | 52.78 | 60.02 | 55.30 | 69.18 |
| May-24 | 85.79 | 61.23 | 75.14 | 66.34 | 75.54 |
| Jun-24 | 90.94 | 67.51 | 84.57 | 74.33 | 81.71 |
| Jul-24 | 97.66 | 72.42 | 90.82 | 79.18 | 87.92 |
| Aug-24 | 100.99 | 75.13 | 98.92 | 82.03 | 91.00 |
| Sep-24 | 89.93 | 67.38 | 83.64 | 73.88 | 81.01 |
| Oct-24 | 76.18 | 57.20 | 69.57 | 61.41 | 68.72 |
| Nov-24 | 73.18 | 58.32 | 66.09 | 61.42 | 66.64 |
| Dec-24 | 74.05 | 60.80 | 68.57 | 63.85 | 68.46 |
| Jan-25 | 79.23 | 61.37 | 70.48 | 64.72 | 71.58 |
| Feb-25 | 78.23 | 61.96 | 67.15 | 63.84 | 70.70 |
| Mar-25 | 78.21 | 50.66 | 55.22 | 52.45 | 64.10 |
| Apr-25 | 82.96 | 59.88 | 68.09 | 62.73 | 72.62 |
| May-25 | 86.88 | 63.98 | 79.25 | 69.97 | 77.61 |
| Jun-25 | 92.52 | 68.33 | 86.04 | 74.97 | 83.16 |
| Jul-25 | 100.33 | 73.00 | 93.31 | 80.46 | 89.86 |
| Aug-25 | 103.73 | 76.09 | 96.47 | 84.08 | 92.95 |
| Sep-25 | 90.95 | 68.06 | 84.58 | 74.26 | 82.05 |
| Oct-25 | 77.31 | 55.27 | 67.21 | 59.33 | 68.22 |
| Nov-25 | 73.88 | 57.95 | 66.02 | 61.35 | 66.63 |
| Dec-25 | 74.50 | 65.10 | 69.29 | 66.64 | 70.36 |
| Jan-26 | 82.40 | 65.45 | 75.63 | 69.44 | 75.29 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-26 | 80.98 | 64.06 | 69.42 | 66.01 | 73.14 |
| Mar-26 | 82.79 | 53.61 | 58.23 | 55.31 | 68.33 |
| Apr-26 | 86.77 | 61.99 | 70.49 | 64.95 | 75.61 |
| May-26 | 91.21 | 67.77 | 84.74 | 74.81 | 81.87 |
| Jun-26 | 97.43 | 71.96 | 90.61 | 78.45 | 87.73 |
| Jul-26 | 105.34 | 77.34 | 97.96 | 84.36 | 94.74 |
| Aug-26 | 108.63 | 79.46 | 101.02 | 87.92 | 97.27 |
| Sep-26 | 94.03 | 71.22 | 87.45 | 77.31 | 85.11 |
| Oct-26 | 83.09 | 62.33 | 76.51 | 67.54 | 74.90 |
| Nov-26 | 80.50 | 60.69 | 68.77 | 63.91 | 71.28 |
| Dec-26 | 79.24 | 67.68 | 73.70 | 69.89 | 74.31 |
| Jan-27 | 83.80 | 65.92 | 76.64 | 70.37 | 76.15 |
| Feb-27 | 83.08 | 63.20 | 68.50 | 65.13 | 73.68 |
| Mar-27 | 85.92 | 51.98 | 56.26 | 53.44 | 69.53 |
| Apr-27 | 89.51 | 58.42 | 66.44 | 61.21 | 75.05 |
| May-27 | 94.27 | 67.39 | 84.26 | 74.39 | 82.94 |
| Jun-27 | 100.92 | 73.55 | 93.85 | 80.61 | 90.54 |
| Jul-27 | 108.71 | 79.59 | 101.10 | 88.03 | 97.37 |
| Aug-27 | 111.53 | 81.05 | 103.73 | 89.38 | 99.86 |
| Sep-27 | 95.09 | 74.61 | 88.44 | 79.79 | 86.93 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-12 | 23.39 | 17.82 | 19.31 | 18.36 | 20.76 |
| Mar-12 | 24.75 | 16.87 | 18.33 | 17.41 | 20.89 |
| Apr-12 | 27.18 | 17.52 | 20.05 | 18.47 | 22.53 |
| May-12 | 31.21 | 16.57 | 20.33 | 17.95 | 24.22 |
| Jun-12 | 38.04 | 17.78 | 23.78 | 20.03 | 28.43 |
| Jul-12 | 58.75 | 19.98 | 26.68 | 22.61 | 38.93 |
| Aug-12 | 59.44 | 20.98 | 26.56 | 22.88 | 40.96 |
| Sep-12 | 36.06 | 17.76 | 23.33 | 20.12 | 26.85 |
| Oct-12 | 29.33 | 17.06 | 20.74 | 18.31 | 23.76 |
| Nov-12 | 26.84 | 18.41 | 20.76 | 19.29 | 22.81 |
| Dec-12 | 29.58 | 20.03 | 22.71 | 21.14 | 24.77 |
| Jan-13 | 33.68 | 25.22 | 28.96 | 26.59 | 29.94 |
| Feb-13 | 33.78 | 25.88 | 28.05 | 26.67 | 30.06 |
| Mar-13 | 31.99 | 22.55 | 24.58 | 23.35 | 27.26 |
| Apr-13 | 31.73 | 22.04 | 25.06 | 23.09 | 27.31 |
| May-13 | 35.38 | 22.13 | 27.16 | 23.98 | 29.37 |
| Jun-13 | 42.36 | 23.41 | 31.74 | 26.74 | 33.68 |
| Jul-13 | 61.93 | 28.18 | 37.13 | 31.47 | 45.88 |
| Aug-13 | 62.22 | 28.67 | 36.70 | 31.62 | 46.10 |
| Sep-13 | 39.18 | 23.29 | 30.23 | 26.07 | 31.90 |
| Oct-13 | 31.31 | 22.13 | 26.91 | 23.76 | 27.49 |
| Nov-13 | 32.16 | 23.18 | 26.27 | 24.41 | 27.85 |
| Dec-13 | 33.85 | 24.46 | 27.59 | 25.69 | 29.38 |
| Jan-14 | 33.62 | 29.96 | 31.27 | 30.44 | 31.94 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-14 | 33.72 | 29.77 | 31.36 | 30.35 | 31.95 |
| Mar-14 | 29.96 | 25.67 | 27.86 | 26.53 | 28.08 |
| Apr-14 | 30.27 | 24.60 | 27.97 | 25.77 | 27.97 |
| May-14 | 36.32 | 24.51 | 30.36 | 26.80 | 31.10 |
| Jun-14 | 44.29 | 26.13 | 34.93 | 29.43 | 36.36 |
| Jul-14 | 63.97 | 31.25 | 41.18 | 34.90 | 48.65 |
| Aug-14 | 63.94 | 31.41 | 40.67 | 35.04 | 48.09 |
| Sep-14 | 40.66 | 25.65 | 32.90 | 28.37 | 34.11 |
| Oct-14 | 32.88 | 24.19 | 29.42 | 25.97 | 29.39 |
| Nov-14 | 33.53 | 25.01 | 28.49 | 26.48 | 29.45 |
| Dec-14 | 35.04 | 26.49 | 29.73 | 27.68 | 31.16 |
| Jan-15 | 36.82 | 32.13 | 34.24 | 32.96 | 34.70 |
| Feb-15 | 36.86 | 31.91 | 34.28 | 32.77 | 34.72 |
| Mar-15 | 32.39 | 27.76 | 30.12 | 28.63 | 30.41 |
| Apr-15 | 32.69 | 26.66 | 29.98 | 27.62 | 30.10 |
| May-15 | 37.08 | 26.25 | 32.82 | 28.98 | 32.46 |
| Jun-15 | 43.99 | 28.09 | 37.03 | 31.20 | 37.45 |
| Jul-15 | 68.51 | 33.56 | 43.66 | 37.00 | 52.59 |
| Aug-15 | 68.46 | 33.29 | 43.11 | 37.14 | 51.28 |
| Sep-15 | 40.28 | 27.08 | 34.73 | 29.95 | 34.77 |
| Oct-15 | 31.81 | 25.90 | 29.58 | 27.25 | 29.41 |
| Nov-15 | 32.44 | 26.39 | 29.90 | 27.79 | 29.85 |
| Dec-15 | 33.87 | 27.76 | 31.16 | 29.01 | 31.31 |
| Jan-16 | 42.21 | 28.63 | 33.28 | 30.56 | 35.57 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-16 | 43.07 | 29.92 | 32.89 | 30.80 | 36.72 |
| Mar-16 | 41.59 | 29.16 | 31.56 | 29.98 | 35.73 |
| Apr-16 | 44.02 | 29.56 | 33.82 | 31.16 | 37.16 |
| May-16 | 49.78 | 30.64 | 37.95 | 33.50 | 40.85 |
| Jun-16 | 49.44 | 30.35 | 40.02 | 33.72 | 41.40 |
| Jul-16 | 54.79 | 31.79 | 43.01 | 36.45 | 44.34 |
| Aug-16 | 57.02 | 34.21 | 43.29 | 37.30 | 47.05 |
| Sep-16 | 48.83 | 30.32 | 38.88 | 33.53 | 40.67 |
| Oct-16 | 45.25 | 29.23 | 36.22 | 31.97 | 37.97 |
| Nov-16 | 44.07 | 31.23 | 35.20 | 32.72 | 38.01 |
| Dec-16 | 41.82 | 31.23 | 35.26 | 32.80 | 36.87 |
| Jan-17 | 43.43 | 29.90 | 34.55 | 31.72 | 37.01 |
| Feb-17 | 44.68 | 31.16 | 33.78 | 32.11 | 38.10 |
| Mar-17 | 43.43 | 30.72 | 33.25 | 31.58 | 37.45 |
| Apr-17 | 45.60 | 31.62 | 36.39 | 33.53 | 38.89 |
| May-17 | 51.52 | 33.67 | 41.32 | 36.48 | 43.60 |
| Jun-17 | 51.98 | 33.59 | 44.29 | 37.32 | 44.48 |
| Jul-17 | 56.57 | 35.32 | 47.78 | 40.49 | 47.41 |
| Aug-17 | 59.27 | 38.36 | 48.54 | 41.82 | 50.45 |
| Sep-17 | 50.21 | 33.54 | 43.54 | 37.54 | 43.17 |
| Oct-17 | 47.41 | 33.57 | 41.20 | 36.37 | 41.60 |
| Nov-17 | 46.86 | 36.09 | 40.69 | 37.81 | 42.03 |
| Dec-17 | 45.27 | 36.25 | 41.09 | 38.26 | 41.27 |
| Jan-18 | 47.14 | 35.78 | 41.10 | 37.73 | 42.18 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-18 | 50.42 | 37.19 | 40.31 | 38.82 | 44.08 |
| Mar-18 | 48.88 | 37.49 | 40.72 | 38.68 | 43.51 |
| Apr-18 | 56.44 | 34.98 | 40.02 | 36.87 | 44.60 |
| May-18 | 55.65 | 39.10 | 47.98 | 42.36 | 48.65 |
| Jun-18 | 59.75 | 41.71 | 55.57 | 46.90 | 52.90 |
| Jul-18 | 63.99 | 45.85 | 59.52 | 51.21 | 56.98 |
| Aug-18 | 68.83 | 49.61 | 62.79 | 54.10 | 61.38 |
| Sep-18 | 62.65 | 46.35 | 58.27 | 51.39 | 56.15 |
| Oct-18 | 55.59 | 46.23 | 51.70 | 46.11 | 50.80 |
| Nov-18 | 57.55 | 44.93 | 50.65 | 47.07 | 51.96 |
| Dec-18 | 62.00 | 51.89 | 57.66 | 54.28 | 57.60 |
| Jan-19 | 65.87 | 51.10 | 58.68 | 53.88 | 59.55 |
| Feb-19 | 67.33 | 51.37 | 55.68 | 52.94 | 59.79 |
| Mar-19 | 68.67 | 45.22 | 49.29 | 46.82 | 56.70 |
| Apr-19 | 72.58 | 51.82 | 58.93 | 54.30 | 63.24 |
| May-19 | 75.01 | 53.59 | 65.76 | 58.06 | 66.08 |
| Jun-19 | 78.73 | 58.49 | 73.22 | 64.38 | 70.76 |
| Jul-19 | 84.34 | 62.91 | 78.44 | 68.62 | 76.06 |
| Aug-19 | 87.91 | 65.39 | 81.76 | 71.40 | 79.21 |
| Sep-19 | 77.33 | 58.26 | 71.92 | 63.72 | 69.77 |
| Oct-19 | 68.57 | 45.65 | 55.52 | 49.01 | 58.68 |
| Nov-19 | 66.26 | 49.71 | 56.33 | 52.35 | 58.52 |
| Dec-19 | 66.50 | 53.54 | 60.39 | 56.22 | 60.86 |
| Jan-20 | 69.59 | 54.77 | 62.90 | 57.75 | 63.35 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-20 | 71.65 | 53.46 | 58.10 | 55.24 | 62.78 |
| Mar-20 | 73.62 | 45.08 | 48.97 | 46.51 | 59.36 |
| Apr-20 | 75.45 | 53.08 | 60.36 | 55.61 | 65.31 |
| May-20 | 78.63 | 57.51 | 71.91 | 63.49 | 70.00 |
| Jun-20 | 83.06 | 61.90 | 77.25 | 67.24 | 74.98 |
| Jul-20 | 89.51 | 66.18 | 83.24 | 71.99 | 80.65 |
| Aug-20 | 92.69 | 68.26 | 86.20 | 75.29 | 83.15 |
| Sep-20 | 79.96 | 61.15 | 74.36 | 66.10 | 72.57 |
| Oct-20 | 71.97 | 54.23 | 66.56 | 58.76 | 65.01 |
| Nov-20 | 70.35 | 51.97 | 58.90 | 54.74 | 61.67 |
| Dec-20 | 69.01 | 58.35 | 64.18 | 60.49 | 64.52 |
| Jan-21 | 70.72 | 55.80 | 64.87 | 59.57 | 64.37 |
| Feb-21 | 69.66 | 54.24 | 58.79 | 55.90 | 62.45 |
| Mar-21 | 76.43 | 43.25 | 46.81 | 44.46 | 60.30 |
| Apr-21 | 78.42 | 52.11 | 59.26 | 54.60 | 66.24 |
| May-21 | 80.83 | 58.24 | 72.82 | 64.29 | 71.40 |
| Jun-21 | 85.71 | 63.19 | 79.71 | 68.94 | 77.14 |
| Jul-21 | 91.58 | 67.33 | 85.17 | 74.32 | 82.12 |
| Aug-21 | 94.32 | 68.79 | 87.72 | 75.74 | 84.53 |
| Sep-21 | 80.33 | 63.34 | 74.71 | 67.60 | 73.54 |
| Oct-21 | 74.13 | 54.43 | 67.44 | 59.53 | 66.13 |
| Nov-21 | 70.98 | 52.21 | 58.85 | 54.69 | 62.28 |
| Dec-21 | 68.86 | 58.88 | 64.04 | 60.64 | 64.70 |
| Jan-22 | 75.29 | 58.27 | 67.33 | 61.82 | 67.91 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-22 | 73.84 | 56.94 | 61.71 | 58.68 | 65.90 |
| Mar-22 | 77.94 | 43.46 | 47.03 | 44.68 | 61.15 |
| Apr-22 | 79.06 | 57.51 | 65.79 | 60.61 | 69.22 |
| May-22 | 83.57 | 61.31 | 75.94 | 67.05 | 74.51 |
| Jun-22 | 87.78 | 64.98 | 81.64 | 70.77 | 79.09 |
| Jul-22 | 93.92 | 71.38 | 87.35 | 78.01 | 84.85 |
| Aug-22 | 96.74 | 71.06 | 89.93 | 77.48 | 87.01 |
| Sep-22 | 81.29 | 63.59 | 75.60 | 68.09 | 74.25 |
| Oct-22 | 75.21 | 52.00 | 64.42 | 56.87 | 65.15 |
| Nov-22 | 72.23 | 52.61 | 59.30 | 55.11 | 63.09 |
| Dec-22 | 69.50 | 61.53 | 64.63 | 62.75 | 65.80 |
| Jan-23 | 74.90 | 60.06 | 69.40 | 63.72 | 68.77 |
| Feb-23 | 74.43 | 55.25 | 59.88 | 56.93 | 65.26 |
| Mar-23 | 78.93 | 44.91 | 48.60 | 46.17 | 62.40 |
| Apr-23 | 80.47 | 58.05 | 66.81 | 61.55 | 69.96 |
| May-23 | 85.68 | 63.83 | 78.34 | 69.16 | 76.98 |
| Jun-23 | 89.67 | 67.16 | 83.40 | 72.81 | 81.05 |
| Jul-23 | 96.41 | 73.44 | 89.67 | 80.18 | 87.16 |
| Aug-23 | 98.43 | 72.84 | 91.54 | 79.20 | 88.71 |
| Sep-23 | 82.94 | 63.37 | 77.14 | 68.88 | 75.13 |
| Oct-23 | 76.56 | 56.88 | 69.82 | 61.63 | 68.69 |
| Nov-23 | 71.98 | 57.17 | 64.44 | 59.89 | 65.53 |
| Dec-23 | 70.99 | 63.27 | 66.02 | 64.41 | 67.24 |
| Jan-24 | 74.68 | 60.72 | 69.46 | 63.93 | 69.02 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-24 | 76.95 | 61.24 | 66.30 | 63.04 | 69.75 |
| Mar-24 | 78.36 | 50.54 | 55.09 | 52.33 | 64.10 |
| Apr-24 | 83.69 | 52.78 | 60.02 | 55.30 | 69.18 |
| May-24 | 85.79 | 61.23 | 75.14 | 66.34 | 75.54 |
| Jun-24 | 90.94 | 67.51 | 84.57 | 74.33 | 81.71 |
| Jul-24 | 97.66 | 72.42 | 90.82 | 79.18 | 87.92 |
| Aug-24 | 100.99 | 75.13 | 93.92 | 82.03 | 91.00 |
| Sep-24 | 89.93 | 67.38 | 83.64 | 73.88 | 81.01 |
| Oct-24 | 76.18 | 57.20 | 69.57 | 61.41 | 68.72 |
| Nov-24 | 73.18 | 58.32 | 66.09 | 61.42 | 66.64 |
| Dec-24 | 74.05 | 60.80 | 68.57 | 63.85 | 68.46 |
| Jan-25 | 79.23 | 61.37 | 70.48 | 64.72 | 71.58 |
| Feb-25 | 78.23 | 61.96 | 67.15 | 63.84 | 70.70 |
| Mar-25 | 78.21 | 50.66 | 55.22 | 52.45 | 64.10 |
| Apr-25 | 82.96 | 59.88 | 68.09 | 62.73 | 72.62 |
| May-25 | 86.88 | 63.98 | 79.25 | 69.97 | 77.61 |
| Jun-25 | 92.52 | 68.33 | 86.04 | 74.97 | 83.16 |
| Jul-25 | 100.33 | 73.00 | 93.31 | 80.46 | 89.86 |
| Aug-25 | 103.73 | 76.09 | 96.47 | 84.08 | 92.95 |
| Sep-25 | 90.95 | 68.06 | 84.58 | 74.26 | 82.05 |
| Oct-25 | 77.31 | 55.27 | 67.21 | 59.33 | 68.22 |
| Nov-25 | 73.88 | 57.95 | 66.02 | 61.35 | 66.63 |
| Dec-25 | 74.50 | 65.10 | 69.29 | 66.64 | 70.36 |
| Jan-26 | 82.40 | 65.45 | 75.63 | 69.44 | 75.29 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-26 | 80.98 | 64.06 | 69.42 | 66.01 | 73.14 |
| Mar-26 | 82.79 | 53.61 | 58.23 | 55.31 | 68.33 |
| Apr-26 | 86.77 | 61.99 | 70.49 | 64.95 | 75.61 |
| May-26 | 91.21 | 67.77 | 84.74 | 74.81 | 81.87 |
| Jun-26 | 97.43 | 71.96 | 90.61 | 78.45 | 87.73 |
| Jul-26 | 105.34 | 77.34 | 97.96 | 84.36 | 94.74 |
| Aug-26 | 108.63 | 79.46 | 101.02 | 87.92 | 97.27 |
| Sep-26 | 94.03 | 71.22 | 87.45 | 77.31 | 85.11 |
| Oct-26 | 83.09 | 62.33 | 76.51 | 67.54 | 74.90 |
| Nov-26 | 80.50 | 60.69 | 68.77 | 63.91 | 71.28 |
| Dec-26 | 79.24 | 67.68 | 73.70 | 69.89 | 74.31 |
| Jan-27 | 83.80 | 65.92 | 76.64 | 70.37 | 76.15 |
| Feb-27 | 83.08 | 63.20 | 68.50 | 65.13 | 73.68 |
| Mar-27 | 85.92 | 51.98 | 56.26 | 53.44 | 69.53 |
| Apr-27 | 89.51 | 56.42 | 66.44 | 61.21 | 75.05 |
| May-27 | 94.27 | 67.39 | 84.26 | 74.39 | 82.94 |
| Jun-27 | 100.92 | 73.55 | 93.85 | 80.61 | 90.54 |
| Jul-27 | 108.71 | 79.59 | 101.10 | 88.03 | 97.37 |
| Aug-27 | 111.53 | 81.05 | 103.73 | 89.38 | 99.86 |
| Sep-27 | 95.09 | 74.61 | 88.44 | 79.79 | 86.93 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-12 | 23.39 | 17.82 | 19.31 | 18.36 | 20.76 |
| Mar-12 | 24.75 | 16.87 | 18.33 | 17.41 | 20.89 |
| Apr-12 | 27.18 | 17.52 | 20.05 | 18.47 | 22.53 |
| May-12 | 31.21 | 16.67 | 20.33 | 17.95 | 24.22 |
| Jun-12 | 38.04 | 17.78 | 23.78 | 20.03 | 28.43 |
| Jul-12 | 58.75 | 19.98 | 26.68 | 22.61 | 38.93 |
| Aug-12 | 59.44 | 20.98 | 26.56 | 22.88 | 40.96 |
| Sep-12 | 36.06 | 17.76 | 23.33 | 20.12 | 26.85 |
| Oct-12 | 29.33 | 17.06 | 20.74 | 18.31 | 23.76 |
| Nov-12 | 26.84 | 18.41 | 20.76 | 19.29 | 22.81 |
| Dec-12 | 29.58 | 20.03 | 22.71 | 21.14 | 24.77 |
| Jan-13 | 33.68 | 25.22 | 28.96 | 26.59 | 29.94 |
| Feb-13 | 33.78 | 25.88 | 28.05 | 26.67 | 30.06 |
| Mar-13 | 31.99 | 22.55 | 24.58 | 23.35 | 27.26 |
| Apr-13 | 31.73 | 22.04 | 25.06 | 23.09 | 27.31 |
| May-13 | 35.38 | 22.13 | 27.16 | 23.98 | 29.37 |
| Jun-13 | 42.36 | 23.41 | 31.74 | 26.74 | 33.68 |
| Jul-13 | 61.93 | 28.18 | 37.18 | 31.47 | 45.88 |
| Aug-13 | 62.22 | 28.67 | 36.70 | 31.62 | 46.10 |
| Sep-13 | 39.18 | 23.29 | 30.23 | 26.07 | 31.90 |
| Oct-13 | 31.31 | 22.13 | 26.91 | 23.76 | 27.49 |
| Nov-13 | 32.16 | 23.18 | 26.27 | 24.41 | 27.85 |
| Dec-13 | 33.85 | 24.46 | 27.59 | 25.69 | 29.38 |
| Jan-14 | 33.62 | 29.96 | 31.27 | 30.44 | 31.94 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-14 | 33.72 | 29.77 | 31.36 | 30.35 | 31.95 |
| Mar-14 | 29.96 | 25.67 | 27.86 | 26.53 | 28.08 |
| Apr-14 | 30.27 | 24.60 | 27.97 | 25.77 | 27.97 |
| May-14 | 36.32 | 24.51 | 30.36 | 26.80 | 31.10 |
| Jun-14 | 44.29 | 26.13 | 34.93 | 29.46 | 36.36 |
| Jul-14 | 63.97 | 31.25 | 41.18 | 34.90 | 48.65 |
| Aug-14 | 63.94 | 31.41 | 40.67 | 35.04 | 48.09 |
| Sep-14 | 40.66 | 25.65 | 32.90 | 28.37 | 34.11 |
| Oct-14 | 32.88 | 24.19 | 29.42 | 25.97 | 29.39 |
| Nov-14 | 33.53 | 25.01 | 28.49 | 26.48 | 29.45 |
| Dec-14 | 35.04 | 26.49 | 29.73 | 27.68 | 31.16 |
| Jan-15 | 36.82 | 32.13 | 34.24 | 32.96 | 34.70 |
| Feb-15 | 36.86 | 31.91 | 34.28 | 32.77 | 34.72 |
| Mar-15 | 32.39 | 27.76 | 30.12 | 28.63 | 30.41 |
| Apr-15 | 32.69 | 26.36 | 29.98 | 27.62 | 30.10 |
| May-15 | 37.08 | 26.25 | 32.82 | 28.98 | 32.46 |
| Jun-15 | 43.99 | 28.09 | 37.03 | 31.20 | 37.45 |
| Jul-15 | 68.51 | 33.56 | 43.66 | 37.00 | 52.59 |
| Aug-15 | 68.46 | 33.29 | 43.11 | 37.14 | 51.28 |
| Sep-15 | 40.28 | 27.08 | 34.73 | 29.95 | 34.77 |
| Oct-15 | 31.81 | 25.90 | 29.58 | 27.25 | 29.41 |
| Nov-15 | 32.44 | 26.39 | 29.90 | 27.79 | 29.85 |
| Dec-15 | 33.87 | 27.76 | 31.16 | 29.01 | 31.31 |
| Jan-16 | 42.21 | 28.63 | 33.28 | 30.56 | 35.57 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-16 | 43.07 | 29.92 | 32.39 | 30.80 | 36.72 |
| Mar-16 | 41.59 | 29.16 | 31.56 | 29.98 | 35.73 |
| Apr-16 | 44.02 | 29.56 | 33.82 | 31.16 | 37.16 |
| May-16 | 49.78 | 30.64 | 37.95 | 33.50 | 40.85 |
| Jun-16 | 49.44 | 30.35 | 40.02 | 33.72 | 41.40 |
| Jul-16 | 54.79 | 31.79 | 43.01 | 36.45 | 44.34 |
| Aug-16 | 57.02 | 34.21 | 43.29 | 37.30 | 47.05 |
| Sep-16 | 48.83 | 30.32 | 38.88 | 33.53 | 40.67 |
| Oct-16 | 45.25 | 29.23 | 36.22 | 31.97 | 37.97 |
| Nov-16 | 44.07 | 31.23 | 35.20 | 32.72 | 38.01 |
| Dec-16 | 41.82 | 31.23 | 35.23 | 32.80 | 36.87 |
| Jan-17 | 43.43 | 29.90 | 34.55 | 31.72 | 37.01 |
| Feb-17 | 44.68 | 31.16 | 33.78 | 32.11 | 38.10 |
| Mar-17 | 43.43 | 30.72 | 33.25 | 31.58 | 37.45 |
| Apr-17 | 45.60 | 31.62 | 36.39 | 33.63 | 38.89 |
| May-17 | 51.52 | 38.67 | 41.32 | 36.48 | 43.60 |
| Jun-17 | 51.98 | 33.59 | 44.29 | 37.32 | 44.48 |
| Jul-17 | 56.57 | 35.32 | 47.78 | 40.49 | 47.41 |
| Aug-17 | 59.27 | 38.36 | 48.54 | 41.82 | 50.45 |
| Sep-17 | 50.21 | 33.54 | 43.54 | 37.54 | 43.17 |
| Oct-17 | 47.41 | 33.57 | 41.20 | 36.37 | 41.60 |
| Nov-17 | 46.86 | 36.09 | 40.69 | 37.81 | 42.03 |
| Dec-17 | 45.27 | 36.25 | 41.09 | 38.26 | 41.27 |
| Jan-18 | 47.14 | 35.78 | 41.10 | 37.73 | 42.18 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-18 | 50.42 | 37.19 | 40.31 | 38.32 | 44.08 |
| Mar-18 | 48.88 | 37.49 | 40.72 | 38.68 | 43.51 |
| Apr-18 | 53.44 | 34.98 | 40.02 | 36.87 | 44.60 |
| May-18 | 55.65 | 39.10 | 47.98 | 42.36 | 48.65 |
| Jun-18 | 59.75 | 41.71 | 55.57 | 46.90 | 52.90 |
| Jul-18 | 63.99 | 45.85 | 59.52 | 51.21 | 56.98 |
| Aug-18 | 68.83 | 49.61 | 62.79 | 54.10 | 61.38 |
| Sep-18 | 62.65 | 46.35 | 58.27 | 51.39 | 56.15 |
| Oct-18 | 55.59 | 43.23 | 51.70 | 46.11 | 50.80 |
| Nov-18 | 57.55 | 44.93 | 50.65 | 47.07 | 51.96 |
| Dec-18 | 62.00 | 51.89 | 57.66 | 54.28 | 57.60 |
| Jan-19 | 65.87 | 51.10 | 58.68 | 53.88 | 59.55 |
| Feb-19 | 67.33 | 51.37 | 55.68 | 52.94 | 59.79 |
| Mar-19 | 68.67 | 45.22 | 49.29 | 46.82 | 56.70 |
| Apr-19 | 72.58 | 51.82 | 58.93 | 54.30 | 63.24 |
| May-19 | 75.01 | 53.59 | 65.76 | 58.06 | 66.08 |
| Jun-19 | 78.73 | 58.49 | 73.22 | 64.38 | 70.76 |
| Jul-19 | 84.34 | 62.91 | 78.44 | 68.62 | 76.06 |
| Aug-19 | 87.91 | 65.39 | 81.76 | 71.40 | 79.21 |
| Sep-19 | 77.33 | 58.26 | 71.92 | 63.72 | 69.77 |
| Oct-19 | 68.57 | 45.65 | 55.52 | 49.01 | 58.68 |
| Nov-19 | 66.26 | 49.71 | 56.33 | 52.35 | 58.52 |
| Dec-19 | 66.50 | 53.54 | 60.39 | 56.22 | 60.86 |
| Jan-20 | 69.59 | 54.77 | 62.90 | 57.75 | 63.35 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-20 | 71.65 | 53.46 | 58.10 | 55.24 | 62.78 |
| Mar-20 | 73.62 | 45.08 | 48.97 | 46.51 | 59.36 |
| Apr-20 | 75.45 | 53.08 | 60.36 | 55.61 | 65.31 |
| May-20 | 78.63 | 57.51 | 71.93 | 63.49 | 70.00 |
| Jun-20 | 83.06 | 61.90 | 77.25 | 67.24 | 74.98 |
| Jul-20 | 89.51 | 66.18 | 83.24 | 71.99 | 80.65 |
| Aug-20 | 92.69 | 68.26 | 86.20 | 75.29 | 83.15 |
| Sep-20 | 79.96 | 61.15 | 74.36 | 66.10 | 72.57 |
| Oct-20 | 71.97 | 54.23 | 66.56 | 58.76 | 65.01 |
| Nov-20 | 70.35 | 51.97 | 58.90 | 54.74 | 61.67 |
| Dec-20 | 69.01 | 58.35 | 64.18 | 60.49 | 64.52 |
| Jan-21 | 70.72 | 55.80 | 64.87 | 59.57 | 64.37 |
| Feb-21 | 69.66 | 54.24 | 58.79 | 55.90 | 62.45 |
| Mar-21 | 76.43 | 43.25 | 46.81 | 44.46 | 60.30 |
| Apr-21 | 78.42 | 52.11 | 59.26 | 54.60 | 66.24 |
| May-21 | 80.83 | 58.24 | 72.82 | 64.29 | 71.40 |
| Jun-21 | 85.71 | 63.19 | 79.71 | 68.94 | 77.14 |
| Jul-21 | 91.58 | 67.33 | 85.17 | 74.32 | 82.12 |
| Aug-21 | 94.32 | 68.79 | 87.72 | 75.74 | 84.53 |
| Sep-21 | 80.33 | 63.34 | 74.71 | 67.60 | 73.54 |
| Oct-21 | 74.13 | 54.43 | 67.44 | 59.53 | 66.13 |
| Nov-21 | 70.98 | 52.21 | 58.85 | 54.69 | 62.28 |
| Dec-21 | 68.86 | 58.88 | 64.04 | 60.64 | 64.70 |
| Jan-22 | 75.29 | 58.27 | 67.33 | 61.82 | 67.91 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-22 | 73.84 | 56.94 | 61.71 | 58.68 | 65.90 |
| Mar-22 | 77.94 | 43.46 | 47.03 | 44.68 | 61.15 |
| Apr-22 | 79.06 | 57.51 | 65.79 | 60.61 | 69.22 |
| May-22 | 83.57 | 61.31 | 75.94 | 67.05 | 74.51 |
| Jun-22 | 87.78 | 64.98 | 81.64 | 70.77 | 79.09 |
| Jul-22 | 93.92 | 71.38 | 87.35 | 78.01 | 84.85 |
| Aug-22 | 96.74 | 71.06 | 89.93 | 77.48 | 87.01 |
| Sep-22 | 81.29 | 63.59 | 75.60 | 68.09 | 74.25 |
| Oct-22 | 75.21 | 52.00 | 64.42 | 56.87 | 65.15 |
| Nov-22 | 72.23 | 52.61 | 59.30 | 55.11 | 63.09 |
| Dec-22 | 69.50 | 61.53 | 64.63 | 62.75 | 65.80 |
| Jan-23 | 74.90 | 60.06 | 69.40 | 63.72 | 68.77 |
| Feb-23 | 74.43 | 55.25 | 59.88 | 56.93 | 65.26 |
| Mar-23 | 78.93 | 44.91 | 48.60 | 46.17 | 62.40 |
| Apr-23 | 80.47 | 58.05 | 66.81 | 61.55 | 69.96 |
| May-23 | 85.68 | 63.83 | 78.34 | 69.16 | 76.98 |
| Jun-23 | 89.67 | 67.16 | 83.40 | 72.81 | 81.05 |
| Jul-23 | 96.41 | 73.44 | 89.67 | 80.18 | 87.16 |
| Aug-23 | 98.43 | 72.84 | 91.54 | 79.20 | 88.71 |
| Sep-23 | 82.94 | 63.37 | 77.14 | 68.88 | 75.13 |
| Oct-23 | 76.56 | 56.88 | 69.82 | 61.63 | 68.69 |
| Nov-23 | 71.98 | 57.17 | 64.44 | 59.89 | 65.53 |
| Dec-23 | 70.99 | 63.27 | 66.02 | 64.41 | 67.24 |
| Jan-24 | 74.68 | 60.72 | 69.46 | 63.93 | 69.02 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-24 | 76.95 | 61.24 | 66.30 | 63.04 | 69.75 |
| Mar-24 | 78.36 | 50.54 | 55.09 | 52.33 | 64.10 |
| Apr-24 | 83.69 | 52.78 | 60.02 | 55.30 | 69.18 |
| May-24 | 85.79 | 61.23 | 75.14 | 66.34 | 75.54 |
| Jun-24 | 90.94 | 67.51 | 84.57 | 74.33 | 81.71 |
| Jul-24 | 97.66 | 72.42 | 90.82 | 79.18 | 87.92 |
| Aug-24 | 100.99 | 75.13 | 93.92 | 82.03 | 91.00 |
| Sep-24 | 89.93 | 67.38 | 83.64 | 73.88 | 81.01 |
| Oct-24 | 76.18 | 57.20 | 69.57 | 61.41 | 68.72 |
| Nov-24 | 73.18 | 58.32 | 66.09 | 61.42 | 66.64 |
| Dec-24 | 74.05 | 60.80 | 68.57 | 63.85 | 68.46 |
| Jan-25 | 79.23 | 61.37 | 70.48 | 64.72 | 71.58 |
| Feb-25 | 78.23 | 61.96 | 67.15 | 63.84 | 70.70 |
| Mar-25 | 78.21 | 50.66 | 55.22 | 52.45 | 64.10 |
| Apr-25 | 82.96 | 59.88 | 68.09 | 62.73 | 72.62 |
| May-25 | 86.88 | 63.98 | 79.25 | 69.97 | 77.61 |
| Jun-25 | 92.52 | 68.33 | 86.04 | 74.97 | 83.16 |
| Jul-25 | 100.33 | 73.00 | 93.31 | 80.46 | 89.86 |
| Aug-25 | 103.73 | 76.09 | 96.47 | 84.08 | 92.95 |
| Sep-25 | 90.95 | 68.06 | 84.58 | 74.26 | 82.05 |
| Oct-25 | 77.31 | 55.27 | 67.21 | 59.33 | 68.22 |
| Nov-25 | 73.88 | 57.95 | 66.02 | 61.35 | 66.63 |
| Dec-25 | 74.50 | 65.10 | 69.29 | 66.64 | 70.36 |
| Jan-26 | 82.40 | 65.45 | 75.68 | 69.44 | 75.29 |

# ERCOT NORTH

**Quote Date**
**2/8/2012**

**Forward Prices ($/MWh)**
**(Long term model includes capacity)**

| Forward Month | On Peak (5x16) | 7x8 | 2x16 | Wrap | 7x24 |
|---|---|---|---|---|---|
| Feb-26 | 80.98 | 64.06 | 69.42 | 66.01 | 73.14 |
| Mar-26 | 82.79 | 53.61 | 58.23 | 55.31 | 68.33 |
| Apr-26 | 86.77 | 61.99 | 70.49 | 64.95 | 75.61 |
| May-26 | 91.21 | 67.77 | 84.74 | 74.81 | 81.87 |
| Jun-26 | 97.43 | 71.96 | 90.61 | 78.45 | 87.73 |
| Jul-26 | 105.34 | 77.34 | 97.96 | 84.36 | 94.74 |
| Aug-26 | 108.63 | 79.46 | 101.02 | 87.92 | 97.27 |
| Sep-26 | 94.03 | 71.22 | 87.45 | 77.31 | 85.11 |
| Oct-26 | 83.09 | 62.33 | 76.51 | 67.54 | 74.90 |
| Nov-26 | 80.50 | 60.69 | 68.77 | 63.91 | 71.28 |
| Dec-26 | 79.24 | 67.68 | 73.70 | 69.89 | 74.31 |
| Jan-27 | 83.80 | 65.92 | 76.64 | 70.37 | 76.15 |
| Feb-27 | 83.08 | 63.20 | 68.50 | 65.13 | 73.68 |
| Mar-27 | 85.92 | 51.98 | 56.26 | 53.44 | 69.53 |
| Apr-27 | 89.51 | 58.42 | 66.44 | 61.21 | 75.05 |
| May-27 | 94.27 | 67.39 | 84.26 | 74.39 | 82.94 |
| Jun-27 | 100.92 | 73.55 | 93.85 | 80.61 | 90.54 |
| Jul-27 | 108.71 | 79.59 | 101.10 | 88.03 | 97.37 |
| Aug-27 | 111.53 | 81.05 | 103.73 | 89.38 | 99.86 |
| Sep-27 | 95.09 | 74.61 | 88.44 | 79.79 | 86.93 |

Jack I Draws

| Note # | Note Identifier | Principal Balance 12/31/11 (1/3/12) | 3/31/2012 Rate | |
|---|---|---|---|---|
| F00905 | 0011 0002 | 15,826,342.55 | 3.7010% | 0.2740% |
| F00910 | 0011 0003 | 15,392,969.83 | 0.7570% | 0.0545% |
| F00915 | 0011 0004 | 15,928,584.45 | 3.8830% | 0.2894% |
| F00920 | 0011 0005 | 16,005,733.57 | 4.1200% | 0.3085% |
| F00925 | 0011 0007 | 13,204,730.31 | 4.1200% | 0.2545% |
| F00930 | 0011 0001 | 16,193,242.43 | 4.7080% | 0.3567% |
| F00935 | 0011 0006 | 6,627,894.03 | 4.7080% | 0.1460% |
| F00950 | 0011 0008 | 16,006,380.86 | 4.1220% | 0.3087% |
| F00955 | 0011 0009 | 13,627,832.56 | 4.1220% | 0.2628% |
| F00960 | 0011 0010 | 10,415,352.03 | 4.1220% | 0.2009% |
| F00975 | 0011 0012 | 7,813,977.14 | 4.2780% | 0.1564% |
| F00980 | 0011 0011 | 14,281,602.63 | 4.2780% | 0.2858% |
| F00985 | 0011 0013 | 7,517,373.65 | 4.3560% | 0.1532% |
| F01040 | 0011 0014 | 16,373,588.19 | 5.2910% | 0.4053% |
| F01045 | 0011 0015 | 1,385,205.52 | 5.2910% | 0.0343% |
| F01065 | 0011 0016 | 13,408,076.77 | 5.2180% | 0.3273% |
| F01130 | 0011 0017 | 13,731,025.89 | 4.6380% | 0.2980% |
| | | 213,739,912.41 | | 4.1164% |
| | | | CRF | 5.86% |

Capital Recovery Factor (CRF) $\frac{I \times (1 + I)^n}{(1+i)^n-1}$

Jack I Draws

| Note # | Note Identifier | Principal Balance 12/31/11 (1/3/12) | 3/31/2012 Rate | |
|---|---|---|---|---|
| F00905 | 0011 0002 | 15,826,342.55 | 3.7010% | 0.2740% |
| F00910 | 0011 0003 | 15,392,969.83 | 0.7570% | 0.0545% |
| F00915 | 0011 0004 | 15,928,584.45 | 3.8830% | 0.2894% |
| F00920 | 0011 0005 | 16,005,733.57 | 4.1200% | 0.3085% |
| F00925 | 0011 0007 | 13,204,730.31 | 4.1200% | 0.2545% |
| F00930 | 0011 0001 | 16,193,242.43 | 4.7080% | 0.3567% |
| F00935 | 0011 0006 | 6,627,894.03 | 4.7080% | 0.1460% |
| F00950 | 0011 0008 | 16,006,380.86 | 4.1220% | 0.3087% |
| F00955 | 0011 0009 | 13,627,832.56 | 4.1220% | 0.2628% |
| F00960 | 0011 0010 | 10,415,352.03 | 4.1220% | 0.2009% |
| F00975 | 0011 0012 | 7,813,977.14 | 4.2780% | 0.1564% |
| F00980 | 0011 0011 | 14,281,602.63 | 4.2780% | 0.2858% |
| F00985 | 0011 0013 | 7,517,373.65 | 4.3560% | 0.1532% |
| F01040 | 0011 0014 | 16,373,588.19 | 5.2910% | 0.4053% |
| F01045 | 0011 0015 | 1,385,205.52 | 5.2910% | 0.0343% |
| F01065 | 0011 0016 | 13,408,076.77 | 5.2180% | 0.3273% |
| F01130 | 0011 0017 | 13,731,025.89 | 4.6380% | 0.2980% |
| | | 213,739,912.41 | | 4.1164% |
| | | | CRF | 5.86% |

Capital Recovery Factor (CRF) $\frac{I \times (1+I)^n}{(1+i)^n-1}$

Jack I Draws

| Note # | Note Identifier | Principal Balance 12/31/11 (1/3/12) | 3/31/2012 Rate | |
|---|---|---|---|---|
| F00905 | 0011 0002 | 15,826,342.55 | 3.7010% | 0.2740% |
| F00910 | 0011 0003 | 15,392,969.83 | 0.7570% | 0.0545% |
| F00915 | 0011 0004 | 15,928,584.45 | 3.8830% | 0.2894% |
| F00920 | 0011 0005 | 16,005,733.57 | 4.1200% | 0.3085% |
| F00925 | 0011 0007 | 13,204,730.31 | 4.1200% | 0.2545% |
| F00930 | 0011 0001 | 16,193,242.43 | 4.7080% | 0.3567% |
| F00935 | 0011 0006 | 6,627,894.03 | 4.7080% | 0.1460% |
| F00950 | 0011 0008 | 16,006,380.86 | 4.1220% | 0.3087% |
| F00955 | 0011 0009 | 13,627,832.56 | 4.1220% | 0.2628% |
| F00960 | 0011 0010 | 10,415,352.03 | 4.1220% | 0.2009% |
| F00975 | 0011 0012 | 7,813,977.14 | 4.2780% | 0.1564% |
| F00980 | 0011 0011 | 14,281,602.63 | 4.2780% | 0.2858% |
| F00985 | 0011 0013 | 7,517,373.65 | 4.3560% | 0.1532% |
| F01040 | 0011 0014 | 16,373,588.19 | 5.2910% | 0.4053% |
| F01045 | 0011 0015 | 1,385,205.52 | 5.2910% | 0.0343% |
| F01065 | 0011 0016 | 13,408,076.77 | 5.2180% | 0.3273% |
| F01130 | 0011 0017 | 13,731,025.89 | 4.6380% | 0.2980% |
| | | 213,739,912.41 | | 4.1164% |

CRF 5.86%

Capital Recovery Factor (CRF) $\frac{I \times (1 + I)^n}{(1+i)^n-1}$

Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

JUN 13 2014

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 5, 2014

Mr. J. M. Harris
Agent
H & H Associates
406 FM 3016
Grapeland, Texas 75844

Re: Notice of Negative Use Determination
Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
Bridgeport (Jack County)
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Application Number: 16413

Dear Mr. Harris:

This letter responds to Brazos Electric Power Cooperative, Inc.'s Application for Use Determination for the Jack County Generation Facility, originally submitted on March 7, 2012 and remanded to the executive director (ED) on December 5, 2012 by the Texas Commission on Environmental Quality (TCEQ) commissioners. Your Tier III application seeks a use determination for two Heat Recovery Steam Generators (HRSGs) and dedicated ancillary systems.

The ED has completed the review for application #16413 and the associated notice of deficiency (NOD) responses and has issued a Negative Use Determination for the property in accordance with Title 30 Texas Administrative Code (TAC) Chapter 17. The Negative Use Determination is issued for the following reasons: 1) the ED cannot find that the property is used, constructed, acquired, or installed wholly or partly to meet or exceed any cited laws, rules, or regulations adopted by any environmental protection agency of the United States, Texas, or a political subdivision of Texas for the prevention, monitoring, control, or reduction of air, water, or land pollution; and 2) even if there were an applicable law cited in the application for the subject property, the ED does not find your methods for determining the use determination percentage to be reasonable.

Commission rule at 30 TAC §17.10(d) requires an applicant to cite to a specific law, rule, or regulation that is being met or exceeded by the use, construction, acquisition, or installation of the pollution control property. As specified in 30 TAC §17.4(a) and authorized by Article VIII, § 1-l, of the Texas Constitution, for a property to be eligible for an exemption from ad valorem taxation, all or part of property must be used, constructed, acquired, or installed wholly or partly to meet or exceed rules or

regulations adopted by any environmental protection agency of the United States, Texas, or a political subdivision for the prevention, monitoring, control, or reduction of air, water, or land pollution. Commission rules do not allow an applicant to omit the requirement to cite a specific environmental law even for property that is specified on the list of property in Texas Tax Code §11.31(k).

The ED does not require a citation to a law or rule that mandates the installation of a specific type of equipment. However, the ED does not find that the HRSG is used to meet or exceed any of the environmental laws that were cited in your application. While the application and responses provided numerous rule citations, none were to rules that the HRSG was required to meet. Therefore, the HRSGs and dedicated ancillary systems do not meet the applicability requirements of 30 TAC §17.4(a) to be eligible for exemption from ad valorem taxation.

After careful review of the five methods for calculating a partial positive use determination included in the applicant's submittals, the ED has determined that all but one of the methods are unacceptable. The four methods proposed by the applicant do not reasonably distinguish the proportion of the HRSG and dedicated ancillary systems that provides a purported pollution control benefit from the proportion of the HRSG and dedicated ancillary systems that produces steam that is used in a process or to produce electricity for use or sale. The one method that the ED does find acceptable, the Cost Analysis Procedure (CAP) adopted by the commission, produces a negative number. Therefore, the property is not eligible for a positive use determination.

The following is an explanation of the ED's review of the methodologies presented in your application:

- Executive Director's December 3, 2008 Brief (61%): Subsequent to filing the brief where this methodology is presented, the ED determined that the proposed calculation did not accurately calculate an appropriate use determination because the less efficient the equipment, the higher the positive use determination percentage it yielded. This produces an unreasonable result and should not provide the basis for a final determination.

- Avoided Emissions Approach (58%): This approach is not reasonable because it does not distinguish the proportion of property used to control or prevent pollution from the proportion used to produce a product. Furthermore, the avoided emission approach does not attribute any value to production. By attributing the entire avoided emissions to the HRSG and dedicated ancillary systems, this approach ignores nitrogen oxides (NOx) reductions related to other property for which a positive use determination has been issued.

- Modified CAP Calculation (75%): Capital Cost New (CCN) includes dedicated ancillary systems. Allowing Capital Cost Old (CCO) to be equal a pipe or spool piece ignores that HRSGs are alternative production equipment. CCO is the cost of comparable equipment without the pollution control. If the HRSGs produce

steam, then comparable equipment that produces steam without pollution control is a boiler. The ED does not find it reasonable to equate CCO to a spool piece.

- Modified CAP Calculation (100%): Capital Cost New (CCN) includes dedicated ancillary systems. Allowing Capital Cost Old (CCO) to be $0 ignores that HRSGs are alternative production equipment. CCO is the cost of comparable equipment without the pollution control. If the HRSGs produce steam, then comparable equipment that produces steam without pollution control is a boiler. The ED does not find it reasonable to attribute $0 cost to CCO in the CAP.

- CAP as proposed by the executive director (-83%): The CAP formula was adopted by the commission to provide a methodology for determinations that distinguishes the proportion of property that is used to control, monitor, prevent, or reduce pollution from the proportion of property that is used to produce goods or services. The fact that the CAP calculated results in a negative number shows that the HRSG's and dedicated ancillary equipment's pollution prevention benefit is negated by its ability to produce a product.

Please be advised that a Negative Use Determination may be appealed. The appeal must be filed with the TCEQ Chief Clerk within 20 days after the receipt of this letter in accordance with 30 TAC §17.25.

If you have questions regarding this letter or need further assistance, please contact Ronald Hatlett of the Tax Relief for Pollution Control Property Program by telephone at (512) 239-6348, by e-mail at ronald.hatlett@tceq.texas.gov, or write to the Texas Commission on Environmental Quality, Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

David Brymer, Director
Air Quality Division

DB/rh

cc: Chief Appraiser, Jack County Appraisal District, P. O. Box 958, Jacksboro, Texas, 76458-0958

Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 17, 2014

Ms. Kathryn Tronsberg Macciocca
Director
Duff & Phelps, LLC
2000 Market Street, Ste 2700
Philadelphia, PA 19103

Re: Notice of Negative Use Determination
Brazos Valley Energy, LLC
Brazos Valley Energy Center
Richmond (Fort Bend County)
Regulated Entity Number: RN102806346
Customer Number: CN601424740
Application Number: 11969
Tracking Number: DPBRAZOSVALLEYB

Dear Ms. Macciocca:

This letter responds to Brazos Valley Energy, LLC's Application for Use Determination for Brazos Valley Energy Center, originally submitted on March 28, 2008 and remanded to the executive director (ED) on December 5, 2012 by the Texas Commission on Environmental Quality (TCEQ) commissioners. Your application seeks a use determination for two Heat Recovery Steam Generators (HRSGs) and requested a Tier IV partial use determination.

The ED has completed the review for application #07-11969 and the associated notice of deficiency (NOD) responses and has issued a Negative Use Determination for the property in accordance with Title 30 Texas Administrative Code (TAC) Chapter 17. The Negative Use Determination is issued because the methods for determining the use determination percentage were not reasonable.

The Tier IV application process, in place in commission rules between February 2008 and December 2010, allowed an applicant to propose a method for calculating a partial use determination. The commission rules allow for determinations that distinguish the proportion of property that is used to control, monitor, prevent, or reduce pollution from the proportion of property that is used to produce goods or services. If the property is not used wholly for the control of air, water, or land pollution, the applicant must present information in the application for the determination of the proportion of the property that is pollution control. It is the responsibility of the applicant to propose a reasonable method for determining the use determination percentage. It is the

responsibility of the ED to review the proposed method and make the final determination.

After careful review of the three methods for calculating a partial positive use determination included in the applicant's submittals, the ED has determined that all but one of the methods are unacceptable. The two methods proposed by the applicant do not reasonably distinguish the proportion of the HRSG that provides a purported pollution control benefit from the proportion of the HRSG that produces steam that is used in a process or to produce electricity for use or sale. The one method that the ED does find acceptable, the Cost Analysis Procedure (CAP) adopted by the commission, produces a negative number. Therefore, the property is not eligible for a positive use determination.

The following is an explanation of the ED's review of the methodologies presented in your application:

- Avoided Emissions Approach (42%): This approach is not reasonable because it does not distinguish the proportion of property used to control or prevent pollution from the proportion used to produce a product. Furthermore, the avoided emission approach does not attribute any value to production. By attributing the entire avoided emissions to the HRSGs, this approach ignores nitrogen oxides (NOx) reductions related to other property for which a positive use determination has been issued.

- Modified CAP Calculations (48%): Capital Cost New (CCN) includes a steam turbine and water systems. A negative determination was issued for the steam turbine on May 1, 2008. The steam turbine is not a part of this application and the related value cannot be included in CCN. The water systems are also production equipment and should not be included in CCN. Allowing Capital Cost Old (CCO) to be $0 ignores that HRSGs are alternative production equipment. CCO is the cost of comparable equipment without the pollution control. If the HRSGs produce steam, then comparable equipment that produces steam without pollution control is a boiler. The ED does not find it reasonable to attribute $0 cost to CCO in the CAP.

- CAP as proposed by the executive director (-1723%): The CAP formula was adopted by the commission to provide a methodology for determinations that distinguishes the proportion of property that is used to control, monitor, prevent, or reduce pollution from the proportion of property that is used to produce goods or services. The fact that the CAP as calculated results in a negative number shows that the HRSGs pollution prevention benefit is negated by its ability to produce a product.

Please be advised that a Negative Use Determination may be appealed. The appeal must be filed with the TCEQ Chief Clerk within 20 days after the receipt of this letter in accordance with 30 TAC §17.25.

If you have questions regarding this letter or need further assistance, please contact Ronald Hatlett of the Tax Relief for Pollution Control Property Program by telephone at (512) 239-6348, by e-mail at ronald.hatlett@tceq.texas.gov, or write to the Texas

Commission on Environmental Quality, Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

David Brymer, Director
Air Quality Division

DB/rh

cc: Chief Appraiser, Fort Bend Appraisal District, 2801 B. F. Terry Blvd., Richmond, Texas, 77441-5600

Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Zak Covar, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*

JUN 13 2014

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 5, 2014

Mr. J. M. Harris
Agent
H & H Associates
406 FM 3016
Grapeland, Texas 75844

Re: Notice of Negative Use Determination
Brazos Electric Power Cooperative, Inc.
Johnson County Generation Facility
Cleburne (Johnson County)
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Application Number: 13544

Dear Mr. Harris:

This letter responds to Brazos Electric Power Cooperative, Inc.'s Application for Use Determination for Johnson County Generation Facility, originally submitted on April 27, 2009 and remanded to the executive director (ED) on December 5, 2012 by the Texas Commission on Environmental Quality (TCEQ) commissioners. Your Tier IV partial use determination application seeks a use determination for one Heat Recovery Steam Generator (HRSG) and dedicated ancillary systems.

The ED has completed the review for application #13544 and the associated notice of deficiency (NOD) responses and has issued a Negative Use Determination for the property in accordance with Title 30 Texas Administrative Code (TAC) Chapter 17. The Negative Use Determination is issued because the methods for determining the use determination percentage were not reasonable.

The Tier IV application process, in place in commission rules between February 2008 and December 2010, allowed an applicant to propose a method for calculating a partial use determination. The commission rules allow for determinations that distinguish the proportion of property that is used to control, monitor, prevent, or reduce pollution from the proportion of property that is used to produce goods or services. If the property is not used wholly for the control of air, water, or land pollution, the applicant must present information in the application for the determination of the proportion of the property that is pollution control. It is the responsibility of the applicant to propose a reasonable method for determining the use determination percentage. It is the responsibility of the ED to review the proposed method and make the final determination.

After careful review of the five methods for calculating a partial positive use determination included in the applicant's submittals, the ED has determined that all but one of the methods are unacceptable. The four methods proposed by the applicant do not reasonably distinguish the proportion of the HRSG and dedicated ancillary systems that provides a purported pollution control benefit from the proportion of the HRSG and dedicated ancillary systems that produces steam that is used in a process or to produce electricity for use or sale. The one method that the ED does find acceptable, the Cost Analysis Procedure (CAP) adopted by the commission, produces a negative number. Therefore, the property is not eligible for a positive use determination.

The following is an explanation of the ED's review of the methodologies presented in your application:

- Executive Director's December 3, 2008 Brief (61%): Subsequent to filing the brief where this methodology is presented, the ED determined that the proposed calculation did not accurately calculate an appropriate use determination because the less efficient the equipment, the higher the positive use determination percentage it yielded. This produces an unreasonable result and should not provide the basis for a final determination.

- Avoided Emissions Approach (40%): This approach is not reasonable because it does not distinguish the proportion of property used to control or prevent pollution from the proportion used to produce a product. Furthermore, the avoided emission approach does not attribute any value to production. By attributing the entire avoided emissions to the HRSG and dedicated ancillary systems, this approach ignores nitrogen oxides (NOx) reductions related to other property for which a positive use determination has been issued.

- Modified CAP Calculation (64%): Capital Cost New (CCN) includes dedicated ancillary systems. Allowing Capital Cost Old (CCO) to be equal a pipe or spool piece ignores that HRSGs are alternative production equipment. CCO is the cost of comparable equipment without the pollution control. If the HRSGs produce steam, then comparable equipment that produces steam without pollution control is a boiler. The ED does not find it reasonable to equate CCO to a spool piece.

- Modified CAP Calculation (100%): Capital Cost New (CCN) includes dedicated ancillary systems. Allowing Capital Cost Old (CCO) to be $0 ignores that HRSGs are alternative production equipment. CCO is the cost of comparable equipment without the pollution control. If the HRSGs produce steam, then comparable equipment that produces steam without pollution control is a boiler. The ED does not find it reasonable to attribute $0 cost to CCO in the CAP.

- CAP as proposed by the executive director (-83%): The CAP formula was adopted by the commission to provide a methodology for determinations that distinguishes the proportion of property that is used to control, monitor, prevent, or reduce pollution from the proportion of property that is used to produce goods

or services. The fact that the CAP calculated results in a negative number shows that the HRSGs' and dedicated ancillary equipment's pollution prevention benefit is negated by its ability to produce a product.

Please be advised that a Negative Use Determination may be appealed. The appeal must be filed with the TCEQ Chief Clerk within 20 days after the receipt of this letter in accordance with 30 TAC §17.25.

If you have questions regarding this letter or need further assistance, please contact Ronald Hatlett of the Tax Relief for Pollution Control Property Program by telephone at (512) 239-6348, by e-mail at ronald.hatlett@tceq.texas.gov, or write to the Texas Commission on Environmental Quality, Tax Relief for Pollution Control Property Program, MC-110, P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

David Brymer, Director
Air Quality Division

DB/rh

cc: Chief Appraiser, Johnson County Appraisal District, 109 N. Main St., Cleburne, Texas, 76033-4941

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 1, 2008

STATE OF TEXAS
COUNTY OF TRAVIS
OCT 10 2012

DUFF & PHELPS LLC
GREG MAXIM
919 CONGRESS #1450
AUSTIN, TX 78701

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11969 was completed. This application is for:

BRAZOS VALLEY ENERGY LP
BRAZOS VALLEY ENERGY
3440 LOCKWOOD RD
RICHMOND, TX 77469

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11969, filed by:

BRAZOS VALLEY ENERGY LP
BRAZOS VALLEY ENERGY
3440 LOCKWOOD RD
RICHMOND TX 77469

The pollution control property/project listed in the Use Determination Application is:

**This facility has two thermally efficient heat recovery steam generators (HRSGs) and one steam turbine. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the two Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.**

Executive Director

May 2 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11969 Review Start Date: 4/8/2008

Company Name: BRAZOS VALLEY ENERGY LP
Facility Name: BRAZOS VALLEY ENERGY
County: FORT BEND Outstanding Fees: N
Batch/Voucher Number:B500156

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has two thermally efficient heat recovery steam generators (HRSGs) and one steam turbine. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

Since the property is listed on Part B of the Equipment & Categories List this property leaves the Decision Flow Chart at Box 6. It passes through Box 1 of the Part B Decision Flow Chart with a yes answer. The use of this property at a combined cycle plant, as opposed to having a simple

cycle plant, provides an environmental benefit of reduced NOx emissions at the site. So there is a Yes answer for Box 2, Since there is a reduction in NOx emissions there is an environmental rule which is being met so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has two thermally efficient heat recovery steam generators (HRSGs) and one steam

turbine. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the two Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** Ronald Hatfield **Date Signed:** 5/1/08

**Peer Reviewed:** Mary McCutchan **Date Signed:** 5-1-08

**Team Leader:** David [illegible] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 1, 2008

STATE OF TEXAS
COUNTY OF
OCT 10 2012

DUFF & PHELPS LLC
GREG MAXIM
919 CONGRESS #1450
AUSTIN, TX 78701

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11966 was completed. This application is for:

FREESTONE POWER GENERATION LP
FREESTONE ENERGY CENTER
13.6 MI N ON FM 488
FAIRFIELD, TX 75840

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11966, filed by:

**FREESTONE POWER GENERATION LP**
**FREESTONE ENERGY CENTER**
**13.6 MI N ON FM 488**
**FAIRFIELD TX 75840**

The pollution control property/project listed in the Use Determination Application is:

**This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the four Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the two steam turbines. The use of the steam turbines does not provide an environmental benefit at the site. The steam turbines are not considered to be pollution control equipment.**

Executive Director

May 1 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11966 Review Start Date: 4/8/2008

Company Name: FREESTONE POWER GENERATION LP
Facility Name: FREESTONE POWER GENERATION LP
County: FREESTONE Outstanding Fees: N
Batch/Voucher Number:B500156

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

Since the property is listed on Part B of the Equipment & Categories List this property leaves the Decision Flow Chart at Box 6. It passes through Box 1 of the Part B Decision Flow Chart with a yes answer. The use of this property at a combined cycle plant, as opposed to having a simple

cycle plant, provides an environmental benefit of reduced NOx emissions at the site. So there is a Yes answer for Box 2, Since there is a reduction in NOx emissions there is an environmental rule which is being met so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam

turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the four Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** [signature] **Date Signed:** 5/1/08

**Peer Reviewed:** [signature] **Date Signed:** 5-1-08

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 1, 2008

OCT 10 2012

DUFF & PHELPS LLC
GREG MAXIM
919 CONGRESS #1450
AUSTIN, TX 78701

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11926 was completed. This application is for:

NAVASOTA WHARTON ENERGY PARTNERS LP
COLORADO BEND
3821 S STATE HWY 60
WHARTON, TX 77488

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form, #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, **07-11926**, filed by:

**NAVASOTA WHARTON ENERGY PARTNERS LP**
**COLORADO BEND**
**3821 S STATE HWY 60**
**WHARTON TX 77488**

The pollution control property/project listed in the Use Determination Application is:

**This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the four Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the two steam turbines. The use of the steam turbines does not provide an environmental benefit at the site. The steam turbines are not considered to be pollution control equipment.**

Executive Director

May. 1. 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11926 Review Start Date: 4/8/2008

Company Name: NAVASOTA WHARTON ENERGY PARTNERS LP
Facility Name: COLORADO BEND
County: WHARTON Outstanding Fees: N
Batch/Voucher Number:B500028

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

The Heat Recovery Steam Generators (HRSGs) are listed on Part B of the Equipment & Categories List as item B-8. As Part B equipment the HRSGs leave the Decision Flow Chart at Box 6 and pass through Box 1 of the Part B Decision Flow Chart with a yes answer. Since the use

of HRSGs provide an environmental benefit of reduced NOx emissions at the site there is a yes answer for Box 2. Since there is a reduction in NOx emissions there is an environmental rule which is being met, so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has four thermally efficient heat recovery steam generators (HRSGs) and two steam

turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the four Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** Ronald Hatcher **Date Signed:** 5/1/08

**Peer Reviewed:** Gary McCaulley **Date Signed:** 5-1-08

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

STATE OF TEXAS
OCT 10 2012

May 1, 2008

TENASKA INC
DAVID D JOHNSON
1044 N 115 ST #400
OMAHA, NE 68154 4446

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11914 was completed. This application is for:

TENASKA GATEWAY PARTNERS LTD
TENASKA GATEWAY GENERATION STATION
SH 315, PO BOX 697
MOUNT ENTERPRISE, TX 75681 0697

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11914, filed by:

TENSKA GATEWAY PARTNERS LTD
TENASKA GATEWAY GENERATION STATION
SH 315, PO BOX 697
MOUNT ENTERPRISE TX 75681

The pollution control property/project listed in the Use Determination Application is:

**This facility has three combustion turbine generators coupled with three thermally efficient heat recovery steam generators (HRSGs) and one enhanced steam turbine. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the three Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.**

Executive Director

May. 1.2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11914 Review Start Date: 4/8/2008

Company Name: TENSKA GATEWAY PARTNERS LTD
Facility Name: TENASKA GATEWAY GENERATION STATION
County: RUSK Outstanding Fees: N
Batch/Voucher Number:B99788

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has three combustion turbine generators coupled with three thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the three HRSGs and the enhanced steam turbines. To generate the equivalent amount of power using combustion turbine they would have needed to install a Selective Catalytic Reduction System.The application requests a partial determination.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

The Heat Recovery Steam Generators (HRSGs) are listed on Part B of the Equipment &

Categories List as item B-8. As Part B equipment the HRSGs leave the Decision Flow Chart at Box 6 and pass through Box 1 of the Part B Decision Flow Chart with a yes answer. Since the use of HRSGs provide an environmental benefit of reduced NOx emissions at the site there is a yes answer for Box 2. Since there is a reduction in NOx emissions there is an environmental rule which is being met, so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has three combustion turbine generators coupled with three thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the three HRSGs and the enhanced steam turbines. To generate the equivalent amount of power using combustion turbine they would have needed to install a Selective Catalytic Reduction System.The application requests a partial determination.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the three Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** Ronald Hatcliffe **Date Signed:** 5/1/2008

**Peer Reviewed:** Mary McArthur **Date Signed:** 5/1/2008

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 1, 2008

STATE OF TEXAS
COUNTY OF TRAVIS
OCT 10 2012

DUFF & PHELPS LLC
DENNIS DEEGEAR
919 CONGRESS #1450
AUSTIN, TX 78701

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11971 was completed. This application is for:

BORGER ENERGY ASSOCIATES LP
BORGER ENERGY BLACKHAWK STATION
119 N. SPUR CO-GEN PLACE
BORGER, TX 79008

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11971, filed by:

BORGER ENERGY ASSOCIATES LP
BORGER ENERGY BLACKHAWK STATION
119 N. SPUR CO-GEN PLACE
BORGER TX 79008

The pollution control property/project listed in the Use Determination Application is:

**This facility has two thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the two HRSGs.**

The outcome of the review is:

**A 100% positive use determination for the two Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

Executive Director

May 1 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11971 Review Start Date: 4/8/2008

Company Name: BORGER ENERGY ASSOCIATES LP
Facility Name: BORGER ENERGY BLACKHAWK STATION
County: HUTCHINSON Outstanding Fees: N
Batch/Voucher Number:B500156

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators, is item B8 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has two thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the two HRSGs.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

Since the property is listed on Part B of the Equipment & Categories List this property leaves the Decision Flow Chart at Box 6. It passes through Box 1 of the Part B Decision Flow Chart with a yes answer. The use of this property at a combined cycle plant, as opposed to having a simple cycle plant, provides an environmental benefit of reduced NOx emissions at the site. So there is a

Yes answer for Box 2, Since there is a reduction in NOx emissions there is an environmental rule which is being met so there is a yes answer to Box 3.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has two thermally efficient heat recovery steam generators (HRSGs). This application is a Tier IV application seeking a partial use determination for the two HRSGs.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director.

**Provide the language for the final determination.**

A positive use determination of 100% for the two Heat Recovery Steam Generators.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** Ronald Hatcher **Date Signed:** 5/1/08

**Peer Reviewed:** Larry McArthur **Date Signed:** 5-1-08

**Team Leader:** [signature] **Date Signed:** 5/1/08

**Section Manager:** [signature] **Date Signed:** MAY 1 2008

**Division Director:** [signature] **Date Signed:** MAY 1 2008

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

STATE OF TEXAS
OCT 10 2012

May 1, 2008

CALPINE/DOW
JUSTIN HYLAND/LEO SCHERRER
717 TEXAS AVE
HOUSTON, TX 77002

This letter is to inform you that on 5/1/2008, the technical review of Use Determination Application 07-11994 was completed. This application is for:

FREEPORT ENERGY CENTER LP
FREEPORT ENERGY CENTER LP
2301 N BRAZOSPORT BLVD
FREEPORT, TX 77451

The use determination is included with this letter. In order to request an exemption, a copy of this Use Determination, along with a completed exemption request form #50-248 (can be found at www.cpa.state.tx.us), must be provided to the Chief Appraiser of the appropriate appraisal district. This request must be made by April 30.

House Bill 3121, enacted during the 77th Legislative Session, established a process for appealing a use determination. The Texas Commission on Environmental Quality (TCEQ) rules that implement the appeals process are at 30 TAC 17.25. Pursuant to 17.25(a)(1), an appeal must be filed within 20 days of receipt of the use determination. Should you choose to appeal the use determination, please submit a copy of your appeal to the TCEQ Tax Relief for Pollution Control Property program at the time of filing the appeal with the Chief Clerk of the commission.

If you have any questions or require any additional information, please contact the Tax Relief for Pollution Control Property Program at (512) 239-3100.

Sincerely,

David Greer
Team Leader, Pollution Prevention

Buddy Garcia, *Chairman*
Larry R. Soward, *Commissioner*
Bryan W. Shaw, Ph.D., *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

# USE DETERMINATION

The Texas Commission on Environmental Quality has reviewed Use Determination Application, 07-11994, filed by:

FREEPORT ENERGY CENTER LP
FREEPORT ENERGY CENTER LP
2301 N BRAZOSPORT BLVD
FREEPORT TX 77451

The pollution control property/project listed in the Use Determination Application is:

**This facility has thermally efficient heat recovery steam generators (HRSGs) and steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.**

The outcome of the review is:

**A 100% positive use determination for the Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or state regulations.**

**A negative determination is issued for the steam turbines. The use of the steam turbines does not provide an environmental benefit at the site. The steam turbines are not considered to be pollution control equipment.**

Executive Director

May 1 2008
Date

TAX RELIEF FOR POLLUTION CONTROL PROPERTY: TECHNICAL REVIEW DOCUMENT

Reviewed By: RLH App. No.: 07 - 11994 Review Start Date: 4/8/2008

Company Name: FREEPORT ENERGY CENTER LP
Facility Name: FREEPORT ENERGY CENTER LP
County: BRAZORIA Outstanding Fees: N
Batch/Voucher Number:B500289

ADMINISTRATIVE REVIEW

Administrative Complete Date:4/8/2008

TIER LEVEL
**What Tier is this application? The application was filed as a Tier IV application. Is this the appropriate level?**

The property listed on this application, Heat Recovery Steam Generators and a steam turbine are items B8 and B10 on the Equipment and Categories List. This application was filed as a Tier IV. Tier IV is the appropriate level for this application.

RELEVANT RULE, REGULATION, OR STATUTORY PROVISION
**The rule listed in the application is: 40 CFR 60.44Da**
**The appropriate rule is: 40 CFR 60.44Da**

**Explain why this is the appropriate rule?**

40 CFR 60.Subpart DA: Standards of Performance for New Stationary Sources. Standards of performance for Electric Utility Steam Generating Units for Which Construction is Commenced after September 18, 1978. This is an appropriate rule.

BRIEF DESCRIPTION OF PROPERTY
**The property is described as:**

This facility has thermally efficient heat recovery steam generators (HRSGs) and steam turbines. This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Is an adequate description and purpose of the property provided? Does it list the anticipated environmental benefits? Are sketches and flow diagrams provided if needed?**

An adequate description of the property was provided, and the purpose of the property was listed. The anticipated environmental benefit is listed. Sketches and flow diagrams were provided.

DECISION FLOWCHART(30 TAC 17.15(a))
**Mark the appropriate boxes: Box 3 Box 5 Box 6(IV) Y Box 10(III) Box 12(I) Box 13( II)**
PART B DECISION FLOWCHART (17.15(b))
**Mark the appropriate boxes: Box 1Y Box 2 Y Box 3 Y**

**Describe how the property flowed through the Decision Flowchart:**

Since the property is listed on Part B of the Equipment & Categories List this property leaves the Decision Flow Chart at Box 6. It passes through Box 1 of the Part B Decision Flow Chart with a yes answer. The use of this property at a combined cycle plant, as opposed to having a simple

cycle plant, provides an environmental benefit of reduced NOx emissions at the site. So there is a Yes answer for Box 2, Since there is a reduction in NOx emissions there is an environmental rule which is being met so there is a yes answer to Box 3. The steam turbine passes through Box 1 on the Part B Decision Flow Chart with a yes answer. Since the use of the steam turbine does not provide an environmental benefit at the site a no answer is the result of Box 2. The steam turbine is not eligible for a positive determination.

TIER III or IV APPLICATIONS

**Does your calculation agree with the applicants?**

No. The application contains a proposed formula for calculating the pollution control value of the HRSGs and the steam turbine. The formula is outcome determinative, and its focus is not on the pollution control aspect of the property. The Executive Director disagrees with this formula.

PROPERTY CATEGORIES AND COSTS

**Is the table completed correctly? Has the applicant certified that all listed property became taxable for the first time after January 1, 1994? Is all information necessary for conducting the technical review included.**

The table was completed correctly. The applicant certified that all listed property became taxable for the first time after January 1, 1994. All the information necessary for conducting the technical review was included on the application.

TECHNICAL DEFICIENCIES

**Is the application complete as received: Y If the application was not administratively complete explain below when justifying the final decision in the final determination section. If the application was not technically complete then:**

**Provide the language to be used in the Notice of Deficiency (NOD) letter:**

**Summarize the NOD response:**

**Provide the language used in the second NOD letter:**

**Summarize the second NOD response:**

**Provide the language used in the thied NOD letter:**

**Summarize the third NOD response:**

FINAL DETERMINATION

**If the property description has been summarized enter the detailed property description:**

This facility has thermally efficient heat recovery steam generators (HRSGs) and steam turbines.

This application is a Tier IV application seeking a partial use determination for the HRSGs and the enhanced steam turbines.

**Provide the reason for your final determination:**

The Heat Recovery Steam Generators meet all of the requirements of Chapter 17. A positive use determination based on the most appropriate formula should be issued for the Heat Recovery Steam Generators. The most appropriate formula has been determined by the Executive Director. A negative determination should be issued for the steam turbine. The use of the steam turbine does not result in there being an environmental benefit at the site.

**Provide the language for the final determination.**

A positive use determination of 100% for the Heat Recovery Steam Generators. A negative determination is issued for the steam turbine. The use of the steam turbine does not provide an environmental benefit at the site. The steam turbine is not considered to be pollution control equipment.

**Highlight the required signatures and establish the appropriate due dates.**

**Reviewed:** _____ **Date Signed:** 5/1/8

**Peer Reviewed:** _____ **Date Signed:** 5-1-08

**Team Leader:** _____ **Date Signed:** 5/1/08

**Section Manager:** _____ **Date Signed:** MAY 1 2008

**Division Director:** _____ **Date Signed:** MAY 1 2008

Bryan W. Shaw, Ph.D., *Chairman*
Buddy Garcia, *Commissioner*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

September 21, 2011

MR MIKE MEYERS ADR
ENVIRONMENTAL ENGINEER
BRAZOS ELECTRIC POWER COOPERATIVE INC
PO BOX 2585
WACO TX 76702-2585

Re: Permit Alteration
Permit Number: 83801
Jack County Generation Facility
Bridgeport, Jack County
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Account Number: JA-0068-E
Associated Permit Number: PSDTX1117

Dear Mr. Meyers:

This is in response to your letter received September 1, 2011, requesting alteration of the conditions of the above-referenced permit. We understand you wish to revise Special Condition No. 5 to match your Title V permit.

As indicated in Title 30 Texas Administrative Code § 116.116(c) [30 TAC § 116.116(c)], and based on our review, Permit Number 83801 is altered. Enclosed are the altered permit conditions to replace those currently attached to your permit. Please attach these to your permit.

Planned maintenance, startup, and shutdown emissions have been previously reviewed, authorized, and included in the MAERT. Any other maintenance activities are not authorized by this permit and will need to obtain a separate authorization.

As of July 1, 2008, all analytical data generated by a mobile or stationary laboratory in support of compliance with air permits must be obtained from a NELAC (National Environmental Laboratory Accreditation Conference) accredited laboratory under the Texas Laboratory Accreditation Program or meet one of several exemptions. Specific information concerning which laboratories must be accredited and which are exempt may be found in 30 TAC § 25.4 and § 25.6.

Re: Permit Number: 83801

For additional information regarding the laboratory accreditation program and a list of accredited laboratories and their fields of accreditation, please see the following Web site:

www.tceq.texas.gov/compliance/compliance_support/qa/env_lab_accreditation.html

For questions regarding the accreditation program, you may contact the Texas Laboratory Accreditation Program at (512) 239-3754 or by e-mail at labprgms@tceq.texas.gov.

Your cooperation in this matter is appreciated. If you need further information or have any questions, please contact Ms. Ruth Alvirez at (512) 239-5220 or write to the Texas Commission on Environmental Quality, Office of Air, Air Permits Division, MC-163, P.O. Box 13087, Austin, Texas 78711-3087.

This action is taken under authority delegated by the Executive Director of the Texas Commission on Environmental Quality.

Sincerely,

Michael Wilson, P.E., Director
Air Permits Division
Office of Air
Texas Commission on Environmental Quality

MPW/RA/ra

Enclosure

cc: Air Section Manager, Region 3 - Abilene

Project Number: 169606

SPECIAL CONDITIONS

Permit Numbers 83801 and PSDTX1117

Federal Applicability

1. These facilities shall comply with applicable requirements of the U.S. Environmental Protection Agency (EPA) regulations on Standards of Performance for New Stationary Sources (NSPS), Title 40 Code of Federal Regulations Part 60 (40 CFR Part 60),

   A. Subpart A: General Provisions

   B. Subpart Dc: Small Industrial-Commercial-Institutional Steam Generating Units

   C. Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

   D. Subpart KKKK: Standards of Performance for Stationary Combustion Turbines

   If any condition of this permit is more stringent than the regulations so incorporated, then for the purposes of complying with this permit, the permit shall govern and be the standard by which compliance shall be demonstrated.

Emission Standards and Operating Specifications

2. The two General Electric Model 7FA combustion turbine generator (CTG) units each rated at a nominal electric power output of 171.1 megawatts (MW) operating in combined cycle mode with two heat recovery steam generators (HRSGs) and associated duct burners rated at 600 million British thermal units per hour (MMBtu/hr) based on the higher heating value (HHV) of the fuel and a 342 MW steam turbine generator are authorized by this permit. The plant's electric generating capacity is approximately 684 MW.

3. The concentration of nitrogen oxides ($NO_x$) in the stack gases from the two CTGs (Emission Point Numbers [EPN]: HRSG3 and HRSG4) shall not exceed 2.0 parts per million by volume dry (ppmvd) corrected to 15 percent oxygen ($O_2$), on a rolling 24-hour average, subject to the following specifications:

   A. A valid hour consists of a minimum of four, and normally 60, approximately equally spaced data points.

   B. Emissions occurring during start-up and shutdown or reduced load operations authorized by this permit are not included.

   C. Excess emissions caused by malfunction are excluded.

D. Excess emission during initial or other major DLN tuning sessions are excluded. Major tuning sessions are scheduled events and would occur after completion of initial construction, a combustor change-out, a major repair or maintenance to a combustor, or other similar circumstances.

E. During the first 24 months of operation following completion of the initial demonstration of compliance testing as required by this permit, hourly average periods may be excluded from selected 24-hour averages, if the hourly average is above 2.0 ppmvd nitrogen oxides ($NO_x$) because of rapid shifts in electrical load and resulting exhaust flow or $NO_x$ concentration, that make it impossible for the emission controller to maintain the desired $NO_x$ set point.

F. No later than the 25th month following completion of the initial demonstration of compliance, the permit holder shall submit a request to TCEQ Air Permits Division for a permit alteration of Special Condition No. 3E to specify a limit on the number of hourly exclusions due to rapid load shifts. The request shall include a report identifying the date and time of each excluded hour during the 24 month period, the hourly average $NO_x$ concentration, and the reason (including the entity requesting it) for the rapid change in load. In addition, the report shall identify the maximum rate of load change for which 2.0 ppm $NO_x$ concentration can be maintained. The TCEQ will alter the permit based upon its review of the data and any other information which may available at the time. The exclusion applies only to Special Condition No. 3, and not the maximum allowable emissions rates table (MAERT), and does not relieve the permit holder from all other provisions.

The concentration of carbon monoxide (CO) in the stack gases from EPNs HRSG3 and HRSG4 during normal operations shall not exceed a three-hour rolling average of 11.0 ppmvd @ 15 percent $O_2$.

The concentrations of $NO_x$ and CO above apply over each turbines normal operating range of 50 to 100 percent of full load and do not apply to emissions from start-up and shutdown activities.

Reduced load operation below 50 percent of base load is authorized provided that the maximum pounds per hour (lb/hr) emission rates specified in the table titled "Emission Sources - Maximum Allowable Emission Rates" (MAERT) are not exceeded.

4. Fuel-fired in the CTGs, duct burners, and auxiliary boiler is limited to pipeline-quality natural gas containing no more than 2.0 grains total sulfur per 100 dscf on an hourly basis and 0.50 grains total sulfur per 100 dscf on an annual basis.

The emergency generator engine (EPN: DG-2) is authorized to combust diesel fuel containing no more than 0.05 percent total sulfur by weight and is limited to a maximum of 150 hours of operation annually.

The auxiliary boiler (EPN: B-2) is limited to an annual capacity factor of 20 percent.

Upon request by the Executive Director of the Texas Commission on Environmental Quality (TCEQ) or any local air pollution control program having jurisdiction, the holder of this permit shall provide a sample and/or an analysis of the fuel-fired or shall allow air pollution control agency representatives to obtain a sample for analysis.

5. Opacity of emissions from natural gas or diesel fired facilities authorized by this permit shall not exceed 5 percent averaged over a six-minute period. During periods of start-up or shutdown opacity shall not exceed 15 percent averaged over a six-minute period.

   Opacity shall be determined by EPA Reference Method 9 during the initial determination of compliance stack sampling. After the initial determination of compliance stack sampling has been completed, the permit holder shall conduct visible emissions observations of each operating natural gas or diesel fired facility quarterly following the procedures of EPA Reference Method 22. If visible emissions are present, opacity shall be determined by EPA Reference Method 9. (9/11)

Aqueous Ammonia ($NH_3$)

6. Concentrations of $NH_3$ from EPNs HRSG3 and HRSG4 shall not exceed 7.0 ppmvd when corrected to 15percent $O_2$ on a three-hour rolling average.

   The concentration for $NH_3$ above apply over each turbines normal operating range of 50 to 100 percent of full load and do not apply to emissions from start-up and shutdown activities.

   Reduced load operation below 50 percent of base load is authorized provided that the maximum pounds per hour (lb/hr) emission rates specified in the MAERT are not exceeded.

7. The permit holder shall maintain prevention and protection so as to protect the $NH_3$ storage system which includes (but is not limited to) the following:

   The $NH_3$ storage tank area will be marked and protected so as to protect the $NH_3$ storage tank form accidents that could cause a rupture.

   The ammonia stored and handled at the facility shall be in aqueous solution and shall contain no more than 20 percent ammonia by mass.

8. In addition to the requirements of Special Condition 7, the permit holder shall maintain the piping and valves in $NH_3$ service as follows:

   A. All operating practices and procedures relating to the handling and storage of $NH_3$ shall conform to the safety recommendations specified for that compound by guidelines of the American National Standards Institute.

   B. Audio, olfactory and visual checks for $NH_3$ leaks with the operating area shall be made once a day.

   C. As soon as possible, following the detection of a leak, plant personnel shall take one or more of the following actions:

      (1) Locate and isolate the leak, if necessary.
      (2) Commence repair or replacement of the leaking component,
      (3) Use a leak collection or containment system to control the leak until repair or replacement can be made if immediate repair is not possible.

Start-up and Shutdown

9. The emissions from start-up and shutdown activities are reflected in the MAERT. These emissions will be minimized by the following:

   A. Facility and air pollution control equipment will be operated in a manner consistent with good practices for minimizing emissions.

   B. The frequency and duration of operation in start-up and shutdown mode will be minimized and the applicable emissions monitoring systems will be kept in operation.

   C. Cold start-up events for EPNs HRSG3 and HRSG4 shall not exceed seven hours. A cold start-up is defined as a start-up after a unit has received no fuel for a period of 24 hours or more.

   D. Warm start-up events for EPNs HRSG3 and HRSG4 shall not exceed five hours. A warm start-up is defined as a start-up which is not a cold start-up.

   E. Shutdown events for both EPNs HRSG3 and HRSG4 shall not exceed two hours.

   F. The start-up and shutdown activities are authorized provided that the $NO_x$, CO, and VOC emission rates in lb/hr do not exceed those specified in the MAERT and comply with the tons per year specified in the MAERT at normal operating conditions.

Initial Determination of Compliance

10. Sampling ports and platforms shall be incorporated into the design of all exhaust stacks according to the specifications set forth in the attachment entitled "Chapter 2, Stack Sampling Facilities." Alternate sampling facility designs may be submitted for approval by the TCEQ Regional Director.

11. The holder of this permit shall perform stack sampling and other testing as required to establish the actual quantities of air contaminants being emitted into the atmosphere from EPNs HRSG3 and HRSG4, and to determine initial compliance with all emission limits established by this permit. Sampling shall be conducted in accordance with the appropriate procedures of the TCEQ Sampling Procedures Manual and in accordance with the appropriate EPA Reference Methods 201A and 202 or Reference Method 5, modified to include back-half condensibles, for the concentration of particulate matter less than 10 microns in diameter ($PM_{10}$); Reference Method 8 or Reference Methods 6 or 6c for sulfur dioxide ($SO_2$); Reference Method 9 for opacity (consisting of 30 six-minute readings as provided in 40 CFR § 60.11[b]); Reference Method 10 for the concentration of CO; Reference Method 25A, modified to exclude methane and ethane, for the concentration of VOC (to measure total carbon as propane); and Reference Method 20 for the concentrations of $NO_x$ and $O_2$; or other equivalent methods approved by the TCEQ Regional Director.

    Fuel sampling using the methods and procedures of 40 CFR § 60.4415 may be conducted in lieu of stack sampling for $SO_2$ or the permit holder may be exempted from fuel monitoring as provided under 40 CFR § 60.4365(a). If fuel sampling is used, compliance with New Source Performance Standards (NSPS), Subpart KKKK, $SO_2$ limits shall be based on 100 percent conversion of the sulfur in the fuel to $SO_2$. Any deviations from those procedures must be approved by the Executive Director of the TCEQ prior to sampling. The TCEQ Executive Director or a designated representative shall be afforded the opportunity to observe all such sampling. The holder of this permit is responsible for providing sampling and testing facilities and conducting the sampling and testing operations at their expense.

    A. The TCEQ Abilene Regional Office shall be contacted as soon as testing is scheduled but not less than 45 days prior to sampling to schedule a pretest meeting.

        The notice shall include:

        (1) Date for pretest meeting.
        (2) Date sampling will occur.
        (3) Name of firm conducting sampling.
        (4) Type of sampling equipment to be used.
        (5) Method or procedure to be used in sampling.
        (6) Procedure used to determine CTG loads during and after the sampling period.

The purpose of the pretest meeting is to review the necessary sampling and testing procedures, to provide the proper data forms for recording pertinent data, and to review the format procedures for submitting the test reports. A written proposed description of any deviation from sampling procedures specified in permit conditions, or TCEQ or EPA sampling procedures shall be made available to the TCEQ prior to the pretest meeting. The TCEQ Regional Director shall approve or disapprove of any deviation from specified sampling procedures. Requests to waive testing for any pollutant specified in this condition shall be submitted to the TCEQ Office of Air, Air Permits Division. Test waivers and alternate/equivalent procedure proposals for NSPS testing which must have EPA approval shall be submitted to the TCEQ Regional Office.

B. Air contaminants and diluents from the turbines to be sampled and analyzed include (but are not limited to) $NO_x$, $O_2$, CO, VOC, formaldehyde ($H_2CO$), $SO_2$, and $PM_{10}$. (Fuel sampling using the methods and procedures of 40 CFR § 60.4415 may be conducted in lieu of stack sampling for $SO_2$.)

C. Each turbine shall be tested at 50 percent and 100 percent of base load of the permitted operating range that is defined in Special Condition No. 3 for the atmospheric conditions which exist during testing. Each tested turbine load shall be identified in the sampling report. The permit holder shall present at the pretest meeting the manner in which stack sampling will be executed in order to demonstrate compliance with emission standards found in 40 CFR Part 60, Subpart KKKK.

D. Sampling as required by this condition shall occur within 60 days after achieving the maximum production rate at which each CTG will be operated but no later than 180 days after initial start-up of each unit. Additional sampling shall occur as may be required by the TCEQ or EPA.

E. Within 60 days after the completion of the testing and sampling required herein, two copies of the sampling reports shall be distributed as follows:

(1) One copy to the TCEQ Abilene Regional Office.
(2) One copy to the EPA Region 6 Office, Dallas.

Continuous Determination of Compliance

12. The holder of this permit shall install, calibrate, maintain, and operate a continuous emission monitoring system (CEMS) to measure and record the concentrations of $NO_x$, CO, and diluent gases ($O_2$ or carbon dioxide [$CO_2$]) from EPNs HRSG3 and HRSG4.

A. Monitored $NO_x$ and CO concentrations shall be corrected and reported in dimensional units corresponding to the emission rate and concentration limits specified in Special Condition No. 3.

B. The CEMS data shall be used to demonstrate compliance with the $NO_x$ and CO emissions limitations in Special Condition No. 3 and the attached MAERT

C. The CEMS shall be operated according to the methods and procedures as set out in 40 CFR § 60.4345.

D. Reporting of monitoring data shall be in accordance with the methods and procedures as set out in 40 CFR § 60.4380(b).

E. Compliance with the continuous emissions monitor requirements above can be demonstrated by meeting the requirements of 40 CFR Part 75 provided that the permit holder demonstrates compliance with applicable NSPS regulations.

F. The TCEQ Abilene Regional Office shall be notified at least 30 days prior to any required relative accuracy test audit (RATA) in order to provide them the opportunity to observe the testing.

13. The $NH_3$ concentration in each Exhaust Stack shall be tested or calculated according to one of the methods listed below and shall be tested or calculated according to frequency listed below. Testing for $NH_3$ slip is only required on days when the Selective Catalytic Reduction (SCR) unit is in operation.

A. The holder of this permit may install, calibrate, maintain, and operate a CEMS to measure and record the concentrations of $NH_3$. The $NH_3$ concentrations shall be corrected and reported in accordance with Special Condition No. 6.

B. As an approved alternative, the $NH_3$ slip may be measured using a sorbent or stain tube device specific for $NH_3$ measurement in the 5 to 10 ppm range. The frequency of sorbent/stain tube testing shall be daily for the first 60 days of operation, after which, the frequency may be reduced to weekly testing if operating procedures have been developed to prevent excess amounts of $NH_3$ from being introduced in the SCR unit and when operation of the SCR unit has been proven successful with regard to controlling $NH_3$ slip. Daily sorbent or stain tube testing shall resume when the catalyst is within 30 days of its useful life expectancy. These results shall be recorded and used to determine compliance with Special Condition No. 6.

C. As an approved alternative to sorbent/stain tube testing or an $NH_3$ CEMS, the permit holder may install and operate a second $NO_x$ CEMS probe located between the duct burners and the SCR, upstream of the stack $NO_x$ CEMS, which may be used in association with the SCR efficiency and $NH_3$ injection rate to estimate $NH_3$ slip. This

condition shall not be construed to set a minimum $NO_x$ reduction efficiency on the SCR unit. These results shall be recorded and used to determine compliance with Special Condition No. 6.

D. If the measured or calculated $NH_3$ slip concentration exceeds 6 ppm at any time, the permit holder shall begin $NH_3$ testing by either the Phenol-Nitroprusside Method, the Indophenol Method, or EPA Conditional Test Method (CTM) 27 on a quarterly basis, in addition to the weekly sorbent or stain tube testing. The quarterly testing shall continue until such time as the SCR unit catalyst is replaced; or if the quarterly testing indicates $NH_3$ slip is 5 ppm or less, the Phenol-Nitroprusside/Indophenol/CTM 27 tests may be suspended until sorbent/stain tube testing again indicate 6 ppm $NH_3$ slip or greater. These results shall be recorded and used to determine compliance with Special Condition No. 6.

E. As an approved alternative to sorbent or stain tube testing, $NH_3$ CEMS, or a second $NO_x$ CEMS, the permit holder may install and operate a dual stream system of $NO_x$ CEMS at the exit of the SCR. One of the exhaust streams would be routed, in an unconverted state, to one $NO_x$ CEMS and the other exhaust stream would be routed through a $NH_3$ converter to convert $NH_3$ to $NO_x$ and then to a second $NO_x$ CEMS. The $NH_3$ slip concentration shall be calculated from the difference between the two $NO_x$ CEMS readings (converted and unconverted).

F. Any other method used for measuring $NH_3$ slip shall require prior approval from the TCEQ Regional Office.

14. The holder of this permit shall additionally install, calibrate, maintain, and operate continuous monitoring systems to monitor and record the average hourly natural gas consumption of the CTGs, duct burners and the auxiliary boiler. The systems shall be accurate to ± 5.0 percent of the unit's maximum flow.

15. If any emission monitor fails to meet specified performance, it shall be repaired or replaced as soon as reasonably possible.

Recordkeeping Requirements

16. The following records shall be kept at the plant for the life of the permit. All records required in this permit shall be made available at the request of personnel from the TCEQ, EPA, or any air pollution control agency with jurisdiction.

A. A copy of this permit.

B. A complete copy of the testing reports and records of the initial performance testing completed pursuant to Special Condition No. 11 to demonstrate initial compliance.

C. Stack sampling results or other air emissions testing (other than CEMS data) that may be requested by the TCEQ Executive Director on units authorized under this permit.

17. The following information shall be maintained by the holder of this permit in a form suitable for inspection for a period of five years after collection and shall be made available as soon as practical upon request to representatives of the TCEQ, EPA, or any local air pollution control program having jurisdiction:

A. The CEMS data of $NO_x$, CO, and $O_2$ emissions from EPNs HRSG3 and HRSG4 to demonstrate compliance with the emission rates listed in the MAERT.

B. Raw data files of all CEMS data including calibration checks and adjustments and maintenance performed.

C. Records of the hours of operation and average daily quantity of natural gas-fired in the CTGs, duct burners, and auxiliary boiler.

D. Records of the hours of operation of the emergency diesel generator.

E. Records of $NH_3$ emissions sampling and calculations pursuant to Special Condition No. 13.

F. Written records of any accidental releases, spills or venting of $NH_3$ and the corrective action taken.

G. Written records of maintenance performed to any piping and valves in $NH_3$ service pursuant to Special Condition 8.

H. Records to identify the times emissions data have been excluded from the calculation of average concentration for purposes of demonstrating compliance with the emission limitations in Special Condition No. 3 and Special Condition No. 6 along with the justification.

I. Record to identify the times and duration of start-up and shutdown periods pursuant to Special Condition No. 9.

J. Record of visible/opacity observations pursuant to Special Condition No. 5. **(9/11)**

Reporting

18. The holder of this permit shall submit to the TCEQ Abilene Regional Office and the Air Enforcement Branch of EPA in Dallas periodic reports as described in 40 CFR § 60.7. Such reports are required for each emission unit which is required to be continuously monitored pursuant to this permit.

Date: September 21, 2011

Bryan W. Shaw, Ph.D., *Commissioner*
Buddy Garcia, *Chairman*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

September 28, 2009

MR DAVID P MURPHY
VICE PRESIDENT GENERATION
BRAZOS ELECTRIC POWER COOPERATIVE INC
PO BOX 2585
WACO TX 76702-2585

BEPC
RECEIVED
SEP 30 2009
POWPROD

Re: Effective Permit Approval
Renewal
Permit Number: O2169
Brazos Electric Power Cooperative, Inc.
Jack County Generation Facility
Jacksboro, Jack County
Regulated Entity Number: RN100221985
Customer Reference Number: CN600128821
Account Number: JA-0068-E

Dear Mr. Murphy:

The effective federal operating permit (FOP) for Brazos Electric Power Cooperative, Inc., Jack County Generation Facility, is enclosed. This FOP constitutes authority to operate the emission units identified in the FOP application.

All site operating permits are subject to public petition for 60 days following the expiration of the 45-day U.S. Environmental Protection Agency (EPA) review. The public petition period for the FOP extends from September 5, 2009 until November 3, 2009. If the EPA receives a valid petition and objects to the above-referenced permit, you will be notified promptly by the Texas Commission on Environmental Quality (TCEQ).

It should be noted that from the date of this letter Brazos Electric Power Cooperative, Inc., Jack County Generation Facility, must operate in accordance with the requirements of Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122) and the FOP. Some of the terms and conditions contained in the FOP include recordkeeping conditions, reporting conditions (which includes deviation reporting), and compliance certification conditions. All reports, along with any questions regarding the reports, shall be forwarded to the TCEQ Abilene Regional Office, 1977 Industrial Boulevard, Abilene, Texas 79602-7833.

Consistent with 30 TAC Chapter 122, Subchapter C, the permit holder shall submit an application to the Air Permits Division (APD) for a revision to an FOP for those activities at a site which change, add, or remove one or more FOP terms or conditions. The permit holder shall also submit an application to the APD for a revision to a permit to address the following: the adoption of an applicable requirement previously designated as federally enforceable only; the promulgation of a new applicable requirement; the adoption of a new state-only requirement; or a change in a state-only designation.

Thank you again for your cooperation in this matter. If you have questions concerning the review or this notice, please contact Mr. Alfredo Mendoza, P.E., at (512) 239-1335.

This action is taken under authority delegated by the Executive Director of the TCEQ.

Sincerely,

Steve Hagle, P.E., Director
Air Permits Division
Office of Permitting and Registration
Texas Commission on Environmental Quality

SH/AM/pg

cc: Mr. Mike Meyers, Environmental Manager, Brazos Electric Power Cooperative, Inc., Waco
Air Section Manager, Region 3 - Abilene

Enclosure: Effective Permit

cc: Air Permit Section Chief, U.S. Environmental Protection Agency, Region 6, Dallas

Project Number: 13334

# FEDERAL OPERATING PERMIT

A FEDERAL OPERATING PERMIT IS HEREBY ISSUED TO

Brazos Electric Power Cooperative, Inc.

AUTHORIZING THE OPERATION OF

Jack County Generation Facility
Electric Services

LOCATED AT

Jack County, Texas

Latitude 33° 06' 11" Longitude 097° 57' 28"

Regulated Entity Number: RN100221985

This permit is issued in accordance with and subject to the Texas Clean Air Act (TCAA), Chapter 382 of the Texas Health and Safety Code and Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122), Federal Operating Permits. Under 30 TAC Chapter 122, this permit constitutes the permit holder's authority to operate the site, emission units, and affected sources listed in this permit. Operations of the site, emission units, and affected sources listed in this permit are subject to all additional rules or amended rules and orders of the Commission pursuant to the TCAA.

This permit does not relieve the permit holder from the responsibility of obtaining New Source Review authorization for new, modified, or existing facilities in accordance with 30 TAC Chapter 116, Control of Air Pollution by Permits for New Construction or Modification.

The site, emission units, and affected sources authorized by this permit shall be operated in accordance with 30 TAC Chapter 122, the general terms and conditions, special terms and conditions, and attachments contained herein.

This permit shall expire five years from the date of issuance. The renewal requirements specified in 30 TAC § 122.241 must be satisfied in order to renew the authorization to operate the site, emission units, and affected sources.

Permit No: O2169 Issuance Date: September 28, 2009

Mat Vile
For the Commission

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## GENERAL TERMS AND CONDITIONS

The permit holder shall comply with all terms and conditions contained in 30 TAC § 122.143 (General Terms and Conditions), 30 TAC § 122.144 (Recordkeeping Terms and Conditions), 30 TAC § 122.145 (Reporting Terms and Conditions), and 30 TAC § 122.146 (Compliance Certification Terms and Conditions).

If the permit holder chooses to demonstrate that this permit is no longer required, a written request to void this permit shall be submitted to the Texas Commission on Environmental Quality (TCEQ) by the Responsible Official in accordance with 30 TAC § 122.161(e). The permit holder shall comply with the permit's requirements, including compliance certification and deviation reporting, until notified by the TCEQ that this permit is voided.

The permit holder shall comply with 30 TAC Chapter 116 by obtaining a New Source Review authorization prior to new construction or modification of emission units located in the area covered by this permit.

All reports required by this permit shall be forwarded as one original and one copy to the TCEQ Regional Office for your site. Reports submitted must include a cover letter which identifies the following information: company name, TCEQ regulated entity number, site name, area name (if applicable), and Air Permits Division permit number.

## SPECIAL TERMS AND CONDITIONS:

**Emission Limitations and Standards, Monitoring and Testing, and Recordkeeping and Reporting:**

1. Permit holder shall comply with the following requirements:

   A. Emission units (including groups and processes) in the Applicable Requirements Summary attachment shall meet the limitations, standards, equipment specifications, monitoring, recordkeeping, reporting, testing, and other requirements listed in the Applicable Requirements Summary attachment to assure compliance with the permit.

   B. The textual description in the column titled "Textual Description" in the Applicable Requirements Summary attachment is not enforceable and is not deemed as a substitute for the actual regulatory language. The Textual Description is provided for information purposes only.

   C. A citation listed on the Applicable Requirements Summary attachment, which has a notation [G] listed before it, shall include the referenced section and subsection for all commission rules, or paragraphs for all federal and state regulations and all subordinate paragraphs, subparagraphs and clauses, subclauses, and items contained within the referenced citation as applicable requirements.

2. The permit holder shall comply with the following sections of 30 TAC Chapter 101 (General Air Quality Rules):

   A. Title 30 TAC § 101.1 (relating to Definitions), insofar as the terms defined in this section are used to define the terms used in other applicable requirements

   B. Title 30 TAC § 101.3 (relating to Circumvention)

   C. Title 30 TAC § 101.8 (relating to Sampling), if such action has been requested by the TCEQ

   D. Title 30 TAC § 101.9 (relating to Sampling Ports), if such action has been requested by the TCEQ

   E. Title 30 TAC § 101.10 (relating to Emissions Inventory Requirements)

   F. Title 30 TAC § 101.201 (relating to Emission Event Reporting and Recordkeeping Requirements)

   G. Title 30 TAC § 101.211 (relating to Scheduled Maintenance, Start-up, and Shutdown Reporting and Recordkeeping Requirements)

   H. Title 30 TAC § 101.221 (relating to Operational Requirements)

   I. Title 30 TAC § 101.222 (relating to Demonstrations)

   J. Title 30 TAC § 101.223 (relating to Actions to Reduce Excessive Emissions)

3. Permit holder shall comply with the following requirements of 30 TAC Chapter 111:

   A. For stationary vents with a flow rate of less than 100,000 actual cubic feet per minute and constructed after January 31, 1972, that are not listed in the Applicable Requirements Summary attachment, the permit holder shall comply with the following requirements:

      (i) Title 30 TAC § 111.111(a)(1)(B) (relating to Requirements for Specified Sources)

      (ii) Title 30 TAC § 111.111(a)(1)(E)

      (iii) Title 30 TAC §§ 111.111(a)(1)(F)(i), (ii), (iii), or (iv)

      (iv) For emission units with vent emissions subject to 30 TAC § 111.111(a)(1)(B), complying with 30 TAC §§ 111.111(a)(1)(F)(ii), (iii), or (iv), and capable of producing visible emissions from (but not limited to) particulate matter, acid gases, and $NO_x$, the permit holder shall also comply with the following periodic monitoring requirements for the purpose of annual compliance certification under 30 TAC § 122.146.

These periodic monitoring requirements do not apply to vents that do not emit visible emissions such as vents that emit only VOC or vents that provide passive ventilation, such as plumbing vents; or vents that are subject to the emission limitation of 30 TAC § 111.111(a)(1)(B) and Compliance Assurance Monitoring, as specified in the attached "Applicable Requirements Summary" and "Additional Monitoring Requirements:"

1. An observation of stationary vents from emission units in operation shall be conducted at least once during each calendar quarter unless the emission unit is not operating for the entire quarter.

2. For stationary vents from a combustion source, if an alternative to the normally fired fuel is fired for a period greater than or equal to 24 consecutive hours, the permit holder shall conduct an observation of the stationary vent for each such period to determine if visible emissions are present. If such period is greater than three months, observations shall be conducted once during each quarter. Supplementing the normally fired fuel with natural gas or fuel gas to increase the net heating value to the minimum required value does not constitute creation of an alternative fuel.

3. Records of all observations shall be maintained.

4. Visible emissions observations of emission units operated during daylight hours shall be conducted no earlier than one hour after sunrise and no later than one hour before sunset. Visible emissions observations of emission units operated only at night must be made with additional lighting and the temporary installation of contrasting backgrounds. Visible emissions observations shall be made during times when the activities described in 30 TAC § 111.111(a)(1)(E) are not taking place. Visible emissions shall be determined with each stationary vent in clear view of the observer. The observer shall be at least 15 feet, but not more than 0.25 mile, away from each stationary vent during the observation. For outdoor locations, the observer shall select a position where the sun is not directly in the observer's eyes. When condensed water vapor is present within the plume, as it emerges from the emissions outlet, observations must be made beyond the point in the plume at which condensed water vapor is no longer visible. When water vapor within the plume condenses and becomes visible at a distance from the emissions outlet, the observation shall be evaluated at the outlet prior to condensation of water vapor. A certified opacity reader is not required for visible emissions observations.

5. Compliance Certification:

(a) If visible emissions are not present during the observation, the RO may certify that the source is in compliance with the applicable opacity requirement in 30 TAC §§ 111.111(a)(1) and (a)(1)(B).

(b) However, if visible emissions are present during the observation, the permit holder shall either list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2) or conduct the appropriate opacity test specified in 30 TAC § 111.111(a)(1)(F) to determine if the source is in compliance with the opacity requirements. If an opacity test is performed and the source is determined to be in compliance, the RO may certify that the source is in compliance with the applicable opacity requirement. However, if an opacity test is performed and the source is determined to be out of compliance, the permit holder shall list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2). The opacity test must be performed by a certified opacity reader.

(c) Some vents may be subject to multiple visible emission or monitoring requirements. All credible data must be considered when certifying compliance with this requirement even if the observation or monitoring was performed to demonstrate compliance with a different requirement.

B. For visible emissions from a building, enclosed facility, or other structure; the permit holder shall comply with the following requirements:

(i) Title 30 TAC § 111.111(a)(7)(A) (relating to Requirements for Specified Sources)

(ii) Title 30 TAC §§ 111.111(a)(7)(B)(i) or (ii)

(iii) For a building containing an air emission source, enclosed facility, or other structure containing or associated with an air emission source subject to 30 TAC § 111.111(a)(7)(A), complying with 30 TAC § 111.111(a)(7)(B)(i) or (ii), and capable of producing visible emissions from (but not limited to) particulate matter, acid gases, and $NO_x$, the permit holder shall also comply with the following periodic monitoring requirements for the purpose of annual compliance certification under 30 TAC § 122.146:

1. An observation of visible emissions from a building containing an air emission source, enclosed facility, or other structure containing or associated with an air emission source which is required to comply with 30 TAC § 111.111(a)(7)(A) shall be conducted at least once during each calendar quarter unless the air emission source or enclosed facility is not operating for the entire quarter.

2. Records of all observations shall be maintained.

3. Visible emissions observations of air emission sources or enclosed facilities operated during daylight hours shall be conducted no earlier than one hour after sunrise and no later than one hour before sunset. Visible emissions observations of air emission sources or enclosed facilities operated only at night must be made with additional lighting and the temporary installation of contrasting backgrounds. Visible emissions shall be determined with each emissions outlet in clear view of the observer. The observer shall be at least 15 feet, but not more than 0.25 mile, away from each emissions outlet during the observation. For outdoor locations, the observer shall select a position where the sun is not directly in the observer's eyes. When condensed water vapor is present within the plume, as it emerges from the emissions outlet, observations must be made beyond the point in the plume at which condensed water vapor is no longer visible. When water vapor within the plume condenses and becomes visible at a distance from the emissions outlet, the observation shall be evaluated at the outlet prior to condensation of water vapor. A certified opacity reader is not required for visible emissions observations.

4. Compliance Certification:

   (a) If visible emissions are not present during the observation, the RO may certify that the source is in compliance with the applicable opacity requirement in 30 TAC §§ 111.111(a)(7) and (a)(7)(A).

   (b) However, if visible emissions are present during the observation, the permit holder shall either list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2) or conduct the appropriate opacity test specified in 30 TAC § 111.111(a)(7)(B) to determine if the source is in compliance with the opacity requirements. If an opacity test is performed and the source is determined to be in compliance, the RO may certify that the source is in compliance with the applicable opacity requirement. However, if an opacity test is performed and the source is determined to be out of compliance, the permit holder shall

list this occurrence as a deviation on the next deviation report as required under 30 TAC § 122.145(2). The opacity test must be performed by a certified opacity reader.

C. Certification of opacity readers determining opacities under Method 9 (as outlined in 40 CFR Part 60, Appendix A) to comply with opacity monitoring requirements shall be accomplished by completing the Visible Emissions Evaluators Course, or approved agency equivalent, no more than 180 days before the opacity reading.

D. For emission units with contributions from uncombined water, the permit holder shall comply with the requirements of 30 TAC § 111.111(b).

E. Emission limits on nonagricultural processes, except for the steam generators specified in 30 TAC § 111.153, shall comply with the following requirements:

(i) Emissions of PM from any source may not exceed the allowable rates as required in 30 TAC § 111.151(a) (relating to Allowable Emissions Limits)

(ii) Sources with an effective stack height ($h_e$) less than the standard effective stack height ($H_e$), must reduce the allowable emission level by multiplying it by $[h_e/H_e]^2$ as required in 30 TAC § 111.151(b)

(iii) Effective stack height shall be calculated by the equation specified in 30 TAC § 111.151(c)

F. Permit holder shall comply with the following requirements for steam generators:

(i) Emissions from any solid fuel-fired steam generator may not exceed 0.3 pound of TSP per MMBtu of heat input, averaged over a two-hour period, as required in 30 TAC § 111.153(b) (relating to Emissions Limits for Steam Generators)

4. The permit holder shall comply with the following requirements for units subject to any subpart of 40 CFR Part 60, unless otherwise stated in the applicable subpart:

A. Title 40 CFR § 60.7 (relating to Notification and Recordkeeping)

B. Title 40 CFR § 60.8 (relating to Performance Tests)

C. Title 40 CFR § 60.11 (relating to Compliance with Standards and Maintenance Requirements)

D. Title 40 CFR § 60.12 (relating to Circumvention)

E. Title 40 CFR § 60.13 (relating to Monitoring Requirements)

F. Title 40 CFR § 60.14 (relating to Modification)

G. Title 40 CFR § 60.15 (relating to Reconstruction)

H. Title 40 CFR § 60.19 (relating to General Notification and Reporting Requirements)

**Additional Monitoring Requirements**

5. Unless otherwise specified, the permit holder shall comply with the compliance assurance monitoring requirements as specified in the attached "CAM Summary" upon issuance of the permit. In addition, the permit holder shall comply with the following:

   A. The permit holder shall comply with the terms and conditions contained in 30 TAC § 122.147 (General Terms and Conditions for Compliance Assurance Monitoring).

   B. The permit holder shall report, consistent with the averaging time identified in the "CAM Summary," deviations as defined by the deviation limit in the "CAM Summary." Any monitoring data below a minimum limit or above a maximum limit, that is collected in accordance with the requirements specified in 40 CFR § 64.7(c), shall be reported as a deviation. Deviations shall be reported according to 30 TAC § 122.145 (Reporting Terms and Conditions).

   C. The permit holder may elect to collect monitoring data on a more frequent basis and average the data, consistent with the averaging time specified in the "CAM Summary," for purposes of determining whether a deviation has occurred. However, the additional data points must be collected on a regular basis. In no event shall data be collected and used in particular instances in order to avoid reporting deviations. All monitoring data shall be collected in accordance with the requirements specified in 40 CFR § 64.7(c).

   D. The permit holder shall operate the monitoring, identified in the attached "CAM Summary," in accordance with the provisions of 40 CFR § 64.7.

6. The permit holder shall comply with the periodic monitoring requirements as specified in the attached "Periodic Monitoring Summary" upon issuance of the permit. Except for, as applicable, monitoring malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments), the permit holder shall conduct all monitoring in continuous operation (or shall collect data at all required intervals) at all times that the pollutant-specific emissions unit is operating. The permit holder may elect to collect monitoring data on a more frequent basis and average the data, consistent with the averaging time specified in the "Periodic Monitoring Summary," for purposes of determining whether a deviation has occurred. However, the additional data points must be collected on a regular basis. In no event shall data be collected and used in particular instances to avoid reporting deviations. Deviations shall be reported according to 30 TAC § 122.145 (Reporting Terms and Conditions).

**New Source Review Authorization Requirements**

7. Permit holder shall comply with the requirements of New Source Review authorizations issued or claimed by the permit holder for the permitted area, including permits, permits by rule, standard permits, flexible permits, special permits, permits for existing facilities including Voluntary Emissions Reduction Permits and Electric Generating Facility Permits issued under 30 TAC Chapter 116, Subchapter I, or special exemptions referenced in the New Source Review Authorization References attachment. These requirements:

   A. Are incorporated by reference into this permit as applicable requirements

   B. Shall be located with this operating permit

   C. Are not eligible for a permit shield

8. The permit holder shall comply with the general requirements of 30 TAC Chapter 106, Subchapter A or the general requirements, if any, in effect at the time of the claim of any PBR.

**Compliance Requirements**

9. The permit holder shall certify compliance with all permit terms and conditions using, at a minimum (but not limited to) the continuous or intermittent compliance method data from monitoring, recordkeeping, reporting, or testing required by the permit and any other credible evidence or information. The certification period may not exceed 12 months and the certification must be submitted within 30 days after the end of the period being certified.

10. Use of Discrete Emission Credits to Comply with Applicable Requirements:

   A. Unless other wise prohibited, the permit holder may use discrete emission credits to comply with the following applicable requirements listed elsewhere in this permit:

      (i) Title 30 TAC Chapter 115

      (ii) Title 30 TAC Chapter 117

      (iii) If applicable, offsets for 30 TAC Chapter 116

      (iv) Temporarily exceed state NSR permit allowables

   B. The permit holder shall comply with the following requirements in order to use the credit to comply with the applicable requirements:

(i) The permit holder must notify the TCEQ according to 30 TAC § 101.376(d)

(ii) The discrete emission credits to be used must meet all the geographic, timeliness, applicable pollutant type, and availability requirements listed in 30 TAC Chapter 101, Subchapter H, Division 4

(iii) The executive director has approved the use of the discrete emission credits according to 30 TAC § 101.376(d)(1)(A)

(iv) The permit holder keeps records of the use of credits towards compliance with the applicable requirements in accordance with 30 TAC § 101.372(h) and 30 TAC Chapter 122

**Protection of Stratospheric Ozone**

11. Permit holders at a site subject to Title VI of the FCAA Amendments shall meet the following requirements for protection of stratospheric ozone:

A. Any on-site servicing, maintenance, and repair on refrigeration and nonmotor vehicle air-conditioning appliances using ozone-depleting refrigerants or non-exempt substitutes shall be conducted in accordance with 40 CFR Part 82, Subpart F. Permit holders shall ensure that repairs on or refrigerant removal from refrigeration and nonmotor vehicle air-conditioning appliances using ozone-depleting refrigerants are performed only by properly certified technicians using certified equipment. Records shall be maintained as required by 40 CFR Part 82, Subpart F.

**Permit Location**

12. The permit holder shall maintain a copy of this permit and records related to requirements listed in this permit on-site.

**Permit Shield (30 TAC § 122.148)**

13. A permit shield is granted for the emission units, groups, or processes specified in the attached "Permit Shield." Compliance with the conditions of the permit shall be deemed compliance with the specified potentially applicable requirements or specified potentially applicable state-only requirements listed in the attachment "Permit Shield." Permit shield provisions shall not be modified by the executive director until notification is provided to the permit holder. No later than 90 days after notification of a change in a determination made by the executive director, the permit holder shall apply for the appropriate permit revision to reflect the new determination. Provisional terms are not eligible for this permit shield. Any term or condition, under a permit shield, shall not be protected by the permit shield if it is replaced by a provisional term or condition or the basis of the term and condition changes.

**Acid Rain Permit Requirements**

14. For units CT-1, CT-2, CT-3, and CT-4 (identified in the Certificate of Representation as CT-1, CT-2, CT-3, and CT-4), located at the affected source identified by ORIS/Facility code 55230, the designated representative and the owner or operator, as applicable, shall comply with the following Acid Rain Permit requirements.

A. General Requirements

(i) Under 30 TAC § 122.12(1) and 40 CFR Part 72, the Acid Rain Permit requirements contained here are a separable portion of the Federal Operating Permit (FOP) and have an independent public comment process which may be separate from, or combined with the FOP.

(ii) The owner and operator shall comply with the requirements of 40 CFR Part 72 and 40 CFR Part 76. Any noncompliance with the Acid Rain Permit will be considered noncompliance with the FOP and may be subject to enforcement action.

(iii) The owners and operators of the affected source shall operate the source and the unit in compliance with the requirements of this Acid Rain Permit and all other applicable State and federal requirements.

(iv) The owners and operators of the affected source shall comply with the General Terms and Conditions of the FOP that incorporates this Acid Rain Permit.

(v) The term for the Acid Rain permit shall commence with the issuance of the FOP that incorporates the Acid Rain permit and shall be run concurrent with the remainder of the term of the FOP. Renewal of the Acid Rain permit shall coincide with the renewal of the FOP that incorporates the Acid Rain permit and subsequent terms shall be no more than five years from the date of renewal of the FOP and run concurrent with the permit term of the FOP.

B. Monitoring Requirements

(i) The owners and operators, and the designated representative, of the affected source and each affected unit at the source shall comply with the monitoring requirements contained 40 CFR Part 75.

(ii) The emissions measurements recorded and reported in accordance with 40 CFR Part 75 and any other credible evidence shall be used to determine compliance by the affected source with the acid rain emissions limitations and emissions reduction requirements for $SO_2$ and $NO_x$ under the ARP.

(iii) The requirements of 40 CFR Part 75 shall not affect the responsibility of the owners and operators to monitor emission of other pollutants or other emissions characteristics at the unit under other applicable requirements of the FCAA Amendments (42 U.S.C. 7401, as amended November 15, 1990) and other terms and conditions of the operating permit for the source.

C. $SO_2$ emissions requirements

(i) The owners and operators of each source and each affected unit at the source shall comply with the applicable acid rain emissions limitations for $SO_2$.

(ii) As of the allowance transfer deadline the owners and operators of the affected source and each affected unit at the source shall hold, in the units's compliance subaccount, allowances in an amount not less than the total annual emissions of $SO_2$ for the previous calendar year.

(iii) Each ton of $SO_2$ emitted in excess of the acid rain emissions limitations for $SO_2$ shall constitute a separate violation of the FCAA amendments.

(iv) An affected unit shall be subject to the requirements under (i) and (ii) of the $SO_2$ emissions requirements as follows:

1. Starting January 1, 2000, an affected unit under 40 CFR § 72.6(a)(2); or

2. Starting on the later of January 1, 2000, or the deadline for monitor certification under 40 CFR Part 75, an affected unit under 40 CFR § 72.6(a)(3).

(v) Allowances shall be held in, deducted from, or transferred into or among Allowance Tracking System accounts in accordance with the requirements of the ARP.

(vi) An allowance shall not be deducted, for compliance with the requirements of this permit, in a calendar year before the year for which the allowance was allocated.

(vii) An allowance allocated by the EPA Administrator or under the ARP is a limited authorization to emit $SO_2$ in accordance with the ARP. No provision of the ARP, Acid Rain permit application, this Acid Rain Permit, or an exemption under 40 CFR §§ 72.7 or 72.8 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.

(viii) An allowance allocated by the EPA Administrator under the ARP does not constitute a property right.

D. $NO_x$ Emission Requirements

(i) The owners and operators of the source and each affected unit at the source shall comply with the applicable acid rain emissions limitations for $NO_x$ under 40 CFR Part 76.

E. Excess emissions requirements for $SO_2$ and $NO_x$.

(i) The designated representative of an affected unit that has excess emissions in any calendar year shall submit a proposed offset plan, as required under 40 CFR Part 77.

(ii) If an affected source has excess emissions in any calendar year shall, as required by 40 CFR Part 77:

1. Pay, without demand, the penalty required and pay, upon demand, the interest on that penalty.

2. Comply with the terms of an approved offset plan.

F. Recordkeeping and Reporting Requirements

(i) Unless otherwise provided, the owners and operators of the affected source and each affected unit at the source shall keep on-site at the source each of the following documents for a period of five years from the date the document is created. This period may be extended for cause, at any time before the end of five years, in writing by the permitting authority or the EPA Administrator.

1. The certificate of representation for the designated representative for the source and each affected unit and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR § 72.24; provided that the certificate and documents shall be retained on-site at the source beyond such five-year period until such documents are superseded because of the submission of a new certificate of representation changing the designated representative.

2. All emissions monitoring information, in accordance with 40 CFR Part 75, provided that to the extent that 40 CFR Part 75 provides for a three-year period for recordkeeping (rather than a five-year period cited in 30 TAC § 122.144), the three-year period shall apply.

3. Copies of all reports, compliance certifications, and other submissions and all records made or required under the ARP or relied upon for compliance certification.

4. Copies of all documents used to complete a acid rain permit application and any other submission under the ARP or to demonstrate compliance with the requirements of the ARP.

(ii) The designated representative of an affected source and each affected unit at the source shall submit the reports required under the ARP including those under 40 CFR Part 72, Subpart I and 40 CFR Part 75.

G. Liability

(i) Any person who knowingly violates any requirement or prohibition of the ARP, a complete acid rain permit application, an acid rain permit, or a written exemption under 40 CFR §§ 72.7 or 72.8, including any requirement for the payment of any penalty owed to the United States, shall be subject to enforcement pursuant to FCAA § 113(c).

(ii) Any person who knowingly makes a false, material statement in any record, submission, or report under the ARP shall be subject to criminal enforcement pursuant to FCAA § 113(c) and 18 U.S.C. 1001.

(iii) No permit revision shall excuse any violation of the requirements of the ARP that occurs prior to the date that the revision takes effect.

(iv) The affected source and each affected unit shall meet the requirements of the ARP contained in 40 CFR Parts 72 through 78.

(v) Any provision of the ARP that applies to an affected source or the designated representative of an affected source shall also apply to the owners and operators of such source and of the affected units at the source.

(vi) Any provision of the ARP that applies to an affected unit (including a provision applicable to the DR of an affected unit) shall also apply to the owners and operators of such unit. Except as provided under 40 CFR § 72.44 (Phase II repowering extension plans) and 40 CFR § 76.11 ($NO_x$ averaging plans), and except with regard to the requirements applicable to units with a common stack under 40 CFR Part 75 (including 40 CFR §§ 75.16, 75.17, and 75.18), the owners and operators and the DR of one affected unit shall not be liable for any violation by any other affected unit of which they are not owners or operators or the DR and that is located at a source of which they are not owners or operators or the DR.

(vii) Each violation of a provision of 40 CFR Parts 72, 73, 74, 75, 76, 77, and 78 by an affected source or affected unit, or by an owner or operator or DR of such source or unit, shall be a separate violation of the FCAA Amendments.

H. Effect on other authorities. No provision of the ARP, an acid rain permit application, an acid rain permit, or an exemption under 40 CFR §§ 72.7 or 72.8 shall be construed as:

(i) Except as expressly provided in Title IV of the FCAA Amendments, exempting or excluding the owners and operators and, to the extent applicable, the DR of an affected source or affected unit from compliance with any other provision of the FCAA Amendments, including the provisions of Title I of the FCAA Amendments relating to applicable National Ambient Air Quality Standards or State Implementation Plans

(ii) Limiting the number of allowances a unit can hold; *provided,* that the number of allowances held by the unit shall not affect the source's obligation to comply with any other provisions of the FCAA Amendments

(iii) Requiring a change of any kind in any state law regulating electric utility rates and charges, affecting any state law regarding such state regulation, or limiting such state regulation, including any prudence review requirements under such state law

(iv) Modifying the Federal Power Act or affecting the authority of the Federal Energy Regulatory Commission under the Federal Power Act; or,

(v) Interfering with or impairing any program for competitive bidding for power supply in a state in which such program is established

I. The number of $SO_2$ allowances allocated by the EPA in 40 CFR Part 73 is enforceable only by the EPA Administrator.

**Clean Air Interstate Rule Permit Requirements**

15. For units CT-1, CT-2, CT-3, and CT-4 (identified in the Certificate of Representation as CT-1, CT-2, CT-3, and CT-4), located at the site identified by ORIS/Facility code 55230, the designated representative and the owner or operator, as applicable, shall comply with the following Clean Air Interstate Rule (CAIR) Permit requirements. Until approval of the Texas CAIR SIP by EPA, the permit holder shall comply with the equivalent requirements of 40 CFR Part 97 in place of the referenced 40 CFR Part 96 requirements in the Texas CAIR permit and 30 TAC Chapter 122 requirements.

A. General Requirements

(i) Under 30 TAC § 122.420(b) and 40 CFR §§ 96.120(b) and 96.220(b) the CAIR Permit requirements contained here are a separable portion of the Federal Operating Permit (FOP).

(ii) The owners and operators of the CAIR $NO_x$ and the CAIR $SO_2$ source shall operate the source and the unit in compliance with the requirements of this CAIR permit and all other applicable State and federal requirements.

(iii) The owners and operators of the CAIR $NO_x$ and the CAIR $SO_2$ source shall comply with the General Terms and Conditions of the FOP that incorporates this CAIR Permit.

(iv) The term for the initial CAIR permit shall commence with the issuance of the revision containing the CAIR permit and shall be the remaining term for the FOP that incorporates the CAIR permit. Renewal of the initial CAIR permit shall coincide with the renewal of the FOP that incorporates the CAIR permit and subsequent terms shall be no more than five years from the date of renewal of the FOP and run concurrent with the permit term of the FOP.

B. Monitoring and Reporting Requirements

(i) The owners and operators, and the CAIR designated representative, of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements contained 40 CFR Part 96, Subpart HH.

(ii) The owners and operators, and the CAIR designated representative, of the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall comply with the monitoring, reporting, and recordkeeping requirements contained 40 CFR Part 96, Subpart HHH.

(iii) The emissions measurements recorded and reported in accordance with 40 CFR Part 96, Subpart HH and any other credible evidence shall be used to determine compliance by the CAIR $NO_x$ source with the CAIR $NO_x$ emissions limitation.

(iv) The emissions measurements recorded and reported in accordance with 40 CFR Part 96, Subpart HHH and any other credible evidence shall be used to determine compliance by the CAIR $SO_2$ source with the CAIR $SO_2$ emissions limitation.

C. $NO_x$ emissions requirements

(i) As of the allowance transfer deadline for a control period, the owners and operators of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source shall hold, in the source's compliance account, CAIR $NO_x$ allowances available for compliance deductions for the control period under 40 CFR § 96.154(a) in an amount not less than the tons of total nitrogen oxides emissions for the control period from all CAIR $NO_x$ units at the source, as determined in accordance the requirements 40 CFR Part 96, Subpart HH.

(ii) A CAIR $NO_x$ unit shall be subject to the requirements of paragraph C(i) of this CAIR Permit starting on the later of January 1, 2009, or the deadline for meeting the unit's monitor certification requirements under 40 CFR §§ 96.170(b)(1), (2), or (5).

(iii) A CAIR $NO_x$ allowance shall not be deducted, for compliance with the requirements of this permit, for a control period in a calendar year before the year for which the CAIR $NO_x$ allowance was allocated.

(iv) CAIR $NO_x$ allowances shall be held in, deducted from, or transferred into or among CAIR $NO_x$ Allowance Tracking System accounts in accordance with the requirements of 40 CFR Part 96, Subpart FF or Subpart GG.

(v) A CAIR $NO_x$ allowance is a limited authorization to emit one ton of nitrogen oxides in accordance with the CAIR $NO_x$ Annual Trading Program. No provision of the CAIR $NO_x$ Annual Trading Program, the CAIR permit application, the CAIR permit, or an exemption under 40 CFR § 96.105 and no provision of law shall be construed to limit the authority of the State or the United States to terminate or limit such authorization.

(vi) A CAIR $NO_x$ allowance does not constitute a property right.

(vii) Upon recordation by the Administrator under 40 CFR Part 96, Subpart FF or Subpart GG, every allocation, transfer, or deduction of a CAIR $NO_x$ allowance to or from a CAIR $NO_x$ unit's compliance account is incorporated automatically in this CAIR permit.

D. $NO_x$ excess emissions requirements

(i) If a CAIR $NO_x$ source emits nitrogen oxides during any control period in excess of the CAIR $NO_x$ emissions limitation, the owners and operators of the source and each CAIR $NO_x$ unit at the source shall surrender the CAIR $NO_x$ allowances required for deduction under 40 CFR § 96.154(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law.

(ii) Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 40 CFR Part 96, Subpart AA, the Clean Air Act, and applicable State law.

E. $SO_2$ emissions requirements

(i) As of the allowance transfer deadline for a control period, the owners and operators of the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall hold, in the source's compliance account, CAIR $SO_2$ allowances available for compliance deductions for the control period under 40 CFR § 96.254(a) and (b) in an amount not less than the tons of total sulfur dioxides emissions for the control period from all CAIR $SO_2$ units at the source, as determined in accordance the requirements 40 CFR Part 96, Subpart HHH.

(ii) A CAIR $SO_2$ unit shall be subject to the requirements of paragraph E(i) of this CAIR Permit starting on the later of January 1, 2010, or the deadline for meeting the unit's monitor certification requirements under 40 CFR § 96.270(b)(1), (2), or (5).

(iii) A CAIR $SO_2$ allowance shall not be deducted, for compliance with the requirements of this permit, for a control period in a calendar year before the year for which the CAIR $SO_2$ allowance was allocated.

(iv) CAIR $SO_2$ allowances shall be held in, deducted from, or transferred into or among CAIR $SO_2$ Allowance Tracking System accounts in accordance with the requirements of 40 CFR Part 96, Subpart FFF or Subpart GGG.

(v) A CAIR $SO_2$ allowance is a limited authorization to emit sulfur dioxide in accordance with the CAIR $SO_2$ Trading Program. No provision of the CAIR $SO_2$ Trading Program, the CAIR permit application, the CAIR permit, or an exemption under 40 CFR § 96.205 and no provision of law shall be construed to limit the authority of the State or the United States to terminate or limit such authorization.

(vi) A CAIR $SO_2$ allowance does not constitute a property right.

(vii) Upon recordation by the Administrator under 40 CFR Part 96, Subpart FFF or Subpart GGG, every allocation, transfer, or deduction of a CAIR $SO_2$ allowance to or from a CAIR $SO_2$ unit's compliance account is incorporated automatically in this CAIR permit.

F. $SO_2$ excess emissions requirements

(i) If a CAIR $SO_2$ source emits sulfur dioxides during any control period in excess of the CAIR $SO_2$ emissions limitation, the owners and operators of the source and each CAIR $SO_2$ unit at the source shall surrender the CAIR $SO_2$ allowances required for deduction under

40 CFR § 96.254(d)(1) and pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, under the Clean Air Act or applicable State law.

(ii) Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 40 CFR Part 96, Subpart AAA, the Clean Air Act, and applicable State law.

G. Recordkeeping and Reporting Requirements

(i) Unless otherwise provided, the owners and operators of the CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source and the CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall keep on-site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time before the end of 5 years, in writing by the permitting authority or the Administrator.

1. The certificate of representation under 40 CFR §§ 96.113 and 96.213 for the CAIR $NO_x$ designated representative for the source and each CAIR $NO_x$ unit and the CAIR $SO_2$ designated representative for the source and each CAIR $SO_2$ unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation; provided that the certificate and documents shall be retained on-site at the source beyond such five-year period until such documents are superseded because of the submission of a new certificate of representation under 40 CFR §§ 96.113 and 96.213 changing the CAIR designated representative.

2. All emissions monitoring information, in accordance with 40 CFR Part 96, Subpart HH and Subpart HHH, provided that to the extent that these subparts provide for a three-year period for recordkeeping, the three-year period shall apply.

3. Copies of all reports, compliance certifications, and other submissions and all records made or required under the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program or relied upon for compliance determinations.

4. Copies of all documents used to complete a CAIR permit application and any other submission under the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program or to demonstrate compliance with the requirements of the CAIR $NO_x$ Annual Trading Program and CAIR $SO_2$ Trading Program.

(ii) The CAIR designated representative of a CAIR $NO_x$ source and each CAIR $NO_x$ unit at the source and a CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall submit the reports required under the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program including those under 40 CFR Part 96, Subpart HH and Subpart HHH.

H. The CAIR $NO_x$ source and each CAIR $NO_x$ unit shall meet the requirements of the CAIR $NO_x$ Annual Trading Program contained in 40 CFR Part 96, Subparts AA through II.

I. The CAIR $SO_2$ source and each CAIR $SO_2$ unit shall meet the requirements of the CAIR $SO_2$ Trading Program contained in 40 CFR Part 96, Subparts AAA through III.

J. Any provision of the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program that applies to a CAIR $NO_x$ source or CAIR $SO_2$ source or the CAIR designated representative of a CAIR $NO_x$ source or CAIR $SO_2$ source shall also apply to the owners and operators of such source and the units at the source.

K. Any provision of the CAIR $NO_x$ Annual Trading Program and the CAIR $SO_2$ Trading Program that applies to a CAIR $NO_x$ unit or CAIR $SO_2$ unit or the CAIR designated representative of a CAIR $NO_x$ unit or CAIR $SO_2$ unit shall also apply to the owners and operators of such unit.

L. No provision of the CAIR $NO_x$ Annual Trading Program, CAIR $SO_2$ Trading Program, a CAIR permit application, a CAIR permit, or an exemption under 40 CFR §§ 96.105 or 96.205 shall be construed as exempting or excluding the owners and operators, and the CAIR designated representative, of a CAIR $NO_x$ source or CAIR $NO_x$ unit or a CAIR $SO_2$ source or CAIR $SO_2$ unit from compliance with any other provision of the applicable, approved State implementation plan, a federally enforceable permit, or the Clean Air Act.

## ATTACHMENTS

Applicable Requirements Summary

Additional Monitoring Requirements

Permit Shield

New Source Review Authorization References

## Applicable Requirements Summary

**Unit Summary** ..... 22

**Applicable Requirements Summary** ..... 23

Note: A "none" entry may be noted for some emission sources in this permit's "Applicable Requirements Summary" under the heading of "Monitoring and Testing Requirements" and/or "Recordkeeping Requirements" and/or "Reporting Requirements." Such a notation indicates that there are no requirements for the indicated emission source as identified under the respective column heading(s) for the stated portion of the regulation when the emission source is operating under the conditions of the specified SOP Index Number. However, other relevant requirements pursuant to 30 TAC Chapter 122 including Recordkeeping Terms and Conditions (30 TAC § 122.144), Reporting Terms and Conditions (30 TAC § 122.145), and Compliance Certification Terms and Conditions (30 TAC § 122.146) continue to apply.

## Unit Summary

| Unit/Group/ Process ID No. | Unit Type | Group/Inclusive Units | SOP Index No. | Regulation | Requirement driver |
|---|---|---|---|---|---|
| B-1 | Boilers/Steam Generators/Steam Generating Units | N/A | 60Dc-1 | 40 CFR Part 60, Subpart Dc | No changing attributes. |
| B-2 | Boilers/Steam Generators/Steam Generating Units | N/A | 60Dc-2 | 40 CFR Part 60, Subpart Dc | No changing attributes. |
| DG-2 | Stationary Reciprocating Int. Comb. Engines | N/A | 60IIII-1 | 40 CFR Part 60, Subpart IIII | No changing attributes. |
| HRSG-1 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-1 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-1 | Stationary Turbines | N/A | 60GG-1 | 40 CFR Part 60, Subpart GG | No changing attributes. |
| HRSG-2 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-1 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-2 | Stationary Turbines | N/A | 60GG-1 | 40 CFR Part 60, Subpart GG | No changing attributes. |
| HRSG-3 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-2 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-3 | Stationary Turbines | N/A | 60KKKK-1 | 40 CFR Part 60, Subpart KKKK | No changing attributes. |
| HRSG-4 | Boilers/Steam Generators/Steam Generating Units | N/A | 60DA-2 | 40 CFR Part 60, Subpart Da | No changing attributes. |
| HRSG-4 | Stationary Turbines | N/A | 60KKKK-1 | 40 CFR Part 60, Subpart KKKK | No changing attributes. |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements | Reporting Requirements |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | (30 TAC § 122.144) | (30 TAC § 122.145) |
| B-1 | EU | 60Dc-1 | $SO_2$ | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-1 | EU | 60Dc-1 | PM | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-1 | EU | 60Dc-1 | PM (Opacity) | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | $SO_2$ | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | PM | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |
| B-2 | EU | 60Dc-2 | PM (Opacity) | 40 CFR Part 60, Subpart Dc | § 60.40c(a) | This subpart applies to each steam generating unit constructed, reconstructed, or modified after 6/9/89 and that has a maximum design heat input capacity of 2.9-29 megawatts (MW). | None | § 60.48c(g)<br>§ 60.48c(i) | § 60.48c(a)<br>§ 60.48c(a)(1)<br>§ 60.48c(a)(3) |

# Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements | Reporting Requirements |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | (30 TAC § 122.144) | (30 TAC § 122.145) |
| HRSG-1 | EU | 60DA-1 | $NO_x$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-2 | EU | 60DA-1 | $NO_x$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-3 | EU | 60DA-2 | $NO_x$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |
| HRSG-4 | EU | 60DA-2 | $NO_x$, $SO_2$, PM, PM(Opacity) | 40 CFR Part 60, Subpart Da | § 60.40Da(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart Da ** See Periodic Monitoring Summary | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart Da | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart Da |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements (30 TAC § 122.144) | Reporting Requirements (30 TAC § 122.145) |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | | |
| DG-2 | EU | 60IIII-1 | $NO_X$ | 40 CFR Part 60, Subpart IIII | § 60.4200(a) The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart IIII | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart IIII |
| HRSG-1 | EU | 60GG-1 | $SO_2$ | 40 CFR Part 60, Subpart GG | § 60.333(a) | No stationary gas turbine shall cause to be discharged into the atmosphere any gases which contain sulfur dioxide in excess of 0.015% by volume at 15% $O_2$ dry basis. | § 60.334(h)<br>[G]§ 60.334(h)(3) | None | None |
| HRSG-1 | EU | 60GG-1 | $NO_X$ | 40 CFR Part 60, Subpart GG | § 60.332(a)(1)<br>§ 60.332(a)(3) | No owner or operator shall discharge into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of the amount as determined from the specified equation. | § 60.334(j)<br>§ 60.334(j)(1)<br>[G]§ 60.334(j)(1)(iii)<br>[G]§ 60.335(a)<br>§ 60.335(b)(2)<br>§ 60.335(b)(3)<br>** See CAM Summary | None | § 60.334(j)<br>§ 60.334(j)(5) |
| HRSG-2 | EU | 60GG-1 | $SO_2$ | 40 CFR Part 60, Subpart GG | § 60.333(a) | No stationary gas turbine shall cause to be discharged into the atmosphere any gases which contain sulfur dioxide in excess of 0.015% by volume at 15% $O_2$ dry basis. | § 60.334(h)<br>[G]§ 60.334(h)(3) | None | None |
| HRSG-2 | EU | 60GG-1 | $NO_X$ | 40 CFR Part 60, Subpart GG | § 60.332(a)(1)<br>§ 60.332(a)(3) | No owner or operator shall discharge into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of the amount as determined from the specified equation. | § 60.334(j)<br>§ 60.334(j)(1)<br>[G]§ 60.334(j)(1)(iii)<br>[G]§ 60.335(a)<br>§ 60.335(b)(2)<br>§ 60.335(b)(3)<br>** See CAM Summary | None | § 60.334(j)<br>§ 60.334(j)(5) |

## Applicable Requirements Summary

| Unit/Group/Process | | SOP Index No. | Pollutant | Emission Limitation/Standard or Equipment Specification | | Textual Description (See Special Term and Condition 1.B.) | Monitoring And Testing Requirements | Recordkeeping Requirements (30 TAC § 122.144) | Reporting Requirements (30 TAC § 122.145) |
|---|---|---|---|---|---|---|---|---|---|
| ID No. | Type | | | Name | Citation | | | | |
| HRSG-3 | EU | 60KKKK-1 | $NO_x$ | 40 CFR Part 60, Subpart KKKK | § 60.4305 The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart KKKK |
| HRSG-4 | EU | 60KKKK-1 | $NO_x$ | 40 CFR Part 60, Subpart KKKK | § 60.4305 The permit holder shall comply with the applicable limitation, standard and/or equipment specification requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable monitoring and testing requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable recordkeeping requirements of 40 CFR Part 60, Subpart KKKK | The permit holder shall comply with the applicable reporting requirements of 40 CFR Part 60, Subpart KKKK |

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## CAM Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-1 | |
| Control Device ID No.: SCR1 | Control Device Type: Selective Catalytic Reduction (SCR) |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart GG | SOP Index No.: 60GG-1 |
| Pollutant: $NO_X$ | Main Standard: § 60.332(a)(1) |
| **MONITORING INFORMATION** | |
| Indicator: Nitrogen Oxides Concentration | |
| Minimum Frequency: four times per hour | |
| Averaging Period: one hour | |
| Deviation Limit: Maximum NOx concentration = 5 ppmvd (@ 15% oxygen) | |
| CAM Text: Use a continuous emission monitoring system (CEMS) to measure and record the concentration of nitrogen oxides and either oxygen or carbon dioxide in the exhaust stream of the control device. The CEMS shall be operated in accordance with the monitoring requirements of 40 CFR § 60.13 and the performance specifications of 40 CFR Part 60, Appendix B. NOx Emissions shall be corrected/calculated in units of the underlying applicable emission limitation (grams per horsepower-hour, pounds per MMBtu, pounds per hour). | |

## CAM Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-2 | |
| Control Device ID No.: SCR2 | Control Device Type: Selective Catalytic Reduction (SCR) |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart GG | SOP Index No.: 60GG-1 |
| Pollutant: $NO_x$ | Main Standard: § 60.332(a)(1) |
| **MONITORING INFORMATION** | |
| Indicator: Nitrogen Oxides Concentration | |
| Minimum Frequency: four times per hour | |
| Averaging Period: one hour | |
| Deviation Limit: Maximum NOx concentration = 5 ppmvd (@ 15% oxygen) | |
| CAM Text: Use a continuous emission monitoring system (CEMS) to measure and record the concentration of nitrogen oxides and either oxygen or carbon dioxide in the exhaust stream of the control device. The CEMS shall be operated in accordance with the monitoring requirements of 40 CFR § 60.13 and the performance specifications of 40 CFR Part 60, Appendix B. $NO_x$ Emissions shall be corrected/calculated in units of the underlying applicable emission limitation (grams per horsepower-hour, pounds per MMBtu, pounds per hour). | |

## Periodic Monitoring Summary

| UNIT/GROUP/PROCESS INFORMATION | |
|---|---|
| ID No.: HRSG-1, HRSG-2, HRSG-3, HRSG-4 | |
| Control Device ID No.: N/A | Control Device Type: N/A |
| **APPLICABLE REGULATORY REQUIREMENT** | |
| Name: 40 CFR Part 60, Subpart Da | SOP Index No.: 60DA-1, 60DA-2 |
| Pollutant: PM, PM(Opacity) | Main Standard: § 60.42Da(a)(1), § 60.42Da(b) |
| **MONITORING INFORMATION** | |
| Indicator: Fuel Type | |
| Minimum Frequency: N/A | |
| Averaging Period: N/A | |
| Deviation Limit: Fuel usage limited to pipeline-quality natural gas containing no more than 2.0 grains total sulfur per 100 dscf | |
| Periodic Monitoring Text: Record the type of fuel used by the unit. If an alternate fuel is fired, either alone or in combination with the specified gas, it shall be considered and reported as a deviation. | |

## Permit Shield

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## Permit Shield

The Executive Director of the TCEQ has determined that the permit holder is not required to comply with the specific regulation(s) identified for each emission unit, group, or process in this table.

| Unit/Group/Process | | Regulation | Basis of Determination |
|---|---|---|---|
| ID No. | Group/Inclusive Units | | |
| CP-2 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| CT-2 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| CV-1 | N/A | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| DG-1 | N/A | 40 CFR Part 60, Subpart IIII | Generator engine constructed prior to 7/11/2005 |
| FWP-1 | N/A | 40 CFR Part 60, Subpart IIII | Fire water pump engine constructed prior to 7/11/2005 |
| GRP-CTV | CTV-1, CTV-10, CTV-2, CTV-3, CTV-4, CTV-5, CTV-6, CTV-7, CTV-8, CTV-9 | 40 CFR Part 63, Subpart Q | Site is not a major source, and chromium-based chemicals have not and will not be used in cooling towers at the site. |
| HRSG-1 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-1 | N/A | 40 CFR Part 60, Subpart Db | Facility is subject to NSPS Da and therefore is not subject to NSPS Db. |
| HRSG-1 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-1 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |
| HRSG-2 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-2 | N/A | 40 CFR Part 60, Subpart Db | Facility is subject to NSPS Da and therfore is not subject to NSPS Db. |
| HRSG-2 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-2 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |

## Permit Shield

The Executive Director of the TCEQ has determined that the permit holder is not required to comply with the specific regulation(s) identified for each emission unit, group, or process in this table.

| Unit/Group/Process | | Regulation | Basis of Determination |
|---|---|---|---|
| ID No. | Group/Inclusive Units | | |
| HRSG-3 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-3 | N/A | 40 CFR Part 60, Subpart Db | Source is subject to Subpart Da |
| HRSG-3 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-3 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |
| HRSG-4 | N/A | 40 CFR Part 60, Subpart D | Steam generating unit is > 250 MMBTU/hr and constructed after June 19, 1986 and thus is not subject to NSPS D per TCEQ Rule Interpretation Memo 60D.004. |
| HRSG-4 | N/A | 40 CFR Part 60, Subpart Db | Source is subject to Subpart Da |
| HRSG-4 | N/A | 40 CFR Part 63, Subpart B | Site is not a major source of HAP and, as such, MACT B is not applicable. |
| HRSG-4 | N/A | 40 CFR Part 63, Subpart YYYY | Site is not a major source of HAP and, as such, MACT YYYY is not applicable. |

## New Source Review Authorization References

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## New Source Review Authorization References

The New Source Review authorizations listed in the table below are applicable requirements under 30 TAC Chapter 122 and enforceable under this operating permit.

| PSD Permits | NA Permits |
|---|---|
| PSD Permit No.: PSDTX1026 | NA Permit No.: N/A |
| PSD Permit No.: PSDTX1117 | NA Permit No.: N/A |
| **Title 30 TAC Chapter 116 Permits, Special Permits, and Other Authorizations (Other Than Permits By Rule, PSD Permits, or NA Permits) for the Application Area** | |
| Authorization No.: 52756 | Authorization No.: 83801 |
| **Permits By Rule (30 TAC Chapter 106) for the Application Area** | |
| Number: 106.263 | Version No./Date: 11/01/2001 |
| **Municipal Solid Waste and Industrial Hazardous Waste Permits With an Air Addendum** | |
| Permit No.: N/A | Permit No.: N/A |

## New Source Review Authorization References by Emissions Unit

The following is a list of New Source Review (NSR) authorizations for emission units listed elsewhere in this operating permit. The NSR authorizations are applicable requirements under 30 TAC Chapter 122 and enforceable under this operating permit.

| Unit/Group/Process ID No. | Emission Unit Name /Description | New Source Review Authorization |
|---|---|---|
| B-1 | Aux Boiler 1 | 52756, PSDTX1026 |
| B-2 | Aux Boiler 2 | 83801, PSDTX1117 |
| CP-2 | Chiller No. 2 Cooling Tower Vents | 83801, PSDTX1117 |
| CT-2 | Cooling Tower No. 2 Vents | 83801, PSDTX1117 |
| CTV-10 | Cooling Tower Vent #10 | 52756, PSDTX1026 |
| CTV-1 | Cooling Tower Vent #1 | 52756, PSDTX1026 |
| CTV-2 | Cooling Tower Vent #2 | 52756, PSDTX1026 |
| CTV-3 | Cooling Tower Vent #3 | 52756, PSDTX1026 |
| CTV-4 | Cooling Tower Vent #4 | 52756, PSDTX1026 |
| CTV-5 | Cooling Tower Vent #5 | 52756, PSDTX1026 |
| CTV-6 | Cooling Tower Vent #6 | 52756, PSDTX1026 |
| CTV-7 | Cooling Tower Vent #7 | 52756, PSDTX1026 |
| CTV-8 | Cooling Tower Vent #8 | 52756, PSDTX1026 |
| CTV-9 | Cooling Tower Vent #9 | 52756, PSDTX1026 |
| CV-1 | Chiller Unit 1 | 52756, PSDTX1026 |
| DG-1 | Diesel Generator Engine 1 | 52756, PSDTX1026 |
| DG-2 | Emergency Diesel Generator Engine 2 | 83801, PSDTX1117 |
| FWP-1 | Diesel Fire Water Pump Engine | 52756, PSDTX1026 |
| HRSG-1 | Turbine/Duct Burner 1 | 52756, PSDTX1026 |
| HRSG-2 | Turbine/Duct Burner 2 | 52756, PSDTX1026 |
| HRSG-3 | Combined Cycle Turbine/Duct Burner 3 | 83801, PSDTX1117 |
| HRSG-4 | Combined Cycle Turbine/Duct Burner 4 | 83801, PSDTX1117 |

## APPENDIX A

Acronym List.....38

## Acronym List

The following abbreviations or acronyms may be used in this permit:

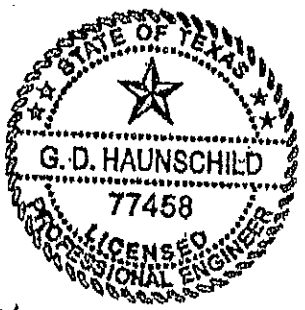
| | |
|---|---|
| ACFM | actual cubic feet per minute |
| AMOC | alternate means of control |
| ARP | Acid Rain Program |
| ASTM | American Society of Testing and Materials |
| B/PA | Beaumont/Port Arthur (nonattainment area) |
| CAM | Compliance Assurance Monitoring |
| CD | control device |
| COMS | continuous opacity monitoring system |
| CVS | closed-vent system |
| D/FW | Dallas/Fort Worth (nonattainment area) |
| DR | Designated Representative |
| ElP | El Paso (nonattainment area) |
| EP | emission point |
| EPA | U.S. Environmental Protection Agency |
| EU | emission unit |
| FCAA Amendments | Federal Clean Air Act Amendments |
| FOP | federal operating permit |
| GF | grandfathered |
| gr/100 scf | grains per 100 standard cubic feet |
| HAP | hazardous air pollutant |
| H/G | Houston/Galveston (nonattainment area) |
| $H_2S$ | hydrogen sulfide |
| ID No. | identification number |
| lb/hr | pound(s) per hour |
| MMBtu/hr | Million British thermal units per hour |
| MRRT | monitoring, recordkeeping, reporting, and testing |
| NA | nonattainment |
| N/A | not applicable |
| NADB | National Allowance Data Base |
| $NO_x$ | nitrogen oxides |
| NSPS | New Source Performance Standard (40 CFR Part 60) |
| NSR | New Source Review |
| ORIS | Office of Regulatory Information Systems |
| Pb | lead |
| PBR | Permit By Rule |
| PM | particulate matter |
| ppmv | parts per million by volume |
| PSD | prevention of significant deterioration |
| RO | Responsible Official |
| $SO_2$ | sulfur dioxide |
| TSP | total suspended particulate |
| TVP | true vapor pressure |
| U.S.C. | United States Code |
| VOC | Volatile organic compound |

# ATTACHMENT D

# BRAZOS ELECTRIC POWER COOPERATIVE, INC
# JACK COUNTY GENERATION FACILITY
# JACKSBORO, TEXAS
# CN600128821
# RN100221985
# ACCOUNT NO. JA-0068-E

## POWER PLANT EXPANSION PROJECT
## PSD/NSR AIR PERMIT APPLICATION

*Prepared for:*
Brazos Electric Power Cooperative, Inc.
2404 LaSalle Avenue
Waco, Texas 76702-2585




Gregory D. Haunschild, Registration No. 77458
Professional Engineer Name, License Number, Signature, Seal

January 2008

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# 1 Introduction

Brazos Electric Power Cooperative, Inc. (BEC) is submitting a PSD air permit application to the Texas Commission of Environmental Quality (TCEQ) for a permit to expand the existing Jack County Generation Facility. The existing BEC facility is permitted by the TCEQ under Permit No. 52756 and PSD-TX-1026.

The existing Jack County Generation Facility is authorized to operate the following primary sources:

- Two GE Combustion Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-1 and HRSG-2);
- One Gas-Fired Auxiliary Steam Boiler (B-1);
- One Diesel Generator Engine (DG-1);
- One Diesel Fire Water Pump Engine (FWP-1);
- One Cooling Tower (CT-1);
- One Chiller (CV1-CV16)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

BEC is now proposing to expand the power plant by installing two additional gas-fired combined cycle combustion turbines with duct burners (HRSG-3 and HRSG-4). The GE turbines are equipped with DLN technology and an SCR unit to reduce NOx emissions. The turbine generators are capable of generating 171.7 MW ISO under base load conditions. The steam turbine generator is rated for nominal 320 MW. The plant expansion project power generating capacity is approximately 663 MW.

As part of this plant expansion BEC is installing the following new sources:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

The TCEQ is the regulatory authority responsible for reviewing the application and issuing the preconstruction air quality permit. The existing power plant is currently

authorized under PSD (PSD-TX-1026) and NSR 52756 air permits. BEC is requesting a new PSD permit for the plant expansion.

The principal contact and applicant for the proposed permit is:

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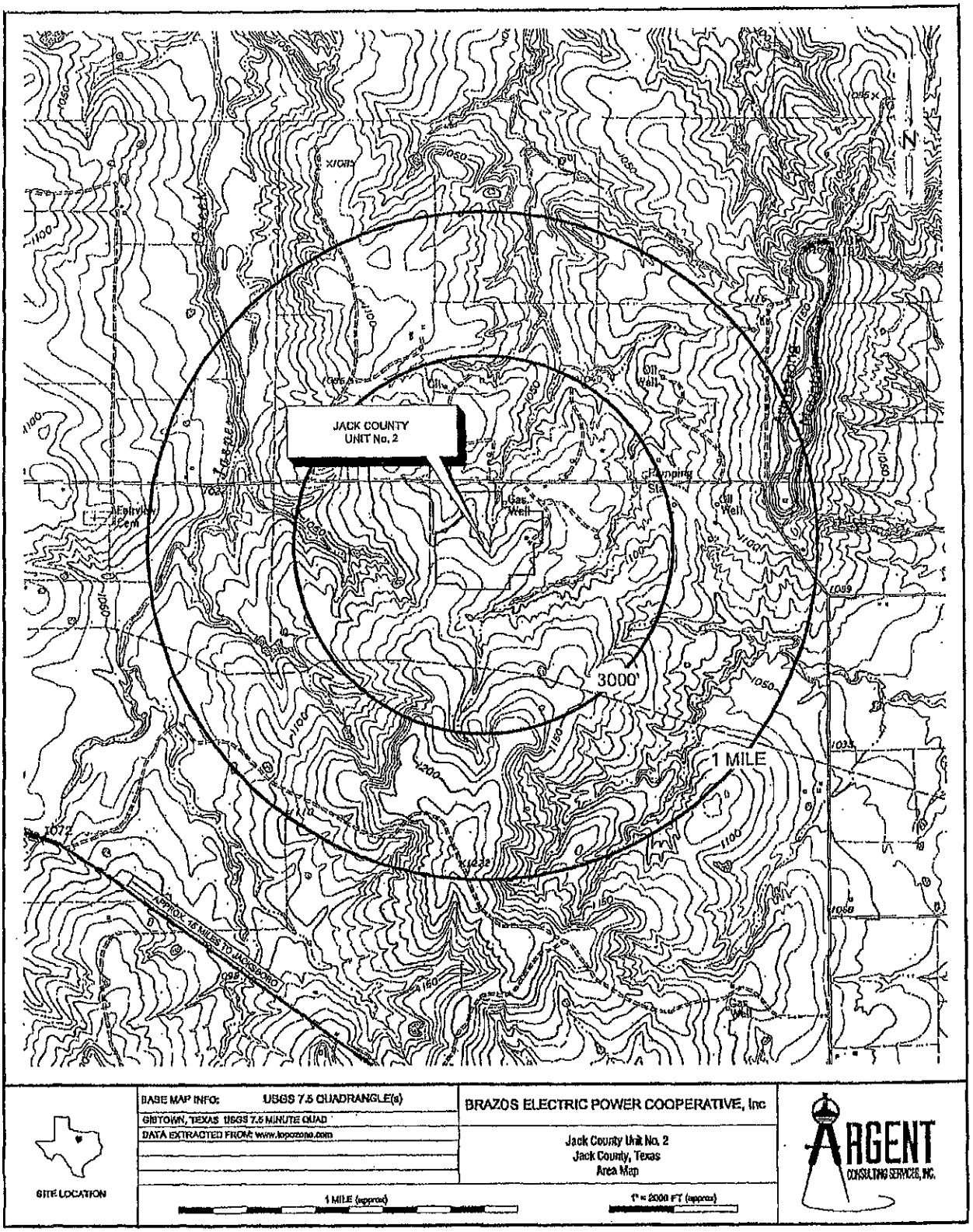
# 2 AREA MAPS AND PLOT PLAN

The following area maps, plot plans and diagrams show the location of the site and detail the layout of the site.

- Figure 2-1: Site Area Map
- Figure 2-2: Aerial Photograph of Site
- Figure 2-3: Facility Plot Plan
- Figure 2-4: Facility Process Flow Diagram

Figures 2-1 and 2-2 show the location of the facility in relation to the surrounding area. Figure 2-3 shows the entire facility, and identifies the key structures and emission sources at the proposed facility. Figure 2-4 provides a process flow diagram for the facility after the proposed expansion.




SITE LOCATION

BASE MAP INFO: USGS 7.5 QUADRANGLE(s)

GIBTOWN, TEXAS USGS 7.5 MINUTE QUAD

DATA EXTRACTED FROM: www.topozone.com

1 MILE (approx)

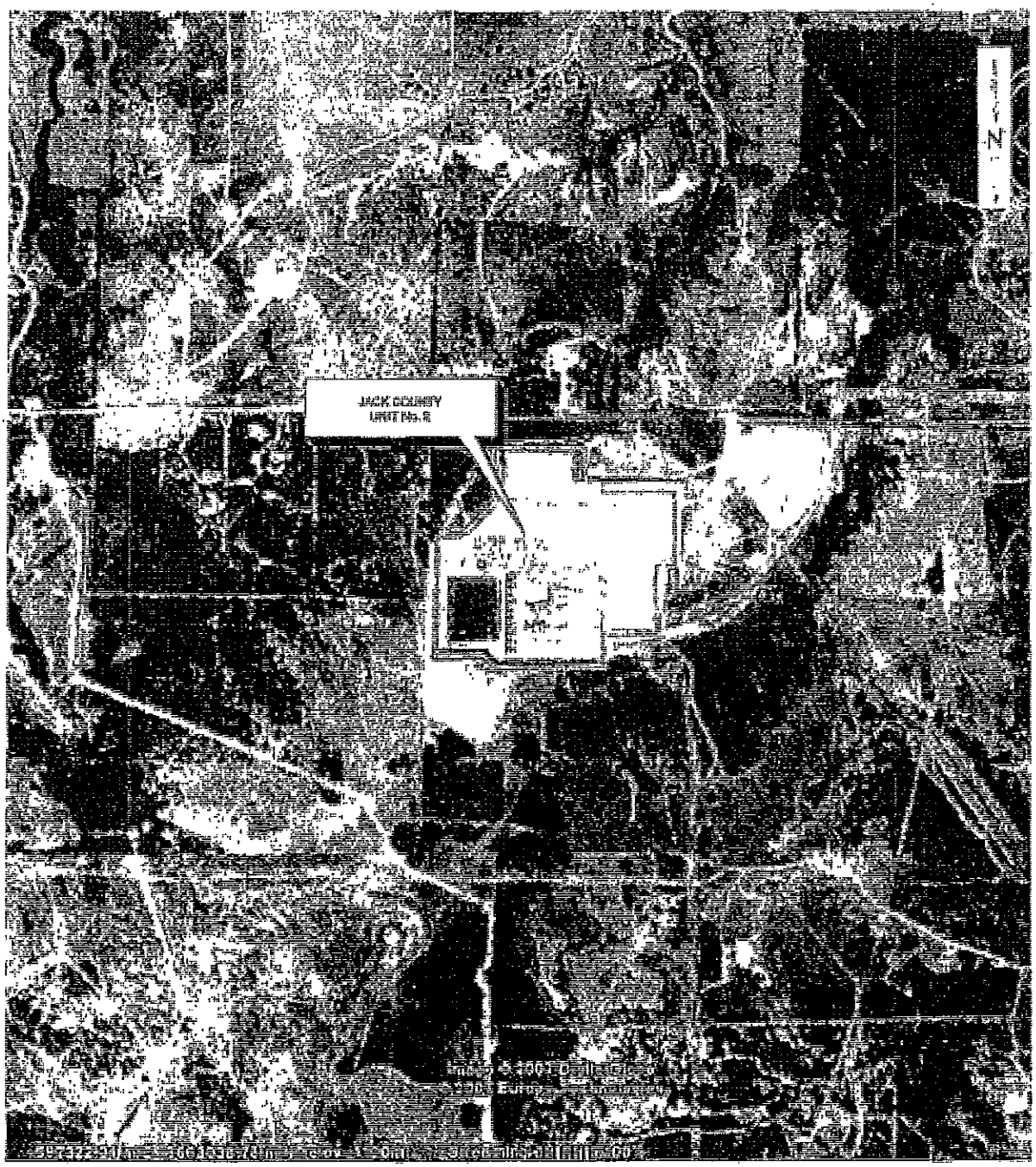
1" = 2000 FT (approx)

BRAZOS ELECTRIC POWER COOPERATIVE, Inc

Jack County Unit No. 2
Jack County, Texas
Area Map

ARGENT CONSULTING SERVICES, INC.

Figure 2-2: Aerial Photograph of Site




SITE LOCATION

AERIAL PHOTO INFO:

EXTRACTED FROM: Google Earth

1/2 MILE (approx)

BRAZOS ELECTRIC POWER COOPERATIVE, Inc

Jack County Unit No. 2
Jack County, Texas
Aerial Photo

1" = 1000 FT (approx)

AGENT CONSULTING SERVICES, INC.

Figure 2-3: Facility Plot Plan

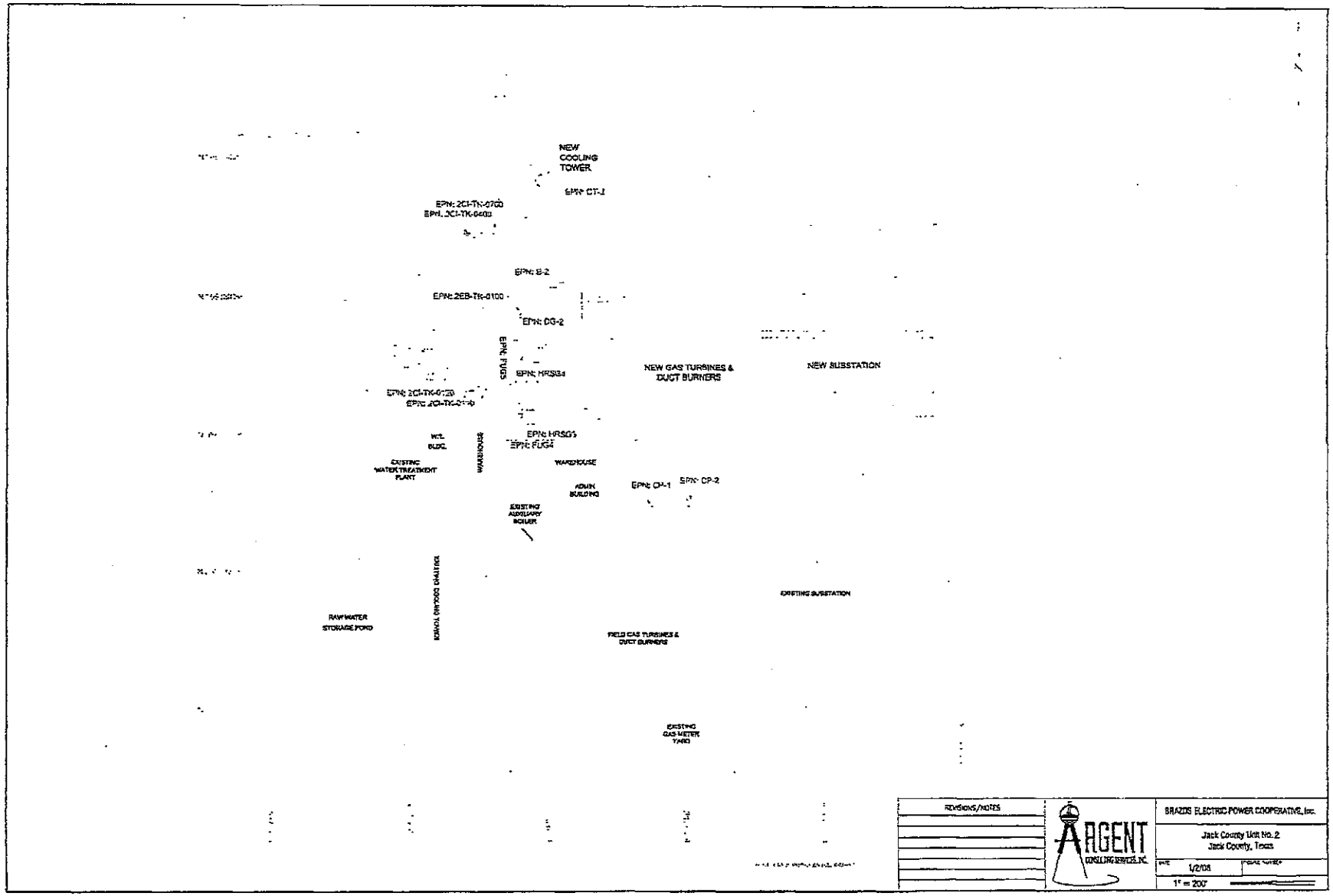
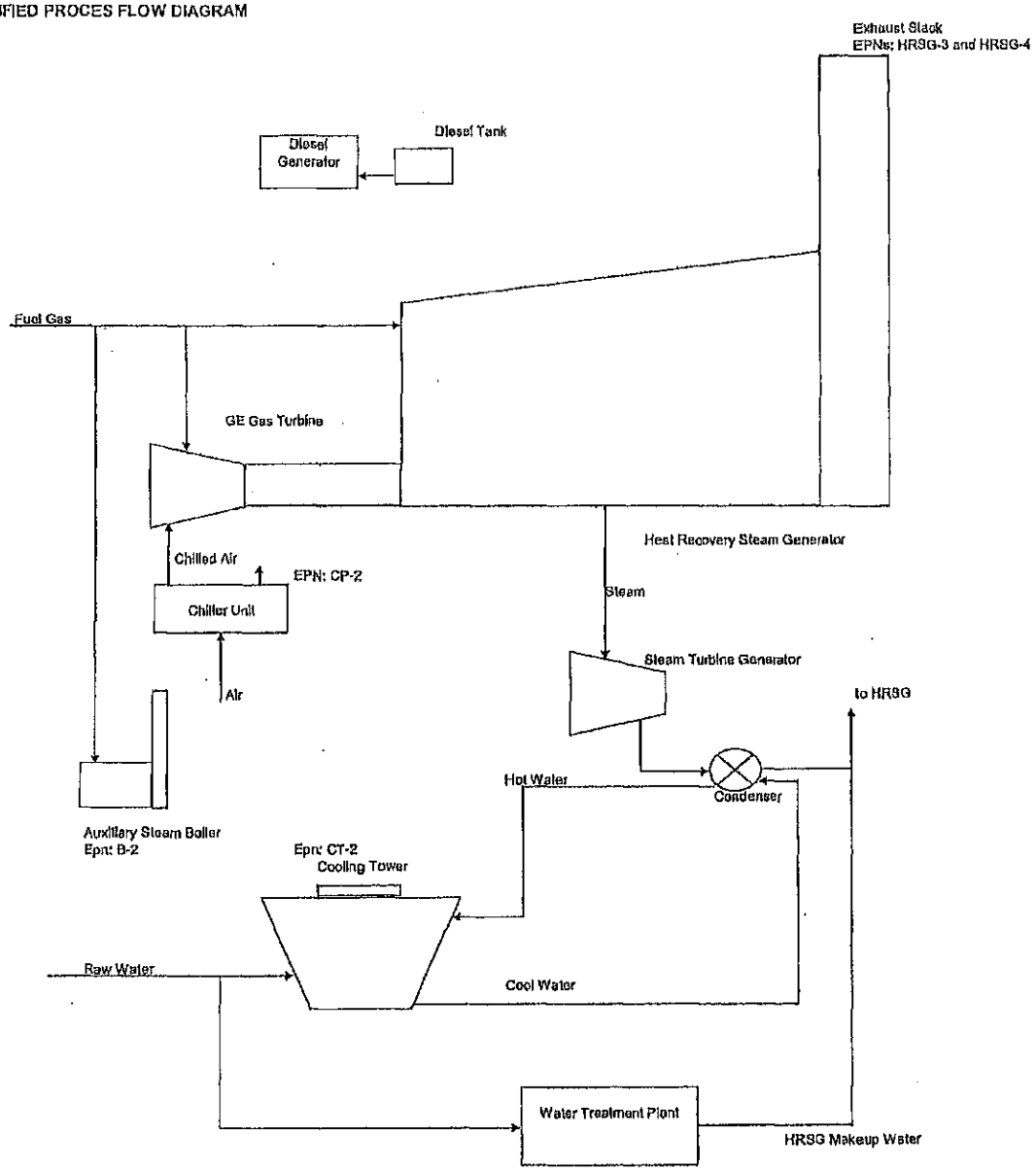

NEW COOLING TOWER
EPN: CT-2
EPN: 2CI-TK-0700
EPN: 2CI-TK-0400
EPN: S-2
EPN: 2EB-TK-0100
EPN: DG-2
EPN: FUGS
EPN: HRSG4
NEW GAS TURBINES & DUCT BURNERS
NEW SUBSTATION
EPN: 2CI-TK-0120
EPN: 2CI-TK-0110
WTL BLDG.
WAREHOUSE
EPN: HRSG3
EPN: FUG4
EXISTING WATER TREATMENT PLANT
WAREHOUSE
ADMIN BUILDING
EPN: CP-1
EPN: CP-2
EXISTING AUXILIARY BOILER
EXISTING SUBSTATION
RAW WATER STORAGE POND
FIELD GAS TURBINES & DUCT BURNERS
EXISTING GAS METER YARD
REVISIONS/NOTES
AGENT CONSULTING SERVICES, INC.
BRAZOS ELECTRIC POWER COOPERATIVE, Inc.
Jack County Unit No. 2
Jack County, Texas
DATE 1/2/08
1" = 200'

Figure 2-4: Facility Process Flow Diagram

BRAZOS ELECTRIC COOPERATIVE, INC.
JACK COUNTY GENERATION FACILITY
EXPANSION PROJECT

SIMPLIFIED PROCES FLOW DIAGRAM



# 3 PROJECT OVERVIEW

## 3.1 Facility Location and Regional Attainment Status

The Jack County Generation Facility is located in Jack County approximately 15 miles southeast of Jacksboro. Currently, Jack County is classified as an attainment area for all criteria pollutants [sulfur oxides, measured as sulfur dioxide ($SO_2$); particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers ($PM_{10}$); particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$); carbon monoxide (CO); ozone ($O_3$); nitrogen dioxide ($NO_2$); and lead (Pb)].

## 3.2 Process Description

The Jack County Generation Facility is an existing 620 MW combined cycle power plant equipped with gas turbines, duct burners, and steam generator. BEC is proposing to expand the power plant by installing an additional nominal 663.4 MW of generating capacity.

The plant expansion will include two 171.7 MW General Electric 7FA-class natural gas fired combustion turbines (CTG) operating in combined-cycle mode with two supplementary fired heat recovery steam generators (HRSGs) and a reheat condensing steam turbine generator (STG). Steam generation in the HRSGs is augmented steam with supplementary natural gas-firing using duct burners. Each HRSG will produce high pressure steam for introduction into a steam turbine. The steam turbine will drive generators to increase the total plant output to approximately 510 MW without duct firing, or 663 MW with duct firing and inlet air chilling.

BEC will use combined cycle power generation technology to maximize generation efficiency and minimize fuel use. Efficient natural gas combustion combined with dry low-NOx technology and selective catalytic reduction (SCR) will minimize air pollutant emissions. Combined cycle technology is 50% more thermally efficient that vintage steam-electric plants. Since combined cycle plants burn less fossil fuel to generate an equivalent amount of power, they also emit substantially less air pollutants, including CO2.

Like the existing plant the expansion project will combine the Brayton and Rankine cycles to maximize thermal efficiency. Natural gas will be combusted in two Brayton cycle turbines, which will generate most of the electrical output. Instead of being discarded to the environment, the exhaust heat will be recovered in a Rankine cycle HRSG/steam turbine, and the heat will be extracted until the exhaust temperature is about 200 °F before being discarded through the stacks. This high-efficiency technology

combined with clean natural gas and BACT will yield a small fraction of air emissions compared to a conventional power plant.

Under the existing air permit BEC is authorized to operate the following equipment and emission sources:

- Two GE Combustion Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-1 and HRSG-2);
- One Gas-Fired Auxiliary Steam Boiler (B-1);
- One Diesel Generator Engine (DG-1);
- One Diesel Fire Water Pump Engine (FWP-1);
- One Cooling Tower (CT-1);
- One Chiller (CV1-CV16)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

The proposed expansion project will consist of the following new sources:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

### 3.2.1 Gas Turbine/HRSG Power Generators

BEC is proposing to install two 171.7 MW ISO General Electric 7FA gas turbines in combined cycle mode with duct-fired HRSGs and a common steam turbine generator (total 663 MW). The fuel will be exclusively pipeline quality natural gas. Each gas turbine power block will include an advanced combustion turbine, including an air compressor section, gas combustion system (utilizing advanced DLN combustors), power turbine, and a 60-hertz, 18 kilovolt (kV) generator.

Exhaust gas exiting the power turbine at approximately 1,100°F is ducted to a fired boiler commonly known as a heat recovery steam generator where steam is produced to generate additional electricity in a steam turbine generator. Natural gas fired duct burners located within the HRSGs are used for supplementary firing to increase steam output.

The combustion turbines are designed to operate in the dry low-NOx mode at loads from 50% up to base load rating and will normally be taken out of service only for scheduled maintenance, or as dictated by economic or electrical demand conditions.

A horizontal, natural circulation, three-pressure HRSG system will extract heat from the exhaust of each gas turbine. Exhaust gas entering the HRSG at approximately 1100°F will be cooled to approximately 200°F by the time it leaves the HRSG exhaust stack. Steam production in the HRSGs will be augmented using "low-NOx" duct burners that will be natural gas fired. The steam produced is used in the combined cycle plant for additional power and natural gas/feedwater heating. Each HRSG will include a high-pressure superheater, high-pressure evaporator, high-pressure economizer, reheat section, intermediate pressure superheater, intermediate pressure evaporator, intermediate pressure economizer, low pressure superheater, low pressure evaporator, and condensate/feedwater preheater. The surface condenser uses cooling tower water to condense the steam exhausting from the steam turbine.

### 3.2.2 Auxiliary Steam Boiler

A 36.6 MMBtu/hr nominally rated (at 105% load) package boiler will be located on site to supply heating steam for the steam turbine seals and for sparging of the HRSG steam drums during down periods. The boiler will be a fire-tube type and combust natural gas only. Make-up water will be received from the demineralizer system that feeds the auxiliary boiler deaerator.

The primary use of the auxiliary boiler will be to provide heat such that temperatures are elevated within the HRSG and steam turbine while the combustion turbines are off-line. By maintaining elevated temperatures in the turbine seals, piping, and HRSGs, the CTGs will be able to minimize the amount of startup time required to come back on line after a shut down. The steam from the auxiliary boiler will not be used to augment power generation of the CTGs or the steam turbine. BEC is proposing to limit the auxiliary boiler annual capacity factor to 20%. This limit effectively caps annual operating hours to no more than 1,752 hours per year if the boiler is operated at maximum capacity. By limiting the annual capacity factor rather than operating hours BEC can operate the boiler at lower loads while still establishing an emission cap based on an equivalent 1,752 hours/year.

### 3.2.3 Standby Generator Engine

A small 400 kW (600-hp) back-up diesel generator will be located on site. The back-up generator will provide power for turning gears, lube oil pumps and auxiliary cooling water pumps. BEC is proposing to limit operating hours to no more than 150 hours/year of non-emergency operations.

The final diesel engine selection has not been finalized but current plans are for a Cummins model or equivalent. BEC will insure that the final engine selection meets the emission requirements of 40 CFR 60 Subpart IIII for Tier 2 or Tier 3 engines.

### 3.2.4 Storage Tanks

BEC will install storage tanks for diesel fuel and for water treatment chemicals (caustics, acids, etc.). The only new volatile organic liquid tank is the diesel tank supporting the emergency generator engine.

### 3.2.5 Fuel Gas System

Pipeline quality natural gas will be delivered to the plant boundary at a pressure sufficient for use in the combustion turbines without additional fuel compression. The gas will be heated, if necessary, using hot water from the HRSGs.

Natural gas enters the plant through an existing meter skid that is already sized to handle the additional gas flow. The gas passes through a knockout drum for removal of any liquid which may have been carried through the pipeline. The gas is split into streams to supply each CTG/HRSG unit. The gas then passes through a series of filters and separator to remove particulate matter and entrained liquids.

### 3.2.6 Cooling Tower

A new cooling tower will be installed as part of the planned electric generating facility. The majority of the cooling water will be used in the surface condenser to absorb the heat rejected from the combined cycle. Water from the cooling tower is commonly referred to as "main" cooling water. A dedicated set of cooling water pumps is provided for this service. Additional cooling water will be required for auxiliary plant cooling. Cooling tower water is not used for direct cooling of plant auxiliaries; a closed loop auxiliary cooling system consisting of pumps, expansion tank, and heat exchangers is provided. Cooling tower water is circulated through a set of plate and frame heat exchangers to cool the closed loop coolant, usually a glycol/water mix. This is commonly referred to as "auxiliary" cooling water.

The cooling tower is designed to evaporate clean water, which is the mechanism that provides cooling. Some small droplets (referred to as drift) escape from the top of the tower and may liberate dissolved solids as they evaporate in the atmosphere.

### 3.2.7 Chillers

The turbines will employ an inlet chilling system to enhance the overall power output that would normally be lost due to lower air density at higher ambient temperatures. The process of cooling takes place at the cooling coils where inlet air is cooled before entering the CTG compressor. At lower temperatures, the air becomes denser and therefore more mass flows through the CTGs. The net increase in mass flow results in higher gross output for each of the CTGs. In addition to the output enhancement from the CTGs, the additional mass flow also increases output of the STG.

### 3.2.8 Buildings and Infrastructure

The following buildings will be constructed on site:

- Warehouse/Maintenance Building;
- Turbine Enclosures;
- Electrical Substation Buildings; and
- Standby Generator Shelter.

Access roads will be provided for operation, maintenance, and fire and emergency vehicles.

## 3.3 Emission Generating Equipment

Emission generating equipment at the expanded facility will consist of:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

### 3.3.1 Gas Turbine/HRSG Power Generators

The primary emissions sources for this project will be the two combustion turbines. The manufacturer (General Electric) provided hourly emission rates of criteria pollutants from the combustion turbines. Stack concentrations that result from these emission rates when combined with duct burning were determined by the project contractor with input from GE and the HRSG manufacturer. The NOx emissions were adjusted to account for the control effectiveness of the SCR system. Emissions of SO2 were calculated using expected turbine operational data and the maximum assumed sulfur content (2 gr/100 scf) of the pipeline quality natural gas.

Maximum hourly emission rates for each pollutant were established after reviewing the provided vendor data over the range of potential ambient temperatures and proposed operating loads. Annual emissions were based on the highest hourly emission rate over the proposed operating range and assuming both turbines would be operated continuously. These emissions do not include start-up and shut-down operations. BEC is proposing the following emissions rates for the CTG/HRSG units:

| Pollutant | lb/hr | tpy | Project (tpy) |
|---|---|---|---|
| NOx | 43.61 | 191.01 | 382.02 |
| CO | 58.72 | 257.19 | 514.39 |
| TSP/PM10 | 13.65 | 59.79 | 119.57 |
| SO2 | 13.01 | 14.25 | 28.50 |
| VOC | 5.36 | 23.48 | 46.95 |
| NH3 | 22.60 | 98.99 | 197.98 |

BEC is permitting these units as based load generators, not peaking units. BEC intends to normally operate the CTG/HRSG units no lower than a 50% load factor. However, there may be short periods when an extended down turn below 50% is necessary due to factors beyond the control of BEC. BEC proposes to include the following permit condition:

- Reduced load operation below 50 percent of base load not associated with start-up, shutdown, upset, or maintenance is authorized, provided that the $NO_x$ and CO maximum pounds per hour (lb/hr) emission rates for $NO_x$ and CO specified in the MAERT are not exceeded.

This condition will allow for low load (<50%) operations for short periods without having to shutdown the units for economic dispatch. The proposed permit condition insures that the mass emission rates for these contaminants are not exceeded while allowing BEC the flexibility to respond to market conditions in a cost efficient manner.

### 3.3.2 Auxiliary Steam Boiler

The project will utilize a 36.6 MMBtu/hr (HHV at 105% load) gas-fired auxiliary boiler to maintain minimal steam flow when the turbines are not in operation. Maximum emission rate factors for the boiler unit were provided by the manufacturer. The auxiliary boiler does not operate continuously. However, to maintain maximum flexibility BEC proposes to limit the annual capacity factor rather than a specific hourly limit in the permit.

| | |
|---|---|
| Max Rating: | 36.6 MMBtu/hr |
| Fuel Heat: | 1,020 Btu/scf (HHV) |
| Max Fuel Consumption: | 314.33 MMscf/yr |
| Limited Fuel Consumption: | 62.87 MMscf/yr |
| Annual Capacity Factor: | 20% |

BEC proposes to limit the annual capacity factor of the auxiliary boiler to 20%. This allows for approximately 1752 hours of operation annually at full load. Detailed emission calculations are included in this application.

### 3.3.3 Standby Diesel Generator

The plant expansion will include a single 400 kW diesel engine backup generator engine. New compression ignition engines are subject to the recently promulgated NSPS Subpart IIII regulation which cites Tier 2 and Tier 3 emission limits. The emission rates represented in this application are the Tier 3 limits. BEC is proposing to limit annual operating hours to 150 hours per year which will allow for up to 100 hours for maintenance and testing, plus an additional 50 hours for other operational requirements.

### 3.3.4 Storage Tanks

There are three (3) storage tanks included in the expansion project which store VOC or a regulated pollutant. These include a small diesel tank for the generator, an aqueous ammonia tank for the SCR system, and a sulfuric acid tank for the water treatment plant. The ammonia tank is pressurized with the only associated emissions resulting from fugitives.

EPA's Tank 4.1 was used to estimate emissions from the diesel tank and the sulfuric acid tank. Emissions from two additional inorganic liquids tanks are also included.

### 3.3.5 Fuel Gas System (Fugitives)

The main fugitive emission source is equipment (valves, flanges, etc.) leaks from the fuel handling system, a potential source of VOC. Emissions from these sources were estimated using TCEQ approved Oil and Gas factors and an estimated component count.

Fugitive emissions from the ammonia handling system were calculated in the same manner as VOC except that TCEQ approved SOCMI w/o ethylene factors were used.

### 3.3.6 Cooling Tower

The process cooling tower will be a source of $PM_{10}$ emissions. The emissions from the cooling tower are dependent upon several factors: (1) the dissolved solids content of the circulating water, and (2) the amount of drift that leaves the tower. The dissolved solids content of the circulating water is dependent on the quality of the makeup water and the average number of cycles the water is allowed to circulate before being discharge through the blowdown system. The amount of drift is dependent on the tower design.

The method used to estimate particulate matter emissions is based on the approach presented by the EPA AP-42 Section 13. Using the cooling tower preliminary design characteristics and a drift rate of 0.001%, the total particulate emissions from the tower can be calculated. Once the total PM is calculated it is necessary to estimate the portion of total PM that is $PM_{10}$.

**$PM_{10}$ Estimation Methodology**

The EPA AP-42 Section 13 contains a factor for estimating $PM_{10}$ emissions as a portion of total PM. However, the EPA indicates that this factor is overly conservative which results in an overestimation of $PM_{10}$. Therefore, BEC is utilizing a more detailed method for estimating these emissions. The method and support data is contained in a paper entitled, "Calculating PM10 Emissions from Cooling Towers." The paper is included in the cooling tower emission calculation section of this application.

*Basis*

Each water droplet that leaves the cooling tower can be assumed to liberate solid particulate upon evaporation of the water in the droplet. Based on this assumption, the mass of solids (dissolved and suspended) in the droplet must equal the mass of solids in the final particle.

From the reference paper the following formula can be used to calculate the diameter of the final particle upon evaporation of the water:

$$D_p = D_d \times [(P_d/P_p) \times (Solids \times C) / 1{,}000{,}000]^{1/3}$$

Where

| | |
|---|---|
| $D_p$ = | diameter of final particulate |
| $P_p$ = | density of the final particle |
| $D_d$ = | diameter of the droplet |
| $P_d$ = | density of the droplet |
| Solids = | total solids (suspended and dissolved) |
| C = | cycles of concentration |

The mass fraction of droplets that will form particulates 10 microns (PM10) and smaller can be estimated for a given droplet size distribution using the above approach. Specifically, the particle size ($D_p$) is calculated using the above equation for each droplet size for a given distribution. The mass fraction of droplets corresponding to 10 micron particles and small is then summed.

Detailed cooling tower emissions are included in this application.

### 3.3.7 Chillers

The turbine inlet chillers will be a source of $PM_{10}$ emissions. The operating principle behind the chiller units is similar to the cooling tower. Therefore, the emission calculation methodology described for the cooling tower are used for the chillers and adjusted only for the smaller water recirculation rates.

Detailed chiller emissions are included in this application.

# 4 REGULATORY OVERVIEW

The Jack County Generation Facility is subject to federal, state, and local regulations governing the construction of new facilities. The lead agency for all air permitting in Texas is the TCEQ, which implements all of its own regulations and incorporates United States Environmental Protection Agency (EPA) regulatory requirements into its own program.

For regulatory review purposes, emission sources associated with the proposed Jack County Generation Facility expansion will include the following:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

BEC will comply with all federal, state and local air quality control requirements. The following sections describe the applicable federal and state air quality control regulations associated with the construction and operation of the expanded Jack County Generation Facility. No local regulations were identified.

## 4.1 Federal Air Quality Regulations

The Clean Air Act (CAA) of 1970, 42 USC 7401 et seq. amended in 1977 and 1990 and 40 CFR Parts 50-99 are the basic federal statutes and regulations governing air pollution. The following federal requirements have been reviewed to determine their applicability to the proposed Jack County Generation Facility expansion.

### 4.1.1 New Source Review (NSR)

Separate pre-construction review procedures have been established for projects that are proposed to be built in attainment areas versus nonattainment areas. The pre-construction review process for new or modified major sources located in attainment areas is called New Source Review, and may include a Prevention of Significant Deterioration (PSD) review. This review process is intended to keep new air emission sources from causing existing air quality to deteriorate beyond acceptable levels codified in the Federal regulations.

#### 4.1.1.1 Prevention of Significant Deterioration (PSD)

The emission threshold for "major stationary sources" varies under PSD according to the type of facility. As defined by 40 CFR Part 52.21(b)(1)(i), a facility is considered major under PSD if it has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. The Jack County Generation Facility process was permitted to authorize fossil fuel fired boilers totaling more than 250 MMBtu/hr, which are a specified source category. Therefore, the PSD threshold for this facility is 100 tpy. The proposed facility expansion emissions will be above the PSD thresholds for three criteria air pollutants: NOx, CO, and $PM_{10}$. Therefore, the facility expansion must be authorized under the PSD permitting requirements.

For new major sources, PSD applicability is based upon the definition of "major" as found in the PSD rules at 40 CFR §§51.165(v), 51.166(2), and 52.21. A PSD looks at proposed increases in emissions of more pollutants (all criteria pollutants and some others) but the increase resulting from the project must be more than an allowable level of increase called "PSD significance levels". The definition is limited in that a "major" source must lead to a net increase in air emissions above PSD significance levels.

**PSD SIGNIFICANCE LEVELS**

| Pollutant | Rate (tpy) |
|---|---|
| PM10 | 15 |
| TSP | 25 |
| SO2 | 40 |
| NOX | 40 |
| VOC (ozone) | 40 |
| CO | 100 |
| Pb | 0.6 |

The proposed expansion project will result in the PSD significance levels being exceeded for NOx, CO, VOC and $PM_{10}$.

One of the factors considered in the PSD permit review process is potential impacts on protected Class I airsheds located throughout the country. Class I areas are specifically designated as pristine wilderness areas. The Project will not be located in a Class I area, nor will it be located within 100 kilometers of a Class I area, therefore a full Class I analysis will not be required to be included in the permit application. The closest Class I area to the project site is the Caney Creek Wilderness Area located approximately 300 kilometers east of the Project site.

Another factor considered in the PSD permit review is the potential impact of facility emissions on soil and vegetation and visibility. An additional impacts analysis addressing these factors will be submitted under separate cover as a part of the ambient air quality dispersion modeling impacts analysis.

#### 4.1.1.2 Nonattainment New Source Review (NNSR)

The federal pre-construction review for a new or modified major source located in a nonattainment area is commonly called Nonattainment New Source Review (NNSR). NNSR only applies to major sources of the pollutants that are classified as nonattainment; therefore a new facility could potentially undergo both types of review, depending on the emissions of the various pollutants and their respective attainment status. Jack County is classified as an attainment area for all criteria pollutants; therefore, the facility will not be subject to NNSR requirements.

### 4.1.2 Title V Operating Permit

The Title V Permit program, as described in 40 CFR Part 70, requires major sources of air emissions to obtain federal operating permits. In Texas, authority to issue Title V operating permits has been delegated, by the United States Environmental Protection Agency (EPA), to the TCEQ. The major source threshold levels for determining the need for a Title V operating permit are: 100 tpy of any criteria air pollutant, 10 tpy of any individual hazardous air pollutant (HAP) or 25 tpy of any combination of HAPs. Emissions of several criteria pollutants from the facility exceed 100 tpy; therefore, a Title V Operating Permit is required for this facility. The existing Jack County Generation Facility is operating under a Title V permit – BEC will modify the operating permit to include the new applicable requirements for the expanded facility by the deadline stipulated in 30 TAC 122.

### 4.1.3 New Source Performance Standards (NSPS)

40 CFR Part 60 establishes new source performance standards (NSPS) for specific emission sources. The following NSPS requirements were identified as potentially applicable to the specified sources at the facility.

40 CFR Part 60 Subpart Db: Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. Subpart Db lists affected emission sources as fuel fired steam-generating units with a heat input capacity of 100 MMBTU/hr to 250 MMBTU/hr. The definition of an applicable unit includes sources that produce steam or that heat water or any other heat transfer medium. The HRSG units are each rated in excess of 250 MMBtu/hr, therefore, these units are potentially subject to the requirements of Subpart Db. However, the new NSPS Subpart KKKK standard affects duct burners used in combined cycle systems. Therefore, the duct burners will comply with these standards.

40 CFR Part 60 Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. Subpart Dc lists affected emission sources is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr). The auxiliary boiler is rated in excess of 10 MMBtu/hr and is subject to the requirements of Subpart

Dc. Since this source will fire natural gas exclusively only recordkeeping and reporting requirements will apply.

40 CFR Part 60 Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels. Subpart Kb lists affected emission sources as storage vessels containing volatile organic liquids with regulatory applicability being dependent on the construction date of the storage vessel, the capacity, and the material stored. The expanded facility will have a single diesel fuel tank to support the generator engine. The diesel tank will not exceed 75 m3 (19,815 gallons) and are therefore not subject to this rule. This rule does not apply to inorganic storage tanks.

40 CFR 60 Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) as specified in the regulation. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. The expanded Jack County Generation Facility will be equipped with an additional diesel engine to drive a standby generator. BEC will insure that this source complies with all applicable requirements of this regulation.

40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines. Subpart KKKK establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that have a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel and that commenced construction, modification or reconstruction after February 18, 2005. The expanded Jack County Generation Facility will be equipped with two gas turbines that meet this qualification criteria. This subpart also applies to emissions from any associated HRSG and duct burners.

### 4.1.4 National Emissions Standards for Hazardous Air Pollutants (NESHAP)

40 CFR Part 61 contains the Federal emission standards that have been developed to address certain individual HAPs. The individual HAP rules are typically referred to as the national emission standards for hazardous air pollutants or NESHAP. The Jack County Generation Facility will not emit any of the individual HAPs included in the NESHAP rules; therefore the NESHAP regulations do not apply to this facility.

### 4.1.5 Maximum Achievable Control Technology (MACT) Standards

40 CFR Part 63, as incorporated by reference in TAC 113, contains the Federal emission standards that have been developed to address HAP emissions from a variety of source categories. The source category rules, commonly referred to as the MACT standards, apply to facilities that are classified as major sources of HAPs, and operate affected equipment as listed in each standard. A facility is a major source of HAPs if it emits any individual HAP in excess of 10 tpy or a combination of HAPs in excess of 25 tpy. The facility will not be a major source of HAPs, therefore the MACT standards do not apply.

### 4.1.6 Acid Rain Standards

40 CFR Part 70-75 contains the Federal emission standards that have been developed to address acid rain emissions from specified sources. BEC already complies with the acid rain program for the existing power generating facility. The expanded portion of the plant will be incorporated into the acid program as well. BEC will file the proper documents with the EPA and acquire an acid rain permit through the Texas federal operating permit program.

### 4.1.7 Clean Air Interstate Rule (CAIR)

40 CFR Part 96 contains the Federal emission standards that have been developed to address NOx and SO2 emissions from specified sources in the electric power generation category. BEC already complies with the CAIR program for the existing power generating facility. The expanded portion of the plant will be incorporated into the CAIR program as well. BEC will file the proper documents with the EPA and acquire a CAIR permit through the Texas federal operating permit program.

### 4.1.8 Risk Management Program

40 CFR Part 68, Chemical Accident Prevention Provisions, is a federal regulation designed to prevent the release of hazardous materials in the event of an accident and minimize impacts when releases do occur. The regulation contains a list of substances and threshold quantities for determining applicability of the rule to a facility. If a facility stores, handles, or processes one or more substances on this list and at a quantity equal to or greater than specified in the regulation, the facility must prepare and submit a risk management plan (RMP).

If a facility does not have a listed substance on site, or the quantity of a listed substance is below the applicability threshold, the facility does not have to prepare an RMP. However, it must still comply with requirements of the general duty provisions in Section 112(r)(1) of the 1990 Clean Air Act Amendments if it has any regulated substance or other extremely hazardous substance on-site.

The general duty provision is as follows:

*"The owners and operators of stationary sources producing, processing, handling and storing such substances have a general duty ... to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur."*

With the exception of natural gas constituents (e.g., methane, ethane, propane, etc.), no regulated substance will be handled or stored in quantities greater than the applicability threshold. Natural gas pipelines are not covered if the U.S. Department of Transportation (DOT) or an equivalent state natural gas program certified by DOT in accordance with 49 CFR §6010.5 regulates the pipeline.

The Jack County Generation Facility will not have on site any flammable or toxic materials that trigger the RMP rule. BEC will only store aqueous ammonia in solutions less than 20%.

## 4.2 State Air Quality Regulations

The TCEQ air permitting requirements are codified in the Texas Administrative Code (TAC) Title 30, Part I. These rules incorporate the federal program requirements listed in 40 CFR Parts 50-99, and establish permit review procedures for all facilities that can emit pollutants to the ambient air. All new facilities are required to obtain an air quality permit prior to initiating construction. Facilities can trigger additional review by EPA if emissions exceed the major source thresholds listed in 40 CFR §52.21. The proposed project will exceed these thresholds; therefore, EPA will be reviewing the permit application and TCEQ's proposed permit to ensure all federal program requirements are met.

The TCEQ has codified the federal PSD requirements in TAC 116.160. As indicated the emission threshold for a "major stationary source" varies under PSD according to the type of facility. As defined in 40 CFR 52, a facility is considered major under PSD if it emits or has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. There is more than 250 MMBtu/hr of fossil fuel fired boilers on-site; therefore, the PSD threshold for this facility is 100 tpy. The permitted facility emissions will exceed the 100 tpy threshold for NOx, CO and PM10; therefore the facility is a PSD major source and must be permitted under the PSD requirements.

The remainder of this section provides the information necessary to show the Jack County Generation Facility will comply with the requirements in TAC 30:I. The emissions and plant operations from the proposed new facility will comply with all rules and regulations of TCEQ and with the intent of the Texas Clean Air Act (TCAA), including the protection of the health and physical property of the people. A summary discussion on compliance with each applicable rule is included below.

### 4.2.1 Chapter 101 – General Air Quality Rules

Chapter 101 includes the general rules that are applicable to all sources. BEC will comply with the applicable requirements of this chapter. Some of the potentially applicable sections within this chapter are:

**§101.10 – Emission Inventory**
Specified sources are required to submit an annual emissions inventory to TCEQ. BEC will comply with this requirement.

**§101.24 – Inspection Fee**
Specified sources are required to submit an annual inspection fee to the TCEQ. BEC will comply with this requirement.

**§101.27 – Emissions Fee**
Specified sources are required to submit an annual emissions fee to the TCEQ. BEC will comply with this requirement.

**§101.201 – Emission Events**
This rule defines procedures to use in the event of an emission event resulting in an unauthorized emission. BEC will comply with these requirements.

**§101.211 – Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping Requirements**
This rule defines procedures to use in the event of a scheduled MSS event resulting in an unauthorized emission. BEC will comply with these requirements.

BEC will comply with all applicable requirements of this chapter.

### 4.2.2 Chapter 111 – Control of Visible Emissions and Particulate Matter

The potentially applicable sections within this chapter are:

**§111.111 – Requirements for Specified Sources**
This rule defines visible emission standards for specified sources. BEC will comply with these standards.

**§111.115 – Allowable Emission Limits**
This rule defines particulate matter emission standards for specified sources. BEC will comply with these standards.

### 4.2.3 Chapter 112 – Control of Emissions of Sulfur Compounds

The potentially applicable sections within this chapter are:

**§112.3 – Net Ground Level Concentrations**
The will not cause ground level concentrations of SO2 to exceed 0.4 ppmv averaged over any 30-minute period. The primary sources will fire sweet natural gas exclusively. Therefore, this standard will not be exceeded.

### 4.2.4 Chapter 113 – Standards of Performance for HAP (MACT)

This rule incorporates by reference applicable MACT regulations for which the EPA has delegated authority to the TCEQ. The Jack County Generation Facility will not be a major source of HAP emissions. Therefore, none of the potentially applicable MACT standards are applicable to this project.

### 4.2.5 Chapter 115 – Emission Standards for VOC

This rule establishes standards for a variety of VOC sources in specific geographic locations (i.e. nonattainment and covered attainment areas). Jack County is not a nonattainment area or a covered attainment area. Therefore, no Chapter 115 standards are currently applicable to sources at this account.

### 4.2.6 Chapter 117 – Control of Emissions of NOx

This rule establishes standards for a variety of NOx sources in specific geographic locations. Jack County is not a nonattainment area. Therefore, the requirements of Subchapter C are not applicable to sources at this account. Jack County is not located in the geographic area defined as East and Central Texas. Therefore, the requirements of Subchapter E are not applicable to sources at this account

### 4.2.7 Chapter 118 – Episodes

If the TCEQ declares a Level 1 or 2 emission episode that encompasses the Jack County Generation Facility BEC will strive to reduce emissions for the duration of the episode. An emission reduction plan is not required for sources located in Jack County.

### 4.2.8 Chapter 122 – Federal Operating Permits

The TCEQ implements the requirements of 40 CFR 70 through this chapter. The existing Jack County Generation Facility is already authorized by a FOP. BEC will revise this permit to include the applicable requirements for the expanded plant as well as obtaining both Acid Rain and CAIR permits.

# 5 EMISSIONS INVENTORY

This section provides a summary of emission rates for the proposed Jack County Generation Facility after completion of the proposed expansion project.

## 5.1 Operating Scenarios

Potential operations include both CTG/HRSG units operating 100% of the time, for 8760 hours per year. BEC will operate these sources from base load down to 50% load. BEC is seeking authorization to operate at lower loads (<50%) for short periods but will meet the short-term (lb/hr) mass emission rate limits of the permit. Potential operations for the standby diesel generator engine will be limited to 150 hours per year. The auxiliary steam boiler will operate with a limited annual capacity factor of 20%.

## 5.2 Criteria Pollutant Emissions

The following section summarizes the methodology used to determine potential emissions from the proposed Jack County Generation Facility, and estimates for criteria pollutants emitted from all operations.

### 5.2.1 Determination of Potential Emissions

#### 5.2.1.1 Turbine Generator/HRSG

The engineering contractor provided operating parameters and emission rates for the CTG/HRSG under different operating loads over a wide ambient temperature range. As would be expected worst-case emissions occur at lower ambient conditions.

Emissions of formaldehyde from the gas turbine were estimated using a factor obtained from the EPA MACT website. This factor represents the maximum formaldehyde emission rate records for a GE 7F unit. Recent formaldehyde testing by BEC for the existing GE turbines indicated formaldehyde emissions were below detectible limits.

Emissions of SO2 from the combined CTG/HRSG were estimated based on maximum fuel flow and a range of fuel gas sulfur content. Maximum short-term SO2 emissions were based on 2 grains total sulfur per 100 scf. Annual SO2 emissions were based on 0.5 grains total sulfur per 100 scf.

Emissions of H2SO4 were estimated assuming 10% of the SO2 emitted was actually H2SO4. BEC did not reduce the estimated SO2 emissions by 10% to be conservative. The 10% assumption was obtained from GE information.

Potential CTG/HRSG emission calculations are included in Appendix A.

# APPENDIX A – TCEQ FORMS

# Texas Commission on Environmental Quality
# Form PI-1 General Application for
# Air Preconstruction Permit and Amendments

Update: The TCEQ requires that a Core Data Form be submitted on all incoming applications unless a Regulated Entity and Customer Reference Number has been issued by the TCEQ and no core data information has changed. For more information regarding the Core Data Form, call (512) 239-5175 or go to the TCEQ Web site at www.tceq.state.tx.us/permitting/central_registry/guidance.html.

| I. APPLICANT INFORMATION | | | |
|---|---|---|---|
| A. Company or Other Legal Name: Brazos Electric Power Cooperative, Inc. | | | |
| Texas Secretary of State Charter/Registration Number (If Applicable): 17405247291 | | | |
| B. Company Official Contact Name: David Murphy, PE | | | Title: Vice President Generation |
| Mailing Address: P.O. Box 2585 | | | |
| City: Waco | State: TX | | Zip Code: 76702-2585 |
| Telephone No: 254 750 6213 | Fax No.: 254 750 6292 | | E-mail Address: dmurphy@brazoselectric.com |
| C. Technical Contact Name: Troy Cannon | | | Title: Operations Superintendent |
| Mailing Address: 3844 Henderson Ranch Road | | | |
| City: Bridgeport | State: TX | | Zip Code: 76426 |
| Telephone No.: 940 374 3022 | Fax No.: 940 374 3145 | | E-mail Address: tcannon@brazoselectric.com |
| D. Facility Location Information: | | | |
| Street Address: 3844 Henderson Ranch Road | | | |
| If no street address, provide clear driving directions to the site in writing: | | | |
| | | | |
| City: Bridgeport | County: Jack | | Zip Code: 76426 |
| E. TCEQ Account Identification Number (leave blank if new site or facility): | | | |
| F. Is a TCEQ Core Data Form (TCEQ Form #10400) attached? | | | ☐ YES ☑ NO |
| G. TCEQ Customer Reference Number *(leave blank if unknown)*: CN600128821 | | | |
| H. TCEQ Regulated Entity Number *(leave blank if unknown)*: RN100221985 | | | |
| **II. IMPORTANT GENERAL INFORMATION** | | | |
| A. Is confidential information submitted with this application? | | | ☐ YES ☑ NO |
| If "YES," is each "confidential" page marked "CONFIDENTIAL" in large red letters? | | | ☐ YES ☐ NO |
| B. Is this application in response to a TCEQ investigation or enforcement action? | | | ☐ YES ☑ NO |
| If "YES", attach a copy of any correspondence from the TCEQ | | | |
| C. Number of New Jobs: 0 | | | |
| D. Names of the State Senator and district number for this facility site: Craig Estes: District 30 | | | |
| Names of State Representative and district number for this facility site: Rick Hardcastle: District 68 | | | |
| E. For Concrete Batch Plants, name of the County Judge for this facility site: | | | |
| Mailing Address: | | | |
| City: | State: | | Zip Code: |
| F. For Concrete Batch Plants, is the facility located in a municipality or an extraterritorial jurisdiction of a municipality? If "YES," list the name(s) of the Presiding Officer(s) for this facility site: | | | ☐ YES ☐ NO |
| Mailing Address: | | | |
| City: | State: | | Zip Code: |

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| | | |
|---|---|---|
| **III. FACILITY AND SOURCE INFORMATION** | | |
| A. Site Name: Jack County Generation Facility II | | |
| B. Area Name/Type of Facility: Electric Power Plant | | ☑ PERMANENT ☐ PORTABLE |
| C. Principal Company Product or Business: Electric Power | Primary Standard Industrial Classification Code: 4911 | |
| D. Projected Start of Construction Date: January 2009 | Projected Start of Operation Date: April 2010 | |
| **IV. TYPE OF PERMIT ACTION REQUESTED** | | |
| A. Permit Number *(if existing)*: | | |
| B. Is this an initial permit application? | | ☑ YES ☐ NO |
| If "YES," check the type of permit requested *(check all that apply)*: | | |
| ☐ State Permit | ☐ Nonattainment Federal Permit | |
| ☐ Flexible Permit | ☑ Prevention of Significant Deterioration Federal Permit | |
| ☐ Multiple Plant Permit | ☐ Hazardous Air Pollutants Permit Federal Clean Air Act § 112(g) | |
| Other: | | |
| C. Is this a permit amendment? | | ☐ YES ☑ NO |
| If "YES," check the type of permit requested *(check all that apply)*: | | |
| ☐ State Permit Amendment | ☐ Nonattainment Major Modification | |
| ☐ Flexible Permit Amendment | ☐ Prevention of Significant Deterioration Major Modification | |
| ☐ Multiple Plant Permit Amendment | ☐ Hazardous Air Pollutants Permit Federal Clean Air Act § 112(g) Modification | |
| Other: | | |
| Is a permit renewal application being submitted in conjunction with this amendment in accordance with Senate Bill 1673? [THSC 382.055(a)(2)](80th Leg) | | ☐ YES ☑ NO |
| D. Is this application for a change in location of previously permitted facilities? If "YES," answer D. 1. and D. 2. | | ☐ YES ☑ NO |
| 1. Current location of facility. | | |
| Street Address *(If no street address, provide clear driving directions to the site in writing.)*: | | |
| City: | County: | Zip Code: |
| 2. Will the proposed facility, site and plot plan meet all current technical requirements of the permit special conditions? | | ☐ YES ☐ NO |
| If "NO," attach detailed information. | | |
| E. Are there any standard permits, exemptions or permits by rule to be consolidated into this permit? | | ☐ YES ☑ NO |
| F. Are you permitting a facility or group of facilities that have planned maintenance, startup and shutdown emissions that cannot be authorized by a permit by rule or standard permit or that are authorized by a permit by rule or standard permit and are being rolled into this permit If "YES," attach information on any changes to emissions under this application as specified in Section VIII. And Section IXX. If "YES," answer F. 1 through F. 3. | | ☑ YES ☐ NO |

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| | |
|---|---|
| **IV. TYPE OF PERMIT ACTION REQUESTED *(continued)*** | |
| 1. Are the activities to be included in this permit covered by any previously existing MSS authorizations? If "YES," provide a listing of all other authorizations (permit by rule or standard permit and the associated registration number if any). | ☐ YES ☑ NO |
| 2. Have the emissions been previously submitted as part of an emissions inventory? | ☐ YES ☑ NO |
| 3. List which years the MSS activities were included in emissions inventory submittals: | |
| G. Is this facility located at a site required to obtain a federal operating permit under 30 TAC Chapter 122? If "NO," go to Section V. | ☑ YES ☐ NO |
| 1. Is a site operating permit (SOP) or general operating permit (GOP) review pending for this source, area, or site? | ☐ YES ☑ NO |
| 2. Is and SOP or GOP issued for this source, area, or site? | ☑ YES ☐ NO |
| 3. List SOP or GOP number(s): O-2169 | |
| **V. PERMIT FEE INFORMATION** | |
| A. Fee paid for this application: | $ 75,000 |
| B. Is a copy of the check or money order attached to the original submittal of this application? | ☑ YES ☐ NO ☐ N/A |
| C. Is a Table 30 entitled, "Certification of estimated Capital Cost and Fee Verification," attached? | ☑ YES ☐ NO |
| **VI. PUBLIC NOTICE APPLICABILITY** | |
| A. Is this a new permit application? | ☑ YES ☐ NO |
| B. Is this an application for a major modification of a PSD, NA or 30 TAC § 112(g) permit? | ☑ YES ☐ NO |
| C. Is this a state permit amendment application? If "YES," answer C. 1. through C. 3. | ☐ YES ☑ NO |
| 1a. Is there any change in character of emissions in this application? | ☐ YES ☐ NO |
| 1b. Is there a new air contaminant in this application? | ☐ YES ☐ NO |
| 2. Do the facilities handle, load, unload, dry, manufacture, or process grain, seed, legumes, or vegetables fibers (agricultural facilities)? | ☐ YES ☑ NO |
| 3. List the total annual emission increases associated with the application (*list all that apply*): Volatile Organic Compounds (VOC): 47.83 tpy; Particulate Matter (PM): 125.29 tpy; Sulfur Dioxide ($SO_2$): 29.26 tpy; Lead (Pb): 0 tpy; Carbon Monoxide (CO): 514.65 tpy; Nitrogen oxides ($NO_x$): 382.32 tpy; Other air contaminants not listed above: ____ tpy; List: Ammonia 197.99 tpy | |
| D. Is this a change of location application? If "YES," answer D. 1. through D. 3. | ☐ YES ☑ NO |
| 1. Is the new facility site located in or contiguous to the right-of-way of a public works project? | ☐ YES ☐ NO |
| 2. Is there a permitted facility occupying the new site? | ☐ YES ☐ NO |
| If "YES," please list the permit number: | |
| 3. Have portable facilities occupied the new site at any time in the last two years? | ☐ YES ☐ NO |

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| | | | |
|---|---|---|---|
| **VII. PUBLIC NOTICE INFORMATION** *(complete if applicable)* | | | |
| A. Responsible Person: | | | |
| Name: David Murphy, PE | | Title: Vice President Generation | |
| Mailing Address: P.O. Box 2585 | | | |
| City: Waco | State: TX | | Zip Code: 76702-2585 |
| Telephone No.: 254 750 6213 | Fax No.: 254 750 6292 | E-mail Address: dmurphy@brazoselectric.com | |
| B. Technical Contact: | | | |
| Name: Troy Cannon | | Title: Operations Superintendent | |
| Mailing Address: 3844 Henderson Ranch Road | | | |
| City: Bridgeport | State: | | Zip Code: 76426 |
| Telephone No.: 940 374 3022 | Fax No.: 940 374 3145 | E-mail Address: tcannon@brazoselectric.com | |
| C. Application in Public Place: | | | |
| Name of Public Place: Jack County Court House | | | |
| Physical Address: 100 North Main Street | City: Jacksboro | | County: Jack |
| The public place has granted authorization to place the application for public viewing and copying? | | | ☑ YES ☐ NO |
| D. Small Business Classification: | | | |
| 1. Does this company (including parent companies and subsidiary companies) have fewer than 100 employees or less than $6 million in annual gross receipts? | | | ☐ YES ☑ NO |
| 2. Is the site a major source under 30 TAC Chapter 122, Federal Operating Permit Program? | | | ☑ YES ☐ NO |
| 3. Are the site emissions of any individual air contaminant greater than 50 tpy? | | | ☑ YES ☐ NO |
| 4. Are the site emissions of all air contaminants combined greater than 75 tpy? | | | ☑ YES ☐ NO |
| E. Bilingual notice confirmation: | | | |
| Is a bilingual program required by the Texas Education Code in the School District? | | | ☑ YES ☐ NO |
| Are the children who attend either the elementary school or the middle school closest to your facility eligible to be enrolled in a bilingual program provided by the district? | | | ☑ YES ☐ NO |
| If yes, which language is required by the bilingual program? Spanish | | | |
| **VIII. TECHNICAL INFORMATION** | | | |
| A. Is a current area map attached? | | | ☑ YES ☐ NO |
| Are any schools located within 3,000 feet of this facility? | | | ☐ YES ☑ NO |
| B. Is a plot plan of the plant property attached? | | | ☑ YES ☐ NO |
| C. Is a process flow diagram and a process description attached? | | | ☑ YES ☐ NO |
| D. Maximum Operating Schedule: _____ Hours/Day 24 Days/Week 7 Weeks/Year 52 | | | |
| Seasonal Operation? If "YES," please describe: | | | ☐ YES ☑ NO |
| E. Are worst-case emissions data and calculations attached? | | | ☑ YES ☐ NO |
| 1. Is a Table 1(a) entitled, "Emission Point Summary Table," attached? | | | ☑ YES ☐ NO |
| 2. Is a Table 2 entitled, "Material Balance Table," attached? | | | ☐ YES ☑ NO |
| 3. Are equipment, process or control device tables attached? | | | ☑ YES ☐ NO |
| F. Are actual emissions for the last two years (determination federal applicability) attached? | | | ☐ YES ☑ NO |

**Texas Commission on Environmental Quality**
**Form PI-1 General Application for**
**Air Preconstruction Permit and Amendments**

| | |
|---|---|
| **IX. STATE REGULATORY REQUIREMENTS**<br>Applicants must be in compliance with all applicable state regulations to obtain a permit or amendment | |
| A. The emissions from the proposed facility will comply with all rules and regulations of the TCEQ and details are attached? | ☑ YES ☐ NO |
| B. The proposed facility will be able to measure emissions of significant air contaminants and details are attached? | ☑ YES ☐ NO |
| C. A demonstration of Best Available Control Technology (BACT) is attached? | ☑ YES ☐ NO |
| D. The proposed facilities will achieve the performance in the permit application and compliance demonstration or record keeping information is attached? | ☑ YES ☐ NO |
| E. Is atmospheric dispersion modeling attached? | ☐ YES ☑ NO |
| F. Does this application involve any air contaminants for which a "disaster review" is required? | ☐ YES ☑ NO |
| If "YES," details must be attached.<br>*Note: For a list of air contaminants for which a "disaster review" will be required, refer to the NSRPD Disaster Review Guidance Document at www.tceq.state.tx.us/permitting/air/rules/federal/63/63hmpg.html.* | |
| G. Is this facility or group of facilities located at a site within the Houston/Galveston nonattainment area? (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, or Waller Counties) | ☐ YES ☑ NO |
| Does the facility or group of facilities located at this site have an uncontrolled design capacity to emit 10 tpy or more of $NO_X$? | ☐ YES ☑ NO |
| Is this site subject to 30 TAC Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade)? | ☐ YES ☑ NO |
| Does this action make the site subject to 30 TAC Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade)? | ☐ YES ☑ NO |
| Does this action require the site to obtain additional emission allowances? | ☐ YES ☑ NO |
| **X. FEDERAL REGULATORY REQUIREMENTS**<br>**Applicants must be in compliance with all applicable federal regulations to obtain a permit or amendment.** ***If any of the following questions is answered "YES,, the application must contain detailed attachments addressing applicability, identify federal regulation Subparts, show how requirements are met, and include compliance information.*** | |
| A. Does a Title 40 Code of Federal Regulations Part 60, (40 CFR Part 60) New Source Performance Standard (NSPS) apply to a facility in this application? | ☑ YES ☐ NO |
| B. Does 40 CFR Part 61, National Emissions Standard for Hazardous Air Pollutants (NESHAP) apply to a facility in this application? | ☐ YES ☑ NO |
| C. Does a 40 CFR Part 63, Maximum Achievable Control Technology (MACT) standard apply to a facility in this application? | ☐ YES ☑ NO |
| D. Does nonattainment permitting requirements apply to this application? | ☐ YES ☑ NO |
| E. Does prevention of significant deterioration permitting requirements apply to this application? | ☑ YES ☐ NO |
| F. Does Hazardous Air Pollutant Major Source [FAA § 112(g)] requirements apply to this application? | ☐ YES ☑ NO |
| **XI. COPIES OF THIS APPLICATION** | |
| A. Has the required fee been sent separately with a copy of this Form PI-1 to the TCEQ Revenue Section? *(MC 214, P.O. Box 13088, Austin, Texas 78711).* | ☑ YES ☐ NO ☐ NA |
| B. Are the Core Data Form, Form PI-1, and all attachments being sent to the TCEQ in Austin? | ☑ YES ☐ NO |
| OPTIONAL: Has an extra copy of the Core Data Form, Form PI-1 and all attachments been sent to the TCEQ in Austin?<br>If "YES," please mark this application as "COPY". | ☑ YES ☐ NO |

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendments

| | |
|---|---|
| XI. COPIES OF THIS APPLICATION *(continued)* | |
| C. Is a copy of the Core Data Form, the Form PI-1, and all attachments being sent to the appropriate TCEQ regional office | ☑ YES ☐ NO |
| D. Is a copy of the Core Data Form, the Form PI-1, and all attachments being sent to each appropriate local air pollution control program(s)? | ☐ YES ☑ NO |
| List all local air pollution control program(s): None<br>None | |
| E. Is a copy of the Core Data Form, Form PI-1, and all attachments (without confidential information) being sent to the EPA Region 6 office in Dallas, Texas? (federal applications only) | ☑ YES ☐ NO |
| F. This facility is located within 100 kilometers of the Rio Grande River and a copy of the application was sent to the International Boundary Water Commission (IBWC): | ☐ YES ☑ NO |
| G. This facility is located within 100 kilometers of a federally-designated Class I area and a copy of the application was sent to the appropriate Federal Land Manager: | ☐ YES ☑ NO |
| XII. PROFESSIONAL ENGINEER (P.E.) SEAL | |
| Is the estimated capital cost of the project greater than $2 million dollars?<br>If "YES," the application must be submitted under the seal of a Texas licensed Professional Engineer (P.E.). | ☑ YES ☐ NO |
| XIII. DELINQUENT FEES AND PENALTIES | |
| Notice: This form will not be processed until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the "Delinquent Fee and Penalty Protocol." For more information regarding Delinquent Fees and Penalties, go to the TCEQ Web site at: www.tceq.state.tx.us/agency/delin/index.html. | |
| XIV. SIGNATURE | |
| The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7, Texas Clean Air Act (TCAA), as amended, or any of the air quality rules and regulations of the Texas Commission on Environmental Quality or any local governmental ordinance or resolution enacted pursuant to the TCAA. I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. I further state that I have read and understand TWC §§ 7.177-7.183, which defines CRIMINAL OFFENSES for certain violations, including intentionally or knowingly making or causing to be made false material statements or representations in this application, and TWC § 7.187, pertaining to CRIMINAL PENALTIES. | |
| NAME: David Murphy, PE SIGNATURE: _____ DATE: _____<br>Original Signature Required | |

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| B-2 | B-2 | Auxiliary Boiler 2 | NOx | 1.28 | 1.12 |
| | | | CO | 1.35 | 1.19 |
| | | | VOC | 0.59 | 0.51 |
| | | | PM10 | 0.37 | 0.32 |
| | | | SO2 | 0.20 | 0.04 |
| DG-2 | DG-2 | Diesel Generator Engine | NOx | 4.00 | 0.30 |
| | | | CO | 3.48 | 0.26 |
| | | | VOC | 4.00 | 0.30 |
| | | | PM10 | 0.20 | 0.02 |
| | | | SO2 | 0.80 | 0.06 |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| 2EBTK0100 | 2EBTK0100 | Diesel Tank | VOC | 0.01 | 0.02 |
| CT-2 | CT-2 | Cooling Tower 2 | TSP/PM10 | 2.67/1.26 | 11.71/5.50 |
| CP-2 | CP-2 | Chiller Package 2 | TSP/PM10 | 0.06/0.05 | 0.25/0.21 |
| FUG4 | FUG4 | Power Block 3 Fugitives | VOC | 0.07 | 0.29 |
| FUG5 | FUG5 | Power Block 4 Fugitives | VOC | 0.07 | 0.29 |
| 2CITK0700 | 2CITK0700 | Aqueous Ammonia Fugitives | NH3 | 0.01 | 0.01 |
| 2CITK0120 | 2CITK0120 | Sulfuric Acid Tank | H2SO4 | 0.01 | 0.01 |
| 2CITK0110 | 2CITK0110 | NaOH Tank | NaOH | 0.01 | 0.01 |
| 2CITK0400 | 2CITK0400 | Sodium Hypochlorite Tank | Sodium Hypochlorite | 1.56 | 0.08 |
| | | | | | |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

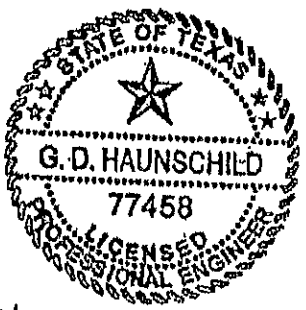
| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| HRSG-3 | CTG3 | Gas turbine and HRSG 3 | NOx | 43.61 | 191.01 |
| | HRSG3 | | CO | 58.72 | 257.19 |
| HRSG-4 | CTG4 | Gas turbine and HRSG 4 | VOC | 5.36 | 23.48 |
| | HRSG4 | | PM10 | 13.65 | 59.79 |
| | | (emissions are per unit) | SO2 | 13.31 | 14.58 |
| | | | H2S04 | 1.33 | 1.46 |
| | | | Formaldehyde | 0.16 | 0.69 |
| | | | NH3 | 22.60 | 98.99 |
| | | | | | |
| | | | | | |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# BRAZOS ELECTRIC POWER COOPERATIVE, INC
# JACK COUNTY GENERATION FACILITY
# JACKSBORO, TEXAS
# CN600128821
# RN100221985
# ACCOUNT NO. JA-0068-E

## POWER PLANT EXPANSION PROJECT
## PSD/NSR AIR PERMIT APPLICATION

*Prepared for:*
Brazos Electric Power Cooperative, Inc.
2404 LaSalle Avenue
Waco, Texas 76702-2585




Gregory D. Haunschild, Registration No. 77458 Greg Haunschild
Professional Engineer Name, License Number, Signature, Seal

January 2008

Argent Consulting Services, Inc.
11757 Katy Freeway, Suite 1000
Houston, TX 77079
(281) 759-9580

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4. Fugitives
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6. Storage Tanks

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# 1 Introduction

Brazos Electric Power Cooperative, Inc. (BEC) is submitting a PSD air permit application to the Texas Commission of Environmental Quality (TCEQ) for a permit to expand the existing Jack County Generation Facility. The existing BEC facility is permitted by the TCEQ under Permit No. 52756 and PSD-TX-1026.

The existing Jack County Generation Facility is authorized to operate the following primary sources:

- Two GE Combustion Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-1 and HRSG-2);
- One Gas-Fired Auxiliary Steam Boiler (B-1);
- One Diesel Generator Engine (DG-1);
- One Diesel Fire Water Pump Engine (FWP-1);
- One Cooling Tower (CT-1);
- One Chiller (CV1-CV16)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

BEC is now proposing to expand the power plant by installing two additional gas-fired combined cycle combustion turbines with duct burners (HRSG-3 and HRSG-4). The GE turbines are equipped with DLN technology and an SCR unit to reduce NOx emissions. The turbine generators are capable of generating 171.7 MW ISO under base load conditions. The steam turbine generator is rated for nominal 320 MW. The plant expansion project power generating capacity is approximately 663 MW.

As part of this plant expansion BEC is installing the following new sources:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

The TCEQ is the regulatory authority responsible for reviewing the application and issuing the preconstruction air quality permit. The existing power plant is currently

authorized under PSD (PSD-TX-1026) and NSR 52756 air permits. BEC is requesting a new PSD permit for the plant expansion.

The principal contact and applicant for the proposed permit is:

Mr. David Murphy, PE
Vice President Generation
Brazos Electric Power Cooperative, Inc.
P.O. Box 2585
2404 LaSalle
Waco, TX 76702-2585

Telephone: (254) 750-6213
Fax: (254) 750-6292
E-mail: dmurphy@brazoselectric.com

This document was prepared by Argent Consulting Services, Inc. under the authorization of, and in cooperation with, Brazos Electric Power Cooperative, Inc. The principal contact at Argent with primary responsibility for the preparation of this document is:

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11757 Katy Freeway, Suite 1000
Houston, TX 77057

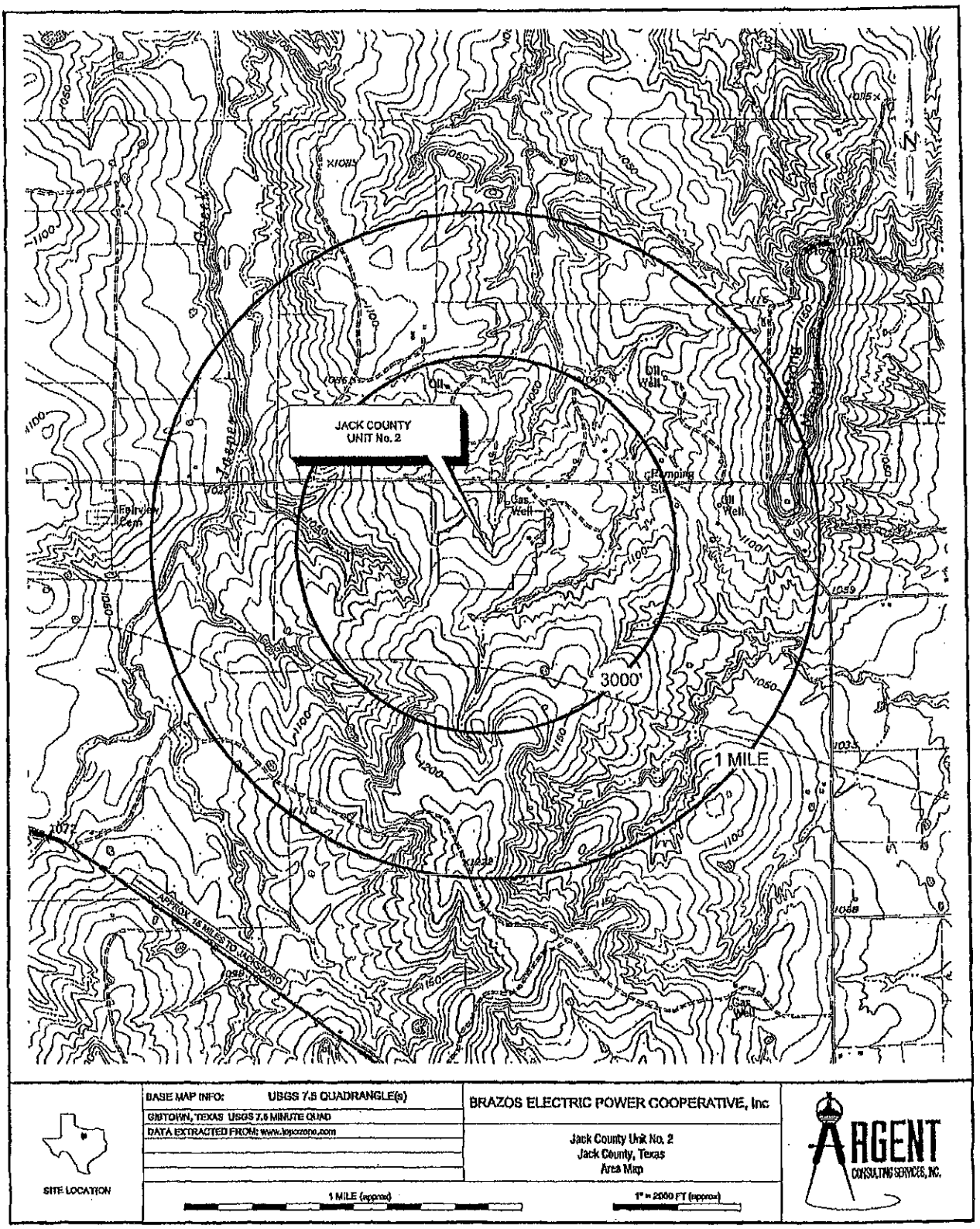
Telephone: (281) 759-9580
Fax: (281) 759-9656
E-mail: jon@argentinc.com

# 2 AREA MAPS AND PLOT PLAN

The following area maps, plot plans and diagrams show the location of the site and detail the layout of the site.

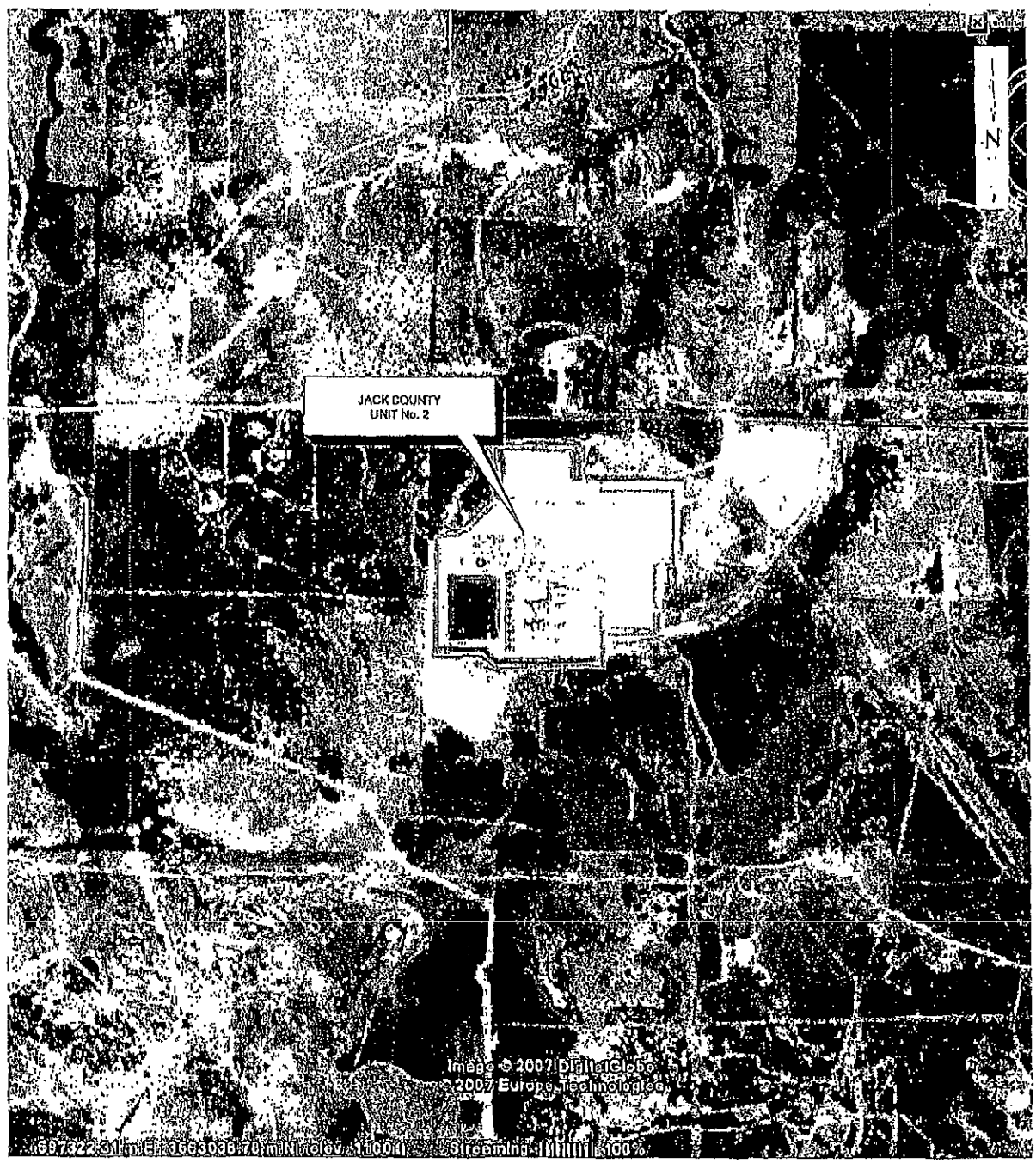
- Figure 2-1: Site Area Map
- Figure 2-2: Aerial Photograph of Site
- Figure 2-3: Facility Plot Plan
- Figure 2-4: Facility Process Flow Diagram

Figures 2-1 and 2-2 show the location of the facility in relation to the surrounding area. Figure 2-3 shows the entire facility, and identifies the key structures and emission sources at the proposed facility. Figure 2-4 provides a process flow diagram for the facility after the proposed expansion.




| | | |
|---|---|---|
| SITE LOCATION | BASE MAP INFO: USGS 7.5 QUADRANGLE(s)<br>GIBTOWN, TEXAS USGS 7.5 MINUTE QUAD<br>DATA EXTRACTED FROM: www.topozone.com | BRAZOS ELECTRIC POWER COOPERATIVE, Inc.<br>Jack County Unit No. 2<br>Jack County, Texas<br>Area Map |
| | 1 MILE (approx) — 1" = 2000 FT (approx) | ARGENT CONSULTING SERVICES, INC. |

Figure 2-2: Aerial Photograph of Site




| | | |
|---|---|---|
| SITE LOCATION | AERIAL PHOTO INFO:<br>EXTRACTED FROM: Google Earth<br>1/2 MILE (approx) | BRAZOS ELECTRIC POWER COOPERATIVE, Inc<br>Jack County Unit No. 2<br>Jack County, Texas<br>Aerial Photo<br>1" = 1000 FT (approx) |

AGENT CONSULTING SERVICES, INC.

Figure 2-3: Facility Plot Plan

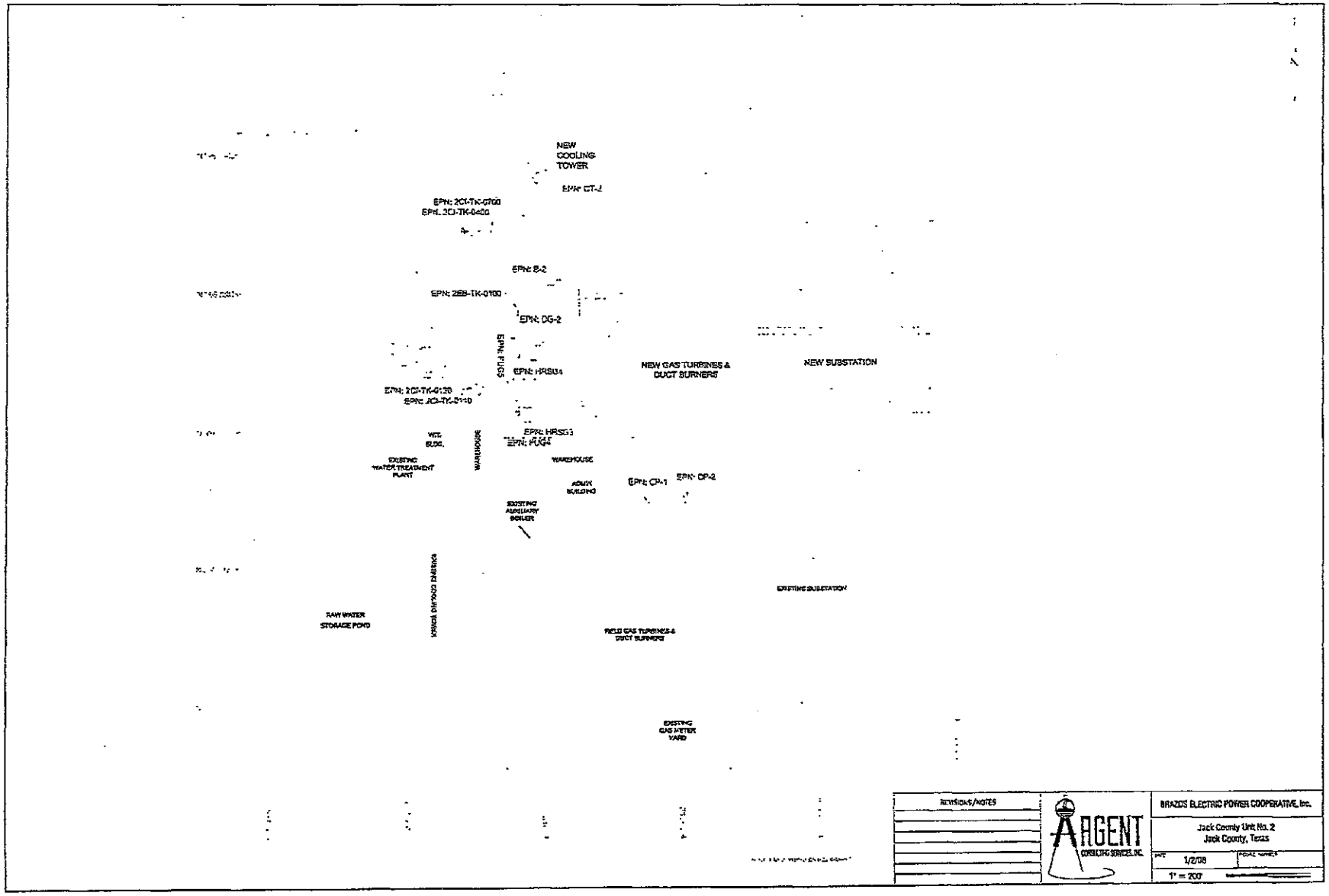
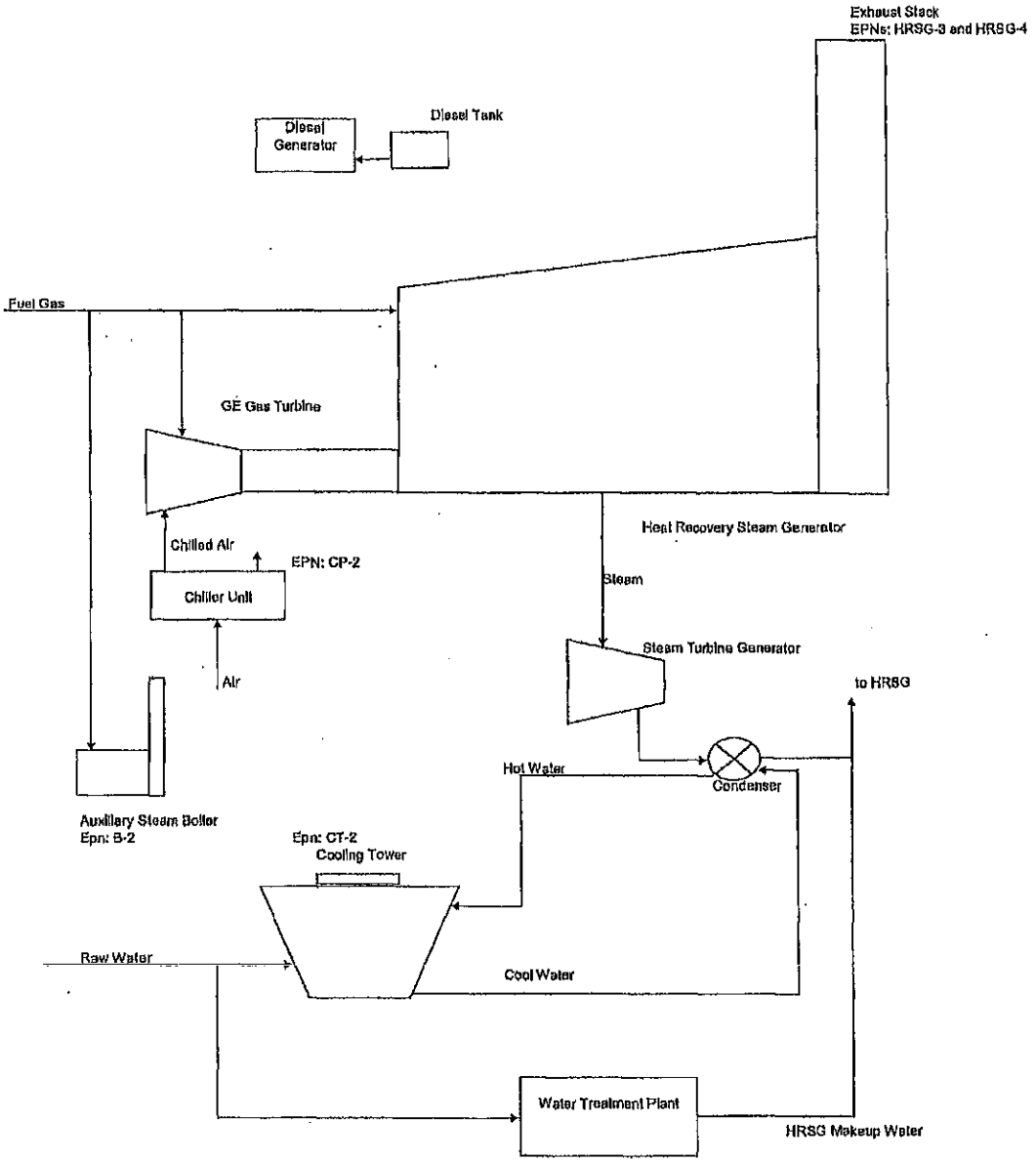

NEW COOLING TOWER
EPN: CT-2
EPN: 2CI-TK-0700
EPN: 2CI-TK-0400
EPN: B-2
EPN: 2EB-TK-0100
EPN: DG-2
EPN: FUG5
EPN: HRSG4
NEW GAS TURBINES & DUCT BURNERS
NEW SUBSTATION
EPN: 2CI-TK-0120
EPN: 2CI-TK-0110
WTC BLDG.
WAREHOUSE
EPN: HRSG3
EPN: FUG4
EXISTING WATER TREATMENT PLANT
WAREHOUSE
ADMIN BUILDING
EPN: CP-1
EPN: CP-2
EXISTING AUXILIARY BOILER
EXISTING SUBSTATION
RAW WATER STORAGE POND
EXISTING GAS METER YARD
REVISIONS/NOTES
ARGENT CONSULTING SERVICES, INC.
BRAZOS ELECTRIC POWER COOPERATIVE, Inc.
Jack County Unit No. 2
Jack County, Texas
DATE 1/2/08
SCALE 1" = 200'

Figure 2-4: Facility Process Flow Diagram

BRAZOS ELECTRIC COOPERATIVE, INC.
JACK COUNTY GENERATION FACILITY
EXPANSION PROJECT

SIMPLIFIED PROCES FLOW DIAGRAM



# 3 PROJECT OVERVIEW

## 3.1 Facility Location and Regional Attainment Status

The Jack County Generation Facility is located in Jack County approximately 15 miles southeast of Jacksboro. Currently, Jack County is classified as an attainment area for all criteria pollutants [sulfur oxides, measured as sulfur dioxide ($SO_2$); particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers ($PM_{10}$); particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$); carbon monoxide (CO); ozone ($O_3$); nitrogen dioxide ($NO_2$); and lead (Pb)].

## 3.2 Process Description

The Jack County Generation Facility is an existing 620 MW combined cycle power plant equipped with gas turbines, duct burners, and steam generator. BEC is proposing to expand the power plant by installing an additional nominal 663.4 MW of generating capacity.

The plant expansion will include two 171.7 MW General Electric 7FA-class natural gas fired combustion turbines (CTG) operating in combined-cycle mode with two supplementary fired heat recovery steam generators (HRSGs) and a reheat condensing steam turbine generator (STG). Steam generation in the HRSGs is augmented steam with supplementary natural gas-firing using duct burners. Each HRSG will produce high pressure steam for introduction into a steam turbine. The steam turbine will drive generators to increase the total plant output to approximately 510 MW without duct firing, or 663 MW with duct firing and inlet air chilling.

BEC will use combined cycle power generation technology to maximize generation efficiency and minimize fuel use. Efficient natural gas combustion combined with dry low-NOx technology and selective catalytic reduction (SCR) will minimize air pollutant emissions. Combined cycle technology is 50% more thermally efficient that vintage steam-electric plants. Since combined cycle plants burn less fossil fuel to generate an equivalent amount of power, they also emit substantially less air pollutants, including CO2.

Like the existing plant the expansion project will combine the Brayton and Rankine cycles to maximize thermal efficiency. Natural gas will be combusted in two Brayton cycle turbines, which will generate most of the electrical output. Instead of being discarded to the environment, the exhaust heat will be recovered in a Rankine cycle HRSG/steam turbine, and the heat will be extracted until the exhaust temperature is about 200 °F before being discarded through the stacks. This high-efficiency technology

combined with clean natural gas and BACT will yield a small fraction of air emissions compared to a conventional power plant.

Under the existing air permit BEC is authorized to operate the following equipment and emission sources:

- Two GE Combustion Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-1 and HRSG-2);
- One Gas-Fired Auxiliary Steam Boiler (B-1);
- One Diesel Generator Engine (DG-1);
- One Diesel Fire Water Pump Engine (FWP-1);
- One Cooling Tower (CT-1);
- One Chiller (CV1-CV16)
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

The proposed expansion project will consist of the following new sources:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

### 3.2.1 Gas Turbine/HRSG Power Generators

BEC is proposing to install two 171.7 MW ISO General Electric 7FA gas turbines in combined cycle mode with duct-fired HRSGs and a common steam turbine generator (total 663 MW). The fuel will be exclusively pipeline quality natural gas. Each gas turbine power block will include an advanced combustion turbine, including an air compressor section, gas combustion system (utilizing advanced DLN combustors), power turbine, and a 60-hertz, 18 kilovolt (kV) generator.

Exhaust gas exiting the power turbine at approximately 1,100°F is ducted to a fired boiler commonly known as a heat recovery steam generator where steam is produced to generate additional electricity in a steam turbine generator. Natural gas fired duct burners located within the HRSGs are used for supplementary firing to increase steam output.

The combustion turbines are designed to operate in the dry low-NOx mode at loads from 50% up to base load rating and will normally be taken out of service only for scheduled maintenance, or as dictated by economic or electrical demand conditions.

A horizontal, natural circulation, three-pressure HRSG system will extract heat from the exhaust of each gas turbine. Exhaust gas entering the HRSG at approximately 1100°F will be cooled to approximately 200°F by the time it leaves the HRSG exhaust stack. Steam production in the HRSGs will be augmented using "low-NOx" duct burners that will be natural gas fired. The steam produced is used in the combined cycle plant for additional power and natural gas/feedwater heating. Each HRSG will include a high-pressure superheater, high-pressure evaporator, high-pressure economizer, reheat section, intermediate pressure superheater, intermediate pressure evaporator, intermediate pressure economizer, low pressure superheater, low pressure evaporator, and condensate/feedwater preheater. The surface condenser uses cooling tower water to condense the steam exhausting from the steam turbine.

### 3.2.2 Auxiliary Steam Boiler

A 36.6 MMBtu/hr nominally rated (at 105% load) package boiler will be located on site to supply heating steam for the steam turbine seals and for sparging of the HRSG steam drums during down periods. The boiler will be a fire-tube type and combust natural gas only. Make-up water will be received from the demineralizer system that feeds the auxiliary boiler deaerator.

The primary use of the auxiliary boiler will be to provide heat such that temperatures are elevated within the HRSG and steam turbine while the combustion turbines are off-line. By maintaining elevated temperatures in the turbine seals, piping, and HRSGs, the CTGs will be able to minimize the amount of startup time required to come back on line after a shut down. The steam from the auxiliary boiler will not be used to augment power generation of the CTGs or the steam turbine. BEC is proposing to limit the auxiliary boiler annual capacity factor to 20%. This limit effectively caps annual operating hours to no more than 1,752 hours per year if the boiler is operated at maximum capacity. By limiting the annual capacity factor rather than operating hours BEC can operate the boiler at lower loads while still establishing an emission cap based on an equivalent 1,752 hours/year.

### 3.2.3 Standby Generator Engine

A small 400 kW (600-hp) back-up diesel generator will be located on site. The back-up generator will provide power for turning gears, lube oil pumps and auxiliary cooling water pumps. BEC is proposing to limit operating hours to no more than 150 hours/year of non-emergency operations.

The final diesel engine selection has not been finalized but current plans are for a Cummins model or equivalent. BEC will insure that the final engine selection meets the emission requirements of 40 CFR 60 Subpart IIII for Tier 2 or Tier 3 engines.

### 3.2.4 Storage Tanks

BEC will install storage tanks for diesel fuel and for water treatment chemicals (caustics, acids, etc.). The only new volatile organic liquid tank is the diesel tank supporting the emergency generator engine.

### 3.2.5 Fuel Gas System

Pipeline quality natural gas will be delivered to the plant boundary at a pressure sufficient for use in the combustion turbines without additional fuel compression. The gas will be heated, if necessary, using hot water from the HRSGs.

Natural gas enters the plant through an existing meter skid that is already sized to handle the additional gas flow. The gas passes through a knockout drum for removal of any liquid which may have been carried through the pipeline. The gas is split into streams to supply each CTG/HRSG unit. The gas then passes through a series of filters and separator to remove particulate matter and entrained liquids.

### 3.2.6 Cooling Tower

A new cooling tower will be installed as part of the planned electric generating facility. The majority of the cooling water will be used in the surface condenser to absorb the heat rejected from the combined cycle. Water from the cooling tower is commonly referred to as "main" cooling water. A dedicated set of cooling water pumps is provided for this service. Additional cooling water will be required for auxiliary plant cooling. Cooling tower water is not used for direct cooling of plant auxiliaries; a closed loop auxiliary cooling system consisting of pumps, expansion tank, and heat exchangers is provided. Cooling tower water is circulated through a set of plate and frame heat exchangers to cool the closed loop coolant, usually a glycol/water mix. This is commonly referred to as "auxiliary" cooling water.

The cooling tower is designed to evaporate clean water, which is the mechanism that provides cooling. Some small droplets (referred to as drift) escape from the top of the tower and may liberate dissolved solids as they evaporate in the atmosphere.

### 3.2.7 Chillers

The turbines will employ an inlet chilling system to enhance the overall power output that would normally be lost due to lower air density at higher ambient temperatures. The process of cooling takes place at the cooling coils where inlet air is cooled before entering the CTG compressor. At lower temperatures, the air becomes denser and therefore more mass flows through the CTGs. The net increase in mass flow results in higher gross output for each of the CTGs. In addition to the output enhancement from the CTGs, the additional mass flow also increases output of the STG.

### 3.2.8 Buildings and Infrastructure

The following buildings will be constructed on site:

- Warehouse/Maintenance Building;
- Turbine Enclosures;
- Electrical Substation Buildings; and
- Standby Generator Shelter.

Access roads will be provided for operation, maintenance, and fire and emergency vehicles.

## 3.3 Emission Generating Equipment

Emission generating equipment at the expanded facility will consist of:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

### 3.3.1 Gas Turbine/HRSG Power Generators

The primary emissions sources for this project will be the two combustion turbines. The manufacturer (General Electric) provided hourly emission rates of criteria pollutants from the combustion turbines. Stack concentrations that result from these emission rates when combined with duct burning were determined by the project contractor with input from GE and the HRSG manufacturer. The NOx emissions were adjusted to account for the control effectiveness of the SCR system. Emissions of SO2 were calculated using expected turbine operational data and the maximum assumed sulfur content (2 gr/100 scf) of the pipeline quality natural gas.

Maximum hourly emission rates for each pollutant were established after reviewing the provided vendor data over the range of potential ambient temperatures and proposed operating loads. Annual emissions were based on the highest hourly emission rate over the proposed operating range and assuming both turbines would be operated continuously. These emissions do not include start-up and shut-down operations. BEC is proposing the following emissions rates for the CTG/HRSG units:

| Pollutant | lb/hr | tpy | Project (tpy) |
|---|---|---|---|
| NOx | 43.61 | 191.01 | 382.02 |
| CO | 58.72 | 257.19 | 514.39 |
| TSP/PM10 | 13.65 | 59.79 | 119.57 |
| SO2 | 13.01 | 14.25 | 28.50 |
| VOC | 5.36 | 23.48 | 46.95 |
| NH3 | 22.60 | 98.99 | 197.98 |

BEC is permitting these units as based load generators, not peaking units. BEC intends to normally operate the CTG/HRSG units no lower than a 50% load factor. However, there may be short periods when an extended down turn below 50% is necessary due to factors beyond the control of BEC. BEC proposes to include the following permit condition:

- Reduced load operation below 50 percent of base load not associated with start-up, shutdown, upset, or maintenance is authorized, provided that the $NO_x$ and CO maximum pounds per hour (lb/hr) emission rates for $NO_x$ and CO specified in the MAERT are not exceeded.

This condition will allow for low load (<50%) operations for short periods without having to shutdown the units for economic dispatch. The proposed permit condition insures that the mass emission rates for these contaminants are not exceeded while allowing BEC the flexibility to respond to market conditions in a cost efficient manner.

### 3.3.2 Auxiliary Steam Boiler

The project will utilize a 36.6 MMBtu/hr (HHV at 105% load) gas-fired auxiliary boiler to maintain minimal steam flow when the turbines are not in operation. Maximum emission rate factors for the boiler unit were provided by the manufacturer. The auxiliary boiler does not operate continuously. However, to maintain maximum flexibility BEC proposes to limit the annual capacity factor rather than a specific hourly limit in the permit.

| | |
|---|---|
| Max Rating: | 36.6 MMBtu/hr |
| Fuel Heat: | 1,020 Btu/scf (HHV) |
| Max Fuel Consumption: | 314.33 MMscf/yr |
| Limited Fuel Consumption: | 62.87 MMscf/yr |
| Annual Capacity Factor: | 20% |

BEC proposes to limit the annual capacity factor of the auxiliary boiler to 20%. This allows for approximately 1752 hours of operation annually at full load. Detailed emission calculations are included in this application.

### 3.3.3 Standby Diesel Generator

The plant expansion will include a single 400 kW diesel engine backup generator engine. New compression ignition engines are subject to the recently promulgated NSPS Subpart IIII regulation which cites Tier 2 and Tier 3 emission limits. The emission rates represented in this application are the Tier 3 limits. BEC is proposing to limit annual operating hours to 150 hours per year which will allow for up to 100 hours for maintenance and testing, plus an additional 50 hours for other operational requirements.

### 3.3.4 Storage Tanks

There are three (3) storage tanks included in the expansion project which store VOC or a regulated pollutant. These include a small diesel tank for the generator, an aqueous ammonia tank for the SCR system, and a sulfuric acid tank for the water treatment plant. The ammonia tank is pressurized with the only associated emissions resulting from fugitives.

EPA's Tank 4.1 was used to estimate emissions from the diesel tank and the sulfuric acid tank. Emissions from two additional inorganic liquids tanks are also included.

### 3.3.5 Fuel Gas System (Fugitives)

The main fugitive emission source is equipment (valves, flanges, etc.) leaks from the fuel handling system, a potential source of VOC. Emissions from these sources were estimated using TCEQ approved Oil and Gas factors and an estimated component count.

Fugitive emissions from the ammonia handling system were calculated in the same manner as VOC except that TCEQ approved SOCMI w/o ethylene factors were used.

### 3.3.6 Cooling Tower

The process cooling tower will be a source of $PM_{10}$ emissions. The emissions from the cooling tower are dependent upon several factors: (1) the dissolved solids content of the circulating water, and (2) the amount of drift that leaves the tower. The dissolved solids content of the circulating water is dependent on the quality of the makeup water and the average number of cycles the water is allowed to circulate before being discharge through the blowdown system. The amount of drift is dependent on the tower design.

The method used to estimate particulate matter emissions is based on the approach presented by the EPA AP-42 Section 13. Using the cooling tower preliminary design characteristics and a drift rate of 0.001%, the total particulate emissions from the tower can be calculated. Once the total PM is calculated it is necessary to estimate the portion of total PM that is $PM_{10}$.

**$PM_{10}$ Estimation Methodology**

The EPA AP-42 Section 13 contains a factor for estimating $PM_{10}$ emissions as a portion of total PM. However, the EPA indicates that this factor is overly conservative which results in an overestimation of $PM_{10}$. Therefore, BEC is utilizing a more detailed method for estimating these emissions. The method and support data is contained in a paper entitled, "Calculating PM10 Emissions from Cooling Towers." The paper is included in the cooling tower emission calculation section of this application.

*Basis*

Each water droplet that leaves the cooling tower can be assumed to liberate solid particulate upon evaporation of the water in the droplet. Based on this assumption, the mass of solids (dissolved and suspended) in the droplet must equal the mass of solids in the final particle.

From the reference paper the following formula can be used to calculate the diameter of the final particle upon evaporation of the water:

$$D_p = D_d \times [(P_d/P_p) \times (Solids \times C) / 1{,}000{,}000]^{1/3}$$

Where

| | |
|---|---|
| $D_p$ = | diameter of final particulate |
| $P_p$ = | density of the final particle |
| $D_d$ = | diameter of the droplet |
| $P_d$ = | density of the droplet |
| Solids = | total solids (suspended and dissolved) |
| C = | cycles of concentration |

The mass fraction of droplets that will form particulates 10 microns (PM10) and smaller can be estimated for a given droplet size distribution using the above approach. Specifically, the particle size ($D_p$) is calculated using the above equation for each droplet size for a given distribution. The mass fraction of droplets corresponding to 10 micron particles and small is then summed.

Detailed cooling tower emissions are included in this application.

### 3.3.7 Chillers

The turbine inlet chillers will be a source of $PM_{10}$ emissions. The operating principle behind the chiller units is similar to the cooling tower. Therefore, the emission calculation methodology described for the cooling tower are used for the chillers and adjusted only for the smaller water recirculation rates.

Detailed chiller emissions are included in this application.

# 4 REGULATORY OVERVIEW

The Jack County Generation Facility is subject to federal, state, and local regulations governing the construction of new facilities. The lead agency for all air permitting in Texas is the TCEQ, which implements all of its own regulations and incorporates United States Environmental Protection Agency (EPA) regulatory requirements into its own program.

For regulatory review purposes, emission sources associated with the proposed Jack County Generation Facility expansion will include the following:

- Two GE Combustion PG7241 (FA) Turbines w/ 600 MMBtu/hr Duct Burners (HRSG-3 and HRSG-4);
- One 36.6 MMBtu/hr Gas-Fired Auxiliary Steam Boiler (B-2);
- One Diesel Generator Engine (DG-2);
- One Cooling Tower (CT-2);
- One Chiller (CP-2);
- Fugitives;
- One Ammonia Storage Tank; and
- Miscellaneous Storage Tanks for Diesel Fuel and Inorganics (Acids and Caustics).

BEC will comply with all federal, state and local air quality control requirements. The following sections describe the applicable federal and state air quality control regulations associated with the construction and operation of the expanded Jack County Generation Facility. No local regulations were identified.

## 4.1 Federal Air Quality Regulations

The Clean Air Act (CAA) of 1970, 42 USC 7401 et seq. amended in 1977 and 1990 and 40 CFR Parts 50-99 are the basic federal statutes and regulations governing air pollution. The following federal requirements have been reviewed to determine their applicability to the proposed Jack County Generation Facility expansion.

### 4.1.1 New Source Review (NSR)

Separate pre-construction review procedures have been established for projects that are proposed to be built in attainment areas versus nonattainment areas. The pre-construction review process for new or modified major sources located in attainment areas is called New Source Review, and may include a Prevention of Significant Deterioration (PSD) review. This review process is intended to keep new air emission sources from causing existing air quality to deteriorate beyond acceptable levels codified in the Federal regulations.

#### 4.1.1.1 Prevention of Significant Deterioration (PSD)

The emission threshold for "major stationary sources" varies under PSD according to the type of facility. As defined by 40 CFR Part 52.21(b)(1)(i), a facility is considered major under PSD if it has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. The Jack County Generation Facility process was permitted to authorize fossil fuel fired boilers totaling more than 250 MMBtu/hr, which are a specified source category. Therefore, the PSD threshold for this facility is 100 tpy. The proposed facility expansion emissions will be above the PSD thresholds for three criteria air pollutants: NOx, CO, and $PM_{10}$. Therefore, the facility expansion must be authorized under the PSD permitting requirements.

For new major sources, PSD applicability is based upon the definition of "major" as found in the PSD rules at 40 CFR §§51.165(v), 51.166(2), and 52.21. A PSD looks at proposed increases in emissions of more pollutants (all criteria pollutants and some others) but the increase resulting from the project must be more than an allowable level of increase called "PSD significance levels". The definition is limited in that a "major" source must lead to a net increase in air emissions above PSD significance levels.

**PSD SIGNIFICANCE LEVELS**

| Pollutant | Rate (tpy) |
|---|---|
| PM10 | 15 |
| TSP | 25 |
| SO2 | 40 |
| NOX | 40 |
| VOC (ozone) | 40 |
| CO | 100 |
| Pb | 0.6 |

The proposed expansion project will result in the PSD significance levels being exceeded for NOx, CO, VOC and $PM_{10}$.

One of the factors considered in the PSD permit review process is potential impacts on protected Class I airsheds located throughout the country. Class I areas are specifically designated as pristine wilderness areas. The Project will not be located in a Class I area, nor will it be located within 100 kilometers of a Class I area, therefore a full Class I analysis will not be required to be included in the permit application. The closest Class I area to the project site is the Caney Creek Wilderness Area located approximately 300 kilometers east of the Project site.

Another factor considered in the PSD permit review is the potential impact of facility emissions on soil and vegetation and visibility. An additional impacts analysis addressing these factors will be submitted under separate cover as a part of the ambient air quality dispersion modeling impacts analysis.

#### 4.1.1.2 Nonattainment New Source Review (NNSR)

The federal pre-construction review for a new or modified major source located in a nonattainment area is commonly called Nonattainment New Source Review (NNSR). NNSR only applies to major sources of the pollutants that are classified as nonattainment; therefore a new facility could potentially undergo both types of review, depending on the emissions of the various pollutants and their respective attainment status. Jack County is classified as an attainment area for all criteria pollutants; therefore, the facility will not be subject to NNSR requirements.

### 4.1.2 Title V Operating Permit

The Title V Permit program, as described in 40 CFR Part 70, requires major sources of air emissions to obtain federal operating permits. In Texas, authority to issue Title V operating permits has been delegated, by the United States Environmental Protection Agency (EPA), to the TCEQ. The major source threshold levels for determining the need for a Title V operating permit are: 100 tpy of any criteria air pollutant, 10 tpy of any individual hazardous air pollutant (HAP) or 25 tpy of any combination of HAPs. Emissions of several criteria pollutants from the facility exceed 100 tpy; therefore, a Title V Operating Permit is required for this facility. The existing Jack County Generation Facility is operating under a Title V permit – BEC will modify the operating permit to include the new applicable requirements for the expanded facility by the deadline stipulated in 30 TAC 122.

### 4.1.3 New Source Performance Standards (NSPS)

40 CFR Part 60 establishes new source performance standards (NSPS) for specific emission sources. The following NSPS requirements were identified as potentially applicable to the specified sources at the facility.

40 CFR Part 60 Subpart Db: Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. Subpart Db lists affected emission sources as fuel fired steam-generating units with a heat input capacity of 100 MMBTU/hr to 250 MMBTU/hr. The definition of an applicable unit includes sources that produce steam or that heat water or any other heat transfer medium. The HRSG units are each rated in excess of 250 MMBtu/hr, therefore, these units are potentially subject to the requirements of Subpart Db. However, the new NSPS Subpart KKKK standard affects duct burners used in combined cycle systems. Therefore, the duct burners will comply with these standards.

40 CFR Part 60 Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. Subpart Dc lists affected emission sources is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr). The auxiliary boiler is rated in excess of 10 MMBtu/hr and is subject to the requirements of Subpart

Dc. Since this source will fire natural gas exclusively only recordkeeping and reporting requirements will apply.

40 CFR Part 60 Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels. Subpart Kb lists affected emission sources as storage vessels containing volatile organic liquids with regulatory applicability being dependent on the construction date of the storage vessel, the capacity, and the material stored. The expanded facility will have a single diesel fuel tank to support the generator engine. The diesel tank will not exceed 75 m3 (19,815 gallons) and are therefore not subject to this rule. This rule does not apply to inorganic storage tanks.

40 CFR 60 Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) as specified in the regulation. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. The expanded Jack County Generation Facility will be equipped with an additional diesel engine to drive a standby generator. BEC will insure that this source complies with all applicable requirements of this regulation.

40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines. Subpart KKKK establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that have a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel and that commenced construction, modification or reconstruction after February 18, 2005. The expanded Jack County Generation Facility will be equipped with two gas turbines that meet this qualification criteria. This subpart also applies to emissions from any associated HRSG and duct burners.

### 4.1.4 National Emissions Standards for Hazardous Air Pollutants (NESHAP)

40 CFR Part 61 contains the Federal emission standards that have been developed to address certain individual HAPs. The individual HAP rules are typically referred to as the national emission standards for hazardous air pollutants or NESHAP. The Jack County Generation Facility will not emit any of the individual HAPs included in the NESHAP rules; therefore the NESHAP regulations do not apply to this facility.

### 4.1.5 Maximum Achievable Control Technology (MACT) Standards

40 CFR Part 63, as incorporated by reference in TAC 113, contains the Federal emission standards that have been developed to address HAP emissions from a variety of source categories. The source category rules, commonly referred to as the MACT standards, apply to facilities that are classified as major sources of HAPs, and operate affected equipment as listed in each standard. A facility is a major source of HAPs if it emits any individual HAP in excess of 10 tpy or a combination of HAPs in excess of 25 tpy. The facility will not be a major source of HAPs, therefore the MACT standards do not apply.

### 4.1.6 Acid Rain Standards

40 CFR Part 70-75 contains the Federal emission standards that have been developed to address acid rain emissions from specified sources. BEC already complies with the acid rain program for the existing power generating facility. The expanded portion of the plant will be incorporated into the acid program as well. BEC will file the proper documents with the EPA and acquire an acid rain permit through the Texas federal operating permit program.

### 4.1.7 Clean Air Interstate Rule (CAIR)

40 CFR Part 96 contains the Federal emission standards that have been developed to address NOx and SO2 emissions from specified sources in the electric power generation category. BEC already complies with the CAIR program for the existing power generating facility. The expanded portion of the plant will be incorporated into the CAIR program as well. BEC will file the proper documents with the EPA and acquire a CAIR permit through the Texas federal operating permit program.

### 4.1.8 Risk Management Program

40 CFR Part 68, Chemical Accident Prevention Provisions, is a federal regulation designed to prevent the release of hazardous materials in the event of an accident and minimize impacts when releases do occur. The regulation contains a list of substances and threshold quantities for determining applicability of the rule to a facility. If a facility stores, handles, or processes one or more substances on this list and at a quantity equal to or greater than specified in the regulation, the facility must prepare and submit a risk management plan (RMP).

If a facility does not have a listed substance on site, or the quantity of a listed substance is below the applicability threshold, the facility does not have to prepare an RMP. However, it must still comply with requirements of the general duty provisions in Section 112(r)(1) of the 1990 Clean Air Act Amendments if it has any regulated substance or other extremely hazardous substance on-site.

The general duty provision is as follows:

*"The owners and operators of stationary sources producing, processing, handling and storing such substances have a general duty ... to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur."*

With the exception of natural gas constituents (e.g., methane, ethane, propane, etc.), no regulated substance will be handled or stored in quantities greater than the applicability threshold. Natural gas pipelines are not covered if the U.S. Department of Transportation (DOT) or an equivalent state natural gas program certified by DOT in accordance with 49 CFR §6010.5 regulates the pipeline.

The Jack County Generation Facility will not have on site any flammable or toxic materials that trigger the RMP rule. BEC will only store aqueous ammonia in solutions less than 20%.

## 4.2 State Air Quality Regulations

The TCEQ air permitting requirements are codified in the Texas Administrative Code (TAC) Title 30, Part I. These rules incorporate the federal program requirements listed in 40 CFR Parts 50-99, and establish permit review procedures for all facilities that can emit pollutants to the ambient air. All new facilities are required to obtain an air quality permit prior to initiating construction. Facilities can trigger additional review by EPA if emissions exceed the major source thresholds listed in 40 CFR §52.21. The proposed project will exceed these thresholds; therefore, EPA will be reviewing the permit application and TCEQ's proposed permit to ensure all federal program requirements are met.

The TCEQ has codified the federal PSD requirements in TAC 116.160. As indicated the emission threshold for a "major stationary source" varies under PSD according to the type of facility. As defined in 40 CFR 52, a facility is considered major under PSD if it emits or has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. There is more than 250 MMBtu/hr of fossil fuel fired boilers on-site; therefore, the PSD threshold for this facility is 100 tpy. The permitted facility emissions will exceed the 100 tpy threshold for NOx, CO and PM10; therefore the facility is a PSD major source and must be permitted under the PSD requirements.

The remainder of this section provides the information necessary to show the Jack County Generation Facility will comply with the requirements in TAC 30:I. The emissions and plant operations from the proposed new facility will comply with all rules and regulations of TCEQ and with the intent of the Texas Clean Air Act (TCAA), including the protection of the health and physical property of the people. A summary discussion on compliance with each applicable rule is included below.

### 4.2.1 Chapter 101 – General Air Quality Rules

Chapter 101 includes the general rules that are applicable to all sources. BEC will comply with the applicable requirements of this chapter. Some of the potentially applicable sections within this chapter are:

**§101.10 – Emission Inventory**
Specified sources are required to submit an annual emissions inventory to TCEQ. BEC will comply with this requirement.

**§101.24 – Inspection Fee**
Specified sources are required to submit an annual inspection fee to the TCEQ. BEC will comply with this requirement.

**§101.27 – Emissions Fee**
Specified sources are required to submit an annual emissions fee to the TCEQ. BEC will comply with this requirement.

**§101.201 – Emission Events**
This rule defines procedures to use in the event of an emission event resulting in an unauthorized emission. BEC will comply with these requirements.

**§101.211 – Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping Requirements**
This rule defines procedures to use in the event of a scheduled MSS event resulting in an unauthorized emission. BEC will comply with these requirements.

BEC will comply with all applicable requirements of this chapter.

### 4.2.2 Chapter 111 – Control of Visible Emissions and Particulate Matter

The potentially applicable sections within this chapter are:

**§111.111 – Requirements for Specified Sources**
This rule defines visible emission standards for specified sources. BEC will comply with these standards.

**§111.115 – Allowable Emission Limits**
This rule defines particulate matter emission standards for specified sources. BEC will comply with these standards.

### 4.2.3 Chapter 112 – Control of Emissions of Sulfur Compounds

The potentially applicable sections within this chapter are:

**§112.3 – Net Ground Level Concentrations**
The will not cause ground level concentrations of SO2 to exceed 0.4 ppmv averaged over any 30-minute period. The primary sources will fire sweet natural gas exclusively. Therefore, this standard will not be exceeded.

### 4.2.4 Chapter 113 – Standards of Performance for HAP (MACT)

This rule incorporates by reference applicable MACT regulations for which the EPA has delegated authority to the TCEQ. The Jack County Generation Facility will not be a major source of HAP emissions. Therefore, none of the potentially applicable MACT standards are applicable to this project.

### 4.2.5 Chapter 115 – Emission Standards for VOC

This rule establishes standards for a variety of VOC sources in specific geographic locations (i.e. nonattainment and covered attainment areas). Jack County is not a nonattainment area or a covered attainment area. Therefore, no Chapter 115 standards are currently applicable to sources at this account.

### 4.2.6 Chapter 117 – Control of Emissions of NOx

This rule establishes standards for a variety of NOx sources in specific geographic locations. Jack County is not a nonattainment area. Therefore, the requirements of Subchapter C are not applicable to sources at this account. Jack County is not located in the geographic area defined as East and Central Texas. Therefore, the requirements of Subchapter E are not applicable to sources at this account

### 4.2.7 Chapter 118 – Episodes

If the TCEQ declares a Level 1 or 2 emission episode that encompasses the Jack County Generation Facility BEC will strive to reduce emissions for the duration of the episode. An emission reduction plan is not required for sources located in Jack County.

### 4.2.8 Chapter 122 – Federal Operating Permits

The TCEQ implements the requirements of 40 CFR 70 through this chapter. The existing Jack County Generation Facility is already authorized by a FOP. BEC will revise this permit to include the applicable requirements for the expanded plant as well as obtaining both Acid Rain and CAIR permits.

# 5 EMISSIONS INVENTORY

This section provides a summary of emission rates for the proposed Jack County Generation Facility after completion of the proposed expansion project.

## 5.1 Operating Scenarios

Potential operations include both CTG/HRSG units operating 100% of the time, for 8760 hours per year. BEC will operate these sources from base load down to 50% load. BEC is seeking authorization to operate at lower loads (<50%) for short periods but will meet the short-term (lb/hr) mass emission rate limits of the permit. Potential operations for the standby diesel generator engine will be limited to 150 hours per year. The auxiliary steam boiler will operate with a limited annual capacity factor of 20%.

## 5.2 Criteria Pollutant Emissions

The following section summarizes the methodology used to determine potential emissions from the proposed Jack County Generation Facility, and estimates for criteria pollutants emitted from all operations.

### 5.2.1 Determination of Potential Emissions

#### 5.2.1.1 Turbine Generator/HRSG

The engineering contractor provided operating parameters and emission rates for the CTG/HRSG under different operating loads over a wide ambient temperature range. As would be expected worst-case emissions occur at lower ambient conditions.

Emissions of formaldehyde from the gas turbine were estimated using a factor obtained from the EPA MACT website. This factor represents the maximum formaldehyde emission rate records for a GE 7F unit. Recent formaldehyde testing by BEC for the existing GE turbines indicated formaldehyde emissions were below detectible limits.

Emissions of SO2 from the combined CTG/HRSG were estimated based on maximum fuel flow and a range of fuel gas sulfur content. Maximum short-term SO2 emissions were based on 2 grains total sulfur per 100 scf. Annual SO2 emissions were based on 0.5 grains total sulfur per 100 scf.

Emissions of H2SO4 were estimated assuming 10% of the SO2 emitted was actually H2SO4. BEC did not reduce the estimated SO2 emissions by 10% to be conservative. The 10% assumption was obtained from GE information.

Potential CTG/HRSG emission calculations are included in Appendix A.

# APPENDIX A – TCEQ FORMS

# Texas Commission on Environmental Quality
# Form PI-1 General Application for
# Air Preconstruction Permit and Amendments

Update: The TCEQ requires that a Core Data Form be submitted on all incoming applications unless a Regulated Entity and Customer Reference Number has been issued by the TCEQ and no core data information has changed. For more information regarding the Core Data Form, call (512) 239-5175 or go to the TCEQ Web site at www.tceq.state.tx.us/permitting/central_registry/guidance.html.

| | | |
|---|---|---|
| **I. APPLICANT INFORMATION** | | |
| A. Company or Other Legal Name: Brazos Electric Power Cooperative, Inc. | | |
| Texas Secretary of State Charter/Registration Number (If Applicable): 17405247291 | | |
| B. Company Official Contact Name: David Murphy, PE | | Title: Vice President Generation |
| Mailing Address: P.O. Box 2585 | | |
| City: Waco | State: TX | Zip Code: 76702-2585 |
| Telephone No: 254 750 6213 | Fax No.: 254 750 6292 | E-mail Address: dmurphy@brazoselectric.com |
| C. Technical Contact Name: Troy Cannon | | Title: Operations Superintendent |
| Mailing Address: 3844 Henderson Ranch Road | | |
| City: Bridgeport | State: TX | Zip Code: 76426 |
| Telephone No.: 940 374 3022 | Fax No.: 940 374 3145 | E-mail Address: tcannon@brazoselectric.com |
| D. Facility Location Information: | | |
| Street Address: 3844 Henderson Ranch Road | | |
| If no street address, provide clear driving directions to the site in writing: | | |
| | | |
| City: Bridgeport | County: Jack | Zip Code: 76426 |
| E. TCEQ Account Identification Number (leave blank if new site or facility): | | |
| F. Is a TCEQ Core Data Form (TCEQ Form #10400) attached? | | ☐ YES ☑ NO |
| G. TCEQ Customer Reference Number *(leave blank if unknown)*: CN600128821 | | |
| H. TCEQ Regulated Entity Number *(leave blank if unknown)*: RN100221985 | | |
| **II. IMPORTANT GENERAL INFORMATION** | | |
| A. Is confidential information submitted with this application? | | ☐ YES ☑ NO |
| If "YES," is each "confidential" page marked "CONFIDENTIAL" in large red letters? | | ☐ YES ☐ NO |
| B. Is this application in response to a TCEQ investigation or enforcement action? | | ☐ YES ☑ NO |
| If "YES", attach a copy of any correspondence from the TCEQ | | |
| C. Number of New Jobs: 0 | | |
| D. Names of the State Senator and district number for this facility site: Craig Estes: District 30 | | |
| Names of State Representative and district number for this facility site: Rick Hardcastle: District 68 | | |
| E. For Concrete Batch Plants, name of the County Judge for this facility site: | | |
| Mailing Address: | | |
| City: | State: | Zip Code: |
| F. For Concrete Batch Plants, is the facility located in a municipality or an extraterritorial jurisdiction of a municipality? If "YES," list the name(s) of the Presiding Officer(s) for this facility site: | | ☐ YES ☐ NO |
| Mailing Address: | | |
| City: | State: | Zip Code: |

Texas Commission on Environmental Quality
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| | | |
|---|---|---|
| **III. FACILITY AND SOURCE INFORMATION** | | |
| A. Site Name: Jack County Generation Facility II | | |
| B. Area Name/Type of Facility: Electric Power Plant | | ☑ PERMANENT ☐ PORTABLE |
| C. Principal Company Product or Business: Electric Power | Primary Standard Industrial Classification Code: 4911 | |
| D. Projected Start of Construction Date: January 2009 | Projected Start of Operation Date: April 2010 | |

**IV. TYPE OF PERMIT ACTION REQUESTED**

A. Permit Number *(if existing)*:

B. Is this an initial permit application? ☑ YES ☐ NO

If "YES," check the type of permit requested *(check all that apply)*:

☐ State Permit
☐ Flexible Permit
☐ Multiple Plant Permit
☐ Nonattainment Federal Permit
☑ Prevention of Significant Deterioration Federal Permit
☐ Hazardous Air Pollutants Permit Federal Clean Air Act § 112(g)

Other:

C. Is this a permit amendment? ☐ YES ☑ NO

If "YES," check the type of permit requested *(check all that apply)*:

☐ State Permit Amendment
☐ Flexible Permit Amendment
☐ Multiple Plant Permit Amendment
☐ Nonattainment Major Modification
☐ Prevention of Significant Deterioration Major Modification
☐ Hazardous Air Pollutants Permit Federal Clean Air Act § 112(g) Modification

Other:

Is a permit renewal application being submitted in conjunction with this amendment in accordance with Senate Bill 1673? [THSC 382.055(a)(2)](80th Leg) ☐ YES ☑ NO

D. Is this application for a change in location of previously permitted facilities? ☐ YES ☑ NO
If "YES," answer D. 1. and D. 2.

1. Current location of facility.

Street Address *(If no street address, provide clear driving directions to the site in writing.)*:

| City: | County: | Zip Code: |
|---|---|---|

2. Will the proposed facility, site and plot plan meet all current technical requirements of the permit special conditions? ☐ YES ☐ NO
If "NO," attach detailed information.

E. Are there any standard permits, exemptions or permits by rule to be consolidated into this permit? ☐ YES ☑ NO

F. Are you permitting a facility or group of facilities that have planned maintenance, startup and shutdown emissions that cannot be authorized by a permit by rule or standard permit or that are authorized by a permit by rule or standard permit and are being rolled into this permit ☑ YES ☐ NO
If "YES," attach information on any changes to emissions under this application as specified in Section VIII, And Section IXX.
If "YES," answer F. 1 through F. 3.

TCEQ

# Texas Commission on Environmental Quality
# Form PI-1 General Application for
# Air Preconstruction Permit and Amendments

| | |
|---|---|
| **IV. TYPE OF PERMIT ACTION REQUESTED *(continued)*** | |
| 1. Are the activities to be included in this permit covered by any previously existing MSS authorizations? If "YES," provide a listing of all other authorizations (permit by rule or standard permit and the associated registration number if any). | ☐ YES ☑ NO |
| 2. Have the emissions been previously submitted as part of an emissions inventory? | ☐ YES ☑ NO |
| 3. List which years the MSS activities were included in emissions inventory submittals: | |
| G. Is this facility located at a site required to obtain a federal operating permit under 30 TAC Chapter 122? If "NO," go to Section V. | ☑ YES ☐ NO |
| 1. Is a site operating permit (SOP) or general operating permit (GOP) review pending for this source, area, or site? | ☐ YES ☑ NO |
| 2. Is and SOP or GOP issued for this source, area, or site? | ☑ YES ☐ NO |
| 3. List SOP or GOP number(s): O-2169 | |
| **V. PERMIT FEE INFORMATION** | |
| A. Fee paid for this application: | $ 75,000 |
| B. Is a copy of the check or money order attached to the original submittal of this application? | ☑ YES ☐ NO ☐ N/A |
| C. Is a Table 30 entitled, "Certification of estimated Capital Cost and Fee Verification," attached? | ☑ YES ☐ NO |
| **VI. PUBLIC NOTICE APPLICABILITY** | |
| A. Is this a new permit application? | ☑ YES ☐ NO |
| B. Is this an application for a major modification of a PSD, NA or 30 TAC § 112(g) permit? | ☑ YES ☐ NO |
| C. Is this a state permit amendment application? If "YES," answer C. 1. through C. 3. | ☐ YES ☑ NO |
| 1a. Is there any change in character of emissions in this application? | ☐ YES ☐ NO |
| 1b. Is there a new air contaminant in this application? | ☐ YES ☐ NO |
| 2. Do the facilities handle, load, unload, dry, manufacture, or process grain, seed, legumes, or vegetables fibers (agricultural facilities)? | ☐ YES ☑ NO |
| 3. List the total annual emission increases associated with the application (*list all that apply*): Volatile Organic Compounds (VOC): 47.83 tpy; Particulate Matter (PM): 125.29 tpy; Sulfur Dioxide ($SO_2$): 29.26 tpy; Lead (Pb): 0 tpy; Carbon Monoxide (CO): 514.65 tpy; Nitrogen oxides ($NO_x$): 382.32 tpy; Other air contaminants not listed above: ____ tpy; List: Ammonia 197.99 tpy | |
| D. Is this a change of location application? If "YES," answer D. 1. through D. 3. | ☐ YES ☑ NO |
| 1. Is the new facility site located in or contiguous to the right-of-way of a public works project? | ☐ YES ☐ NO |
| 2. Is there a permitted facility occupying the new site? | ☐ YES ☐ NO |
| If "YES," please list the permit number: | |
| 3. Have portable facilities occupied the new site at any time in the last two years? | ☐ YES ☐ NO |

**Texas Commission on Environmental Quality**
**Form PI-1 General Application for**
**Air Preconstruction Permit and Amendments**

| VII. PUBLIC NOTICE INFORMATION *(complete if applicable)* | | | |
|---|---|---|---|
| A. Responsible Person: | | | |
| Name: David Murphy, PE | | Title: Vice President Generation | |
| Mailing Address: P.O. Box 2585 | | | |
| City: Waco | State: TX | | Zip Code: 76702-2585 |
| Telephone No.: 254 750 6213 | Fax No.: 254 750 6292 | | E-mail Address: dmurphy@brazoselectric.com |
| B. Technical Contact: | | | |
| Name: Troy Cannon | | Title: Operations Superintendent | |
| Mailing Address: 3844 Henderson Ranch Road | | | |
| City: Bridgeport | State: | | Zip Code: 76426 |
| Telephone No.: 940 374 3022 | Fax No.: 940 374 3145 | | E-mail Address: tcannon@brazoselectric.com |
| C. Application in Public Place: | | | |
| Name of Public Place: Jack County Court House | | | |
| Physical Address: 100 North Main Street | City: Jacksboro | | County: Jack |
| The public place has granted authorization to place the application for public viewing and copying? | | | ☑ YES ☐ NO |
| D. Small Business Classification: | | | |
| 1. Does this company (including parent companies and subsidiary companies) have fewer than 100 employees or less than $6 million in annual gross receipts? | | | ☐ YES ☑ NO |
| 2. Is the site a major source under 30 TAC Chapter 122, Federal Operating Permit Program? | | | ☑ YES ☐ NO |
| 3. Are the site emissions of any individual air contaminant greater than 50 tpy? | | | ☑ YES ☐ NO |
| 4. Are the site emissions of all air contaminants combined greater than 75 tpy? | | | ☑ YES ☐ NO |
| E. Bilingual notice confirmation: | | | |
| Is a bilingual program required by the Texas Education Code in the School District? | | | ☑ YES ☐ NO |
| Are the children who attend either the elementary school or the middle school closest to your facility eligible to be enrolled in a bilingual program provided by the district? | | | ☑ YES ☐ NO |
| If yes, which language is required by the bilingual program? Spanish | | | |
| **VIII. TECHNICAL INFORMATION** | | | |
| A. Is a current area map attached? | | | ☑ YES ☐ NO |
| Are any schools located within 3,000 feet of this facility? | | | ☐ YES ☑ NO |
| B. Is a plot plan of the plant property attached? | | | ☑ YES ☐ NO |
| C. Is a process flow diagram and a process description attached? | | | ☑ YES ☐ NO |
| D. Maximum Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52 | | | |
| Seasonal Operation? If "YES," please describe: | | | ☐ YES ☑ NO |
| E. Are worst-case emissions data and calculations attached? | | | ☑ YES ☐ NO |
| 1. Is a Table 1(a) entitled, "Emission Point Summary Table," attached? | | | ☑ YES ☐ NO |
| 2. Is a Table 2 entitled, "Material Balance Table," attached? | | | ☐ YES ☑ NO |
| 3. Are equipment, process or control device tables attached? | | | ☑ YES ☐ NO |
| F. Are actual emissions for the last two years (determination federal applicability) attached? | | | ☐ YES ☑ NO |

| | |
|---|---|
| **IX. STATE REGULATORY REQUIREMENTS**<br>Applicants must be in compliance with all applicable state regulations to obtain a permit or amendment | |
| A. The emissions from the proposed facility will comply with all rules and regulations of the TCEQ and details are attached? | ☑ YES ☐ NO |
| B. The proposed facility will be able to measure emissions of significant air contaminants and details are attached? | ☑ YES ☐ NO |
| C. A demonstration of Best Available Control Technology (BACT) is attached? | ☑ YES ☐ NO |
| D. The proposed facilities will achieve the performance in the permit application and compliance demonstration or record keeping information is attached? | ☑ YES ☐ NO |
| E. Is atmospheric dispersion modeling attached? | ☐ YES ☑ NO |
| F. Does this application involve any air contaminants for which a "disaster review" is required? | ☐ YES ☑ NO |
| If "YES," details must be attached.<br>*Note: For a list of air contaminants for which a "disaster review" will be required, refer to the NSRPD Disaster Review Guidance Document at www.tceq.state.tx.us/permitting/air/rules/federal/63/63hmpg.html.* | |
| G. Is this facility or group of facilities located at a site within the Houston/Galveston nonattainment area? (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, or Waller Counties) | ☐ YES ☑ NO |
| Does the facility or group of facilities located at this site have an uncontrolled design capacity to emit 10 tpy or more of $NO_X$? | ☐ YES ☑ NO |
| Is this site subject to 30 TAC Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade)? | ☐ YES ☑ NO |
| Does this action make the site subject to 30 TAC Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade)? | ☐ YES ☑ NO |
| Does this action require the site to obtain additional emission allowances? | ☐ YES ☑ NO |
| **X. FEDERAL REGULATORY REQUIREMENTS**<br>**Applicants must be in compliance with all applicable federal regulations to obtain a permit or amendment.** ***If any of the following questions is answered "YES,, the application must contain detailed attachments addressing applicability, identify federal regulation Subparts, show how requirements are met, and include compliance information.*** | |
| A. Does a Title 40 Code of Federal Regulations Part 60, (40 CFR Part 60) New Source Performance Standard (NSPS) apply to a facility in this application? | ☑ YES ☐ NO |
| B. Does 40 CFR Part 61, National Emissions Standard for Hazardous Air Pollutants (NESHAP) apply to a facility in this application? | ☐ YES ☑ NO |
| C. Does a 40 CFR Part 63, Maximum Achievable Control Technology (MACT) standard apply to a facility in this application? | ☐ YES ☑ NO |
| D. Does nonattainment permitting requirements apply to this application? | ☐ YES ☑ NO |
| E. Does prevention of significant deterioration permitting requirements apply to this application? | ☑ YES ☐ NO |
| F. Does Hazardous Air Pollutant Major Source [FAA § 112(g)] requirements apply to this application? | ☐ YES ☑ NO |
| **XI. COPIES OF THIS APPLICATION** | |
| A. Has the required fee been sent separately with a copy of this Form PI-1 to the TCEQ Revenue Section? *(MC 214, P.O. Box 13088, Austin, Texas 78711).* | ☑ YES ☐ NO ☐ NA |
| B. Are the Core Data Form, Form PI-1, and all attachments being sent to the TCEQ in Austin? | ☑ YES ☐ NO |
| OPTIONAL: Has an extra copy of the Core Data Form, Form PI-1 and all attachments been sent to the TCEQ in Austin?<br>If "YES," please mark this application as "COPY". | ☑ YES ☐ NO |

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendments

| | |
|---|---|
| **XI. COPIES OF THIS APPLICATION *(continued)*** | |
| C. Is a copy of the Core Data Form, the Form PI-1, and all attachments being sent to the appropriate TCEQ regional office | ☑ YES ☐ NO |
| D. Is a copy of the Core Data Form, the Form PI-1, and all attachments being sent to each appropriate local air pollution control program(s)? | ☐ YES ☑ NO |
| List all local air pollution control program(s): None<br>None | |
| E. Is a copy of the Core Data Form, Form PI-1, and all attachments (without confidential information) being sent to the EPA Region 6 office in Dallas, Texas? (federal applications only) | ☑ YES ☐ NO |
| F. This facility is located within 100 kilometers of the Rio Grande River and a copy of the application was sent to the International Boundary Water Commission (IBWC): | ☐ YES ☑ NO |
| G. This facility is located within 100 kilometers of a federally-designated Class I area and a copy of the application was sent to the appropriate Federal Land Manager: | ☐ YES ☑ NO |
| **XII. PROFESSIONAL ENGINEER (P.E.) SEAL** | |
| Is the estimated capital cost of the project greater than $2 million dollars?<br>If "YES," the application must be submitted under the seal of a Texas licensed Professional Engineer (P.E.). | ☑ YES ☐ NO |
| **XIII. DELINQUENT FEES AND PENALTIES** | |
| Notice: This form will not be processed until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the "Delinquent Fee and Penalty Protocol." For more information regarding Delinquent Fees and Penalties, go to the TCEQ Web site at: www.tceq.state.tx.us/agency/delin/index.html. | |
| **XIV. SIGNATURE** | |
| The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7, Texas Clean Air Act (TCAA), as amended, or any of the air quality rules and regulations of the Texas Commission on Environmental Quality or any local governmental ordinance or resolution enacted pursuant to the TCAA. I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. I further state that I have read and understand TWC §§ 7.177-7.183, which defines CRIMINAL OFFENSES for certain violations, including intentionally or knowingly making or causing to be made false material statements or representations in this application, and TWC § 7.187, pertaining to CRIMINAL PENALTIES. | |
| NAME: David Murphy, PE SIGNATURE: _____ DATE: _____<br>Original Signature Required | |

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| B-2 | B-2 | Auxiliary Boiler 2 | NOx | 1.28 | 1.12 |
| | | | CO | 1.35 | 1.19 |
| | | | VOC | 0.59 | 0.51 |
| | | | PM10 | 0.37 | 0.32 |
| | | | SO2 | 0.20 | 0.04 |
| DG-2 | DG-2 | Diesel Generator Engine | NOx | 4.00 | 0.30 |
| | | | CO | 3.48 | 0.26 |
| | | | VOC | 4.00 | 0.30 |
| | | | PM10 | 0.20 | 0.02 |
| | | | SO2 | 0.80 | 0.06 |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date: | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| 2EBTK0100 | 2EBTK0100 | Diesel Tank | VOC | 0.01 | 0.02 |
| CT-2 | CT-2 | Cooling Tower 2 | TSP/PM10 | 2.67/1.26 | 11.71/5.50 |
| CP-2 | CP-2 | Chiller Package 2 | TSP/PM10 | 0.06/0.05 | 0.25/0.21 |
| FUG4 | FUG4 | Power Block 3 Fugitives | VOC | 0.07 | 0.29 |
| FUG5 | FUG5 | Power Block 4 Fugitives | VOC | 0.07 | 0.29 |
| 2CITK0700 | 2CITK0700 | Aqueous Ammonia Fugitives | NH3 | 0.01 | 0.01 |
| 2CITK0120 | 2CITK0120 | Sulfuric Acid Tank | H2SO4 | 0.01 | 0.01 |
| 2CITK0110 | 2CITK0110 | NaOH Tank | NaOH | 0.01 | 0.01 |
| 2CITK0400 | 2CITK0400 | Sodium Hypochlorite Tank | Sodium Hypochlorite | 1.56 | 0.08 |
| | | | | | |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| Permit | | RN | 100221985 | Date | January 4, 2008 |
|---|---|---|---|---|---|
| Company | Brazos Electric Power Cooperative, Inc. | | | | |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| AIR CONTAMINANT DATA | | | | | |
|---|---|---|---|---|---|
| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
| EPN (A) | FIN (B) | NAME (C) | | Pounds per Hour (A) | TPY (B) |
| HRSG-3 | CTG3 | Gas turbine and HRSG 3 | NOx | 43.61 | 191.01 |
| | HRSG3 | | CO | 58.72 | 257.19 |
| HRSG-4 | CTG4 | Gas turbine and HRSG 4 | VOC | 5.36 | 23.48 |
| | HRSG4 | | PM10 | 13.65 | 59.79 |
| | | (emissions are per unit) | SO2 | 13.31 | 14.58 |
| | | | H2S04 | 1.33 | 1.46 |
| | | | Formaldehyde | 0.16 | 0.69 |
| | | | NH3 | 22.60 | 98.99 |
| | | | | | |
| | | | | | |
| | | | | | |

EPN = Emission Point Number
FIN = Facility Identification Number

# Section 1 - Document

November 17, 2008

MR DAVID MURPHY

VICE PRESIDENT GENERATION

BRAZOS ELECTRIC POWER COOPERATIVE INC

PO BOX 2585

WACO TX 76702-2585

Re: Permit Application

Permit Numbers: 83801 and PSD-TX-1117

Jack County Generation Facility

Waco, Jack County

Regulated Entity Number: RN100221985

Customer Reference Number: CN600128821

Account Number: JA-0068-E

Dear Mr. Murphy:

This is in response to your Form PI-1 (General Application for Air Preconstruction Permits and Amendments) concerning the above-referenced facility. This will acknowledge that your application for the above-referenced permit is technically complete as of November 12, 2008. We appreciate your cooperation in sending us the information necessary to evaluate your proposal.

A permit for your new facility is enclosed. The permit contains several general and special conditions that define the level of operation and a maximum allowable emissions rates table (MAERT). We appreciate your careful review of the special conditions of the permit and assuring that all requirements are consistently met. In addition, the construction and operation of the facilities must be as represented in the application.

This permit authorizes planned start-up and shutdown emissions as represented in the permit application for only the sources identified on the MAERT. Maintenance activities were not

represented in the application and are not authorized and will need to be authorized separately in the future.

This permit will be automatically void upon the occurrence of any of the following, per Title 30 Texas Administrative Code § 116.120(a) [30 TAC § 116.120(a)]:

1. Failure to begin construction within 18 months of the date of issuance,

2. Discontinuance of construction for more than 18 months prior to completion, or

3. Failure to complete construction within a reasonable time.

Upon request, the Texas Commission on Environmental Quality (TCEQ) Executive Director may grant extensions as allowed in 30 TAC § 116.120(b).

This permit is effective as of the date of this letter and will be in effect for ten years from the date of approval.

As of July 1, 2008, all analytical data generated by a mobile or stationary laboratory in support of compliance with air permits must be obtained from a NELAC (National Environmental Laboratory Accreditation Conference) accredited laboratory under the Texas Laboratory Accreditation Program or meet one of several exemptions. Specific information concerning which laboratories must be accredited and which are exempt may be found in 30 TAC §§ 25.4 and 25.6.

For additional information regarding the laboratory accreditation program and a list of accredited laboratories and their fields of accreditation, please see the following website:

http://www.tceq.state.tx.us/compliance/compliance_support/qa/env_lab_accreditation.html

For questions regarding the accreditation program, you may contact the Texas Laboratory Accreditation Program at (512) 239-3754 or by e-mail at labprgms@tceq.state.tx.us.

You may file a **motion to overturn** with the Chief Clerk. A motion to overturn is a request for the commission to review the TCEQ Executive Director's approval of the application. Any motion must explain why the commission should review the TCEQ Executive Director's action. According to 30 TAC § 50.139, an action by the TCEQ Executive Director is not affected by a motion to overturn filed under this section unless expressly ordered by the commission.

A motion to overturn must be received by the Chief Clerk within 23 days after the date of this letter. An original and 11 copies of a motion must be filed with the Chief Clerk in person or by mail. The Chief Clerk's mailing address is Texas Commission on Environmental Quality, Office of the Chief Clerk, MC-105, P.O. Box 13087, Austin, Texas 78711-3087. On the same day the motion is transmitted to the Chief Clerk, please provide copies to Mr. Robert Martinez, Director, Environmental Law Division, MC-173, and Mr. Blas J. Coy, Jr., Public Interest Counsel, MC-103, both at the same TCEQ address above. If a motion is not acted on by the commission within 45 days after the date of this letter, then the motion shall be deemed overruled.

You may also request **judicial review** of the TCEQ Executive Director's approval. According to Texas Health and Safety Code § 382.032, a person affected by the TCEQ Executive Director's approval must file a petition appealing the TCEQ Executive Director's approval in Travis County district court within 30 days after the effective date of the approval. Even if you request judicial

review, you still must exhaust your administrative remedies, which includes filing a motion to overturn in accordance with the previous paragraphs.

Thank you for your cooperation and interest in air pollution control. If you need further information or have any questions, please contact Ms. Ruth Alvirez at (512) 239-5220 or write to the Texas Commission on Environmental Quality, Office of Permitting and Registration, Air Permits Division, MC-163, P.O. Box 13087, Austin, Texas 78711-3087.

This action is taken under authority delegated by the Executive Director of the TCEQ.

Sincerely,

Richard A. Hyde, P.E., Director

Air Permits Division

Office of Permitting and Registration

Texas Commission on Environmental Quality

RAH/RA/pg

Enclosures

cc: Air Section Manager, Region 3 - Abilene

Air Permits Section Chief, New Source Review, Section (6PD-R), Environmental Protection Agency, Region 6, Dallas

Project Number: 135637

## Headers

Buddy Garcia, *Chairman*

Larry R. Soward, *Commissioner*

Bryan W. Shaw, Ph.D., *Commissioner*

Mark R. Vickery, P.G., *Executive Director*

# Texas Commission on Environmental Quality

*Protecting Texas by Reducing and Preventing Pollution*

Mr. David Murphy

Page

November 17, 2008

Re: Permit Numbers 83801 and PSD-TX-1117

## Footers



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# Section 1 - Document

## Construction Permit

## Review Analysis & Technical Review

| | |
|---|---|
| Company: Brazos Electric Power Cooperative Inc | Permit No.: 83801/PSD-TX-1117 |
| City: Waco | Record No.: 135637 |
| County: Jack | Account No.: JA-0068-E |
| Project Type: Initial Issuance | Regulated Entity No.: RN100221985 |
| Project Reviewer: Ms. Ruth Alvirez | Customer Reference No.: CN600128821 |
| Facility Name: Jack County Generation Facility | |

**Authorization Checklist**

Will a new policy/precedent be established? (ED signature required if yes) No

Is a state or local official opposed to the permit?(ED signature required if yes) No

Is waste or tire derived fuel involved? (ED signature required if yes) No

Are waste management facilities involved?(ED signature required if yes) No

Will action on this application be posted on the Executive Director's agenda? Yes

Have any changes to the application or subsequent proposals been required to increase protection

of public health and the environment during the review? No

**Project Overview:** BEC is proposing to expand the existing Jack County Generation Plant by installing two gas-fired combine cycle combustion turbines (~171 MW) with duct burners (~600 MMBtu/hr) and a steam turbine (342 MW). Ancillary equipment includes an emergency diesel generator, cooling tower, one chiller and miscellaneous storage tanks.

**Compliance History**

In compliance with 30 TAC Chapter 60, a compliance history report was prepared on: Oct 12, 2007

Was an evaluation for Federal Orders conducted on this company? yes

Was the application received after September 1, 2002? yes

If yes, what was the site rating? HIGH 0.0 Company rating? AVE 3.24

Is the permit recommended to be denied or has the permit changed on the basis

of compliance history or rating? no

**Public Notice Information**

'39.403 Public notification required? yes

A. Date application received: January 04, 2008 Date Administrative Complete: Jan 16, 2008

B. Small Business source? no

'39.418 C. Date 1st Public Notice /Admin Complete/Legislators letters mailed: Jan 16, 2008

'39.603 D. Pollutants: NOx, CO, VOC, $SO_2$, PM/$PM_{10}$, $NH_3$

E. Date Published: Jan 29, 2008 in Jacksboro Gazette News

Date Affidavits/Copies received: Mar 27, 2008

F. Bilingual notice required? no

Language: Spanish

Date Published: Jan 29, 2008 in Jacksboro Gazette News

Date Affidavits/Copies received: Mar 27, 2008

'39.604 G. Certification of Sign Posting / Application availability yes

H. Public Comments Received?
yes

Meeting requested? yes Meeting held? no - legal denied, not enough public interest

Hearing requested? no Hearing held? no

Was/were the request(s) withdrawn? no Date:

'39.419 2nd Public Notification required? yes

A. Date 2nd Public Notice mailed: Sept 8, 2008

B. Preliminary determination issue

'39.603 C. Pollutants: NOx, CO, VOC, $SO_2$, PM/$PM_{10}$, $NH_3$

D. Date Published: Sept 16, 2008 in Jacksboro Gazette News

Date Affidavits/Copies received: Oct 20, 2008

E. Bilingual notice required? no

F. Public Comments Received?
yes

Meeting requested? no

Hearing requested? no

'39.420 G. Consideration of Comments:

RTC, Technical Review & Draft Permit Conditions sent to OCC: Nov 17, 2008

Request for Reconsideration Received? no

H. Final action: Letters enclosed? yes

**Emission Controls**

'116.111(a)(2)(G) Is the facility expected to perform as represented in the application? yes

'116.140 Permit Fee: $ 75,000 Fee certification provided? yes

**Sampling and Testing**

'116.111(a)(2)(A)(i) Are the emissions expected to comply with all TCEQ air quality rules and regulations, and the intent of the Texas Clean Air Act? yes

'116.111(a)(2)(B) Will emissions be measured? yes

Method: CEMS

**Federal Program Applicability**

'116.111(a)(2)(D) Compliance with applicable NSPS expected? yes

Subparts A and Dc, IIII, KKKK

'116.111(a)(2)(E) Compliance with applicable NESHAP expected? NA

'116.111(a)(2)(F) Compliance with applicable MACT expected? NA

'116.111(a)(2)(H) Is nonattainment review required? no

A. Is the site located in a nonattainment area? no

If no, skip to 116.111(2)(I). If yes, continue.

116.111(a)(2)(I) Is PSD applicable? yes

A. Is the site a federal major source (100/250 tons/yr)? yes

B. Is the project a federal major source by itself? yes

C. Is the project a federal major modification? yes

1. Did project emission increases, without decreases, for pollutant of concern, minus the two-year average actual emissions trigger netting? no

2. Was contemporaneous increase significant? no

3. Change excluded by 40 CFR 52.21(b)(2)(iii)? no

If yes to B.2 or B.3 above, explain:

**Mass Cap and Trade Applicability**

'116.111(a)(2)(L) Is Mass Cap and Trade applicable? no

**Title V Applicability**

'122.10(13)(A) Is the site a major source under FCAA Section 112(b)? yes

(i). The site emits 10 tons or more of any single HAP? no

(ii). The site emits 25 tons or more of a combination no

'122.10(13)(C) Does the site emit 100 tons or more of any air pollutant? yes

'122.10(13)(D) Is the site a non-attainment major source? no

Note: Fugitive emissions are not included in total emissions unless the site is named in 30 TAC 122.10(13)(C).

**Request for Comments**

| | | | |
|---|---|---|---|
| Region: | 3 | Reviewed by: | |
| City: | | Reviewed by: | |
| | | | |
| | | | |
| | | | |

**Process Description** The Jack County Generation Plant is an existing 620 MW combined cycle power plant equipped with gas turbines, duct burners and a steam generator. BEC is proposing to expand the power plant by installing an additional 684 MW of generating capacity.

**Sources, Controls, Source Reduction and BACT** ['116.111(a)(2)(C)]

Sources of emissions at this plant will be two combined cycle gas turbines with duct burners, a cooling tower, one chiller, an emergency generator, an auxiliary boiler and various storage tanks

**NOx** - A search of the RACT/BACT/LAER Clearinghouse (RBLC) was conducted to identify combined cycle (CC) turbines greater than 25 MW in size that have been permitted in the past five years (2003 to present). A total of 25 natural gas fired SC turbines were identified and included in the review. The maximum allowable NOx emission rate ranged from 2.5 to 5.5 ppmvd @ 15% O2. All the turbines used or used a combination of dry low Nox combustors (DLN) and or selective catalytic reduction (SCR) to control NOx emissions. In summary, the use of DLN and SCR to control NOx emissions to 2 ppmvd while firing natural gas in the proposed turbines is consistent with the top levels of control for combined cycle turbines included in the RBLC and therefore satisfies BACT requirements.

**PM/PM10** - A search of the EPA's RACT/BACT/LAER Clearinghouse database to determine the predominant control methodologies and emission levels for BACT for PM/PM10 between 2003 and the present revealed 61 total entries for combustion turbines, of which 5 were LAER reviews and 56 were BACT reviews. In all reviews, no pre- or post-combustions controls were required for natural gas-fired turbines to control $PM/PM_{10}$. The control descriptions in the database are consistent with the proposed controls for Jack County Generation Plant - "Natural gas quality fuel and good combustions control".

**CO/VOC** - Good combuster design, good combustion practices with the addition of an oxidation catalyst will control CO to a level of 11 ppmvd @ 15% O2 and VOC to 3 ppmvd@15%.

**$SO_2$** - Minimizing formation of $SO_2$ will be accomplished by using pipeline quality natural gas with a sulfur content not exceeding 2.0 grains sulfur per 100 standard cubic feet (short-term) and 0.50grains per 100 standard cubic feet (annually)..

**$NH_3$** - Proper monitoring and operation of the SCR systems will limit $NH_3$ to 7 ppmvd, corrected to 15% oxygen.

**STARTUP/SHUTDOWN (SS)** - A search of the RBLC included both large and small turbines (simple/combined cycle) resulted in one entry that addressed SS emissions. The SS emission rates proposed for this project was deemed to be consistent with other air quality permits. A mass emission rate is listed in MAERT and Special Condition 9 limits the duration of each SS periods. During periods of reduced load operation, turbine emissions will be limited by mass emission rates, which are based upon normal operating BACT concentrations at full load. Unlike SS mass emission rate limits, mass emission rate limits during reduced load operations are predicted on the proper operation of emission controls necessary to meet BACT during normal operations. The mass emission rates are listed on the MAERT and are a form of operational control that represents BACT.

**Impacts Evaluation**

1. Was modeling done? yes Type? AERMOD

2. Will GLC of any air contaminant cause violation of NAAQS? no

3. Is this a sensitive location with respect to nuisance? no

4. Is the site within 3000 feet of any school? no

5. Toxics Evaluation: The significance modeling included all emission sources at the site.

6. Modeling Results: NOx, CO, VOC, and PM/$PM_{10}$ exceeded their corresponding PSD significance levels. Modeling shows that the predicted concentrations for all criteria pollutants with the exception of $PM_{10}$ are below the *de minimis* levels; therefore, only $PM_{10}$ required a full NAAQS analysis.

Table 5. Modeling Results for PSD Increment

| Pollutant | Scenario | Averaging Time | GLCmax Increment ($Fg/m^3$) | ($Fg/m^3$) |
|---|---|---|---|---|
| $PM_{10}$ | Normal | 24-hr | 16 | 30 |

Although PSD review was not triggered for $SO_2$ the client performed modeling analysis on this pollutant. Modeling shows that the predicted concentrations are below the *de minimis* level and no further analysis was required.

NH3 predicted concentrations are below the state ESL Standard.

**Miscellaneous**

1. Is applicant in agreement with special conditions? yes

Company representative? Mike Meyers

2. Emission reductions from source reduction or pollution prevention no

3. Emissions reductions resulting from the application of BACT required by state rules, avoidance of potential impacts problems, and voluntary reductions no

4. Other permit(s) affected by this action? no

If YES, list permit number(s) and actions required or taken

Project Reviewer Date Team Leader/Section Manager/Backup Date

# Headers

## *Review Analysis & Technical Review*

Permit No. 83801 Regulated Entity No. RN100221985

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# Section 1 - Document

## PRELIMINARY DETERMINATION SUMMARY

Brazos Electric Power Cooperative, Inc.

Permit Numbers 83801 and PSD-TX-1117

**I. APPLICANT**

Brazos Electric Power Cooperative, Inc.

P.O. Box 2585

Waco, Texas 76702

**II. PROJECT LOCATION**

Jack County Generation Facility

2404 La Salle Avenue

Waco, Texas 76702

**III. PROJECT DESCRIPTION:** Brazos Electric Power Cooperative, Inc. (BEC) proposes to construct two new combustion turbines (GE 7FAs with a nominal capacity of approximately 171 MW) each with a 600 MMBtu/hr duct burner and a steam turbine (approximately 342 MW) at the existing Jack County Generation Facility. Ancillary equipment that will also be built includes an emergency diesel generator, a cooling tower, chillers and miscellaneous storage tanks.

**IV. EMISSIONS:** The annual emissions of criteria pollutants associated with the proposed turbine project and their corresponding PSD significant levels in parentheses ( ), where applicable are identified as follows:

| Criteria Pollutants | | | | |
|---|---|---|---|---|
| $NO_x$ | CO | VOC | $PM/PM_{10}$ | $SO_2$ |
| **151** (40) | **501** (100) | **77** (40) | **124** (25/15) | 29 (40) |

**V. FEDERAL APPLICABILITY:** The Jack County Generation Facility is located in Jack County which is classified as an attainment area for all criteria pollutants. The site is currently considered to be a named major stationary source with respect to the prevention of significant deterioration (PSD)

program. The increased emissions will exceed the significant emission threshold for $NO_x$, CO, VOC, $PM/PM_{10}$; therefore, PSD review is required for these pollutants.

**VI. CONTROL TECHNOLOGY REVIEW:** Sources of emissions at this plant will be two combined cycle gas turbines with duct burners, a cooling tower, a chiller, an emergency generator, an auxiliary boiler and various storage tanks.

**$NO_x$** - A search of the RACT/BACT/LAER Clearinghouse (RBLC) was conducted to identify combined cycle (CC) turbines greater than 25 MW in size that have been permitted in the past five years (2003 to present). A total of 25 natural gas fired SC turbines were identified and included in the review. The maximum allowable $NO_x$ emission rate ranged from 2.5 to 5.5 ppmvd @ 15% O2. All the turbines used or used a combination of dry low Nox combustors (DLN) and or selective catalytic reduction (SCR) to control $NO_x$ emissions. In summary, the use of DLN and SCR to control $NO_x$ emissions to 2 ppmvd while firing natural gas in the proposed turbines is consistent with the top levels of control for combined cycle turbines included in the RBLC and therefore satisfies BACT requirements.

**$PM/PM_{10}$** - A search of the EPA's RACT/BACT/LAER Clearinghouse database to determine the predominant control methodologies and emission levels for BACT for $PM/PM_{10}$ between 2003 and the present revealed 61 total entries for combustion turbines, of which 5 were LAER reviews and 56 were BACT reviews. In all reviews, no pre- or post-combustions controls were required for natural gas-fired turbines to control $PM/PM_{10}$. The control descriptions in the database are consistent with the proposed controls for Jack County Generation Plant - "Natural gas quality fuel and good combustions control".

**CO/VOC** - Good combuster design, good combustion practices with the addition of an oxidation catalyst will control CO to a level of 11 ppmvd @ 15% $O_2$ and VOC to 3 ppmvd@15%. A search of the RBLC database was conducted to determine the control methodologies and emission levels for BACT for CO for the past three years, for combined cycle turbines greater than 25 MW. A total of 25 combined cycle turbines were identified. The search revealed about half of the facilities utilized an oxidation catalyst. For many the turbine the outlet concentration level was not reported, since the emission rates were listed in lb/hr these were excluded from consideration. For the remaining turbines where the concentration level was listed, the CO concentration levels varied from 1.5 to 25 ppmvd. The CO emissions for this project, fall within the range of RBLC and TCEQ results and in representative of BACT.

**START-UP/SHUTDOWN (SS)** - A search of EPA's RBLC database of both large and small turbines (simple/combined cycle) resulted in one entry that addressed start-up and shutdown emissions. The emission rates for the project (during SS) were deemed to be consistent with other air quality permit applications.

**$SO_2$** - Minimizing formation of $SO_2$ will be accomplished by using pipeline quality natural gas with a sulfur content not exceeding 2.0 grains sulfur per 100 standard cubic feet (short-term) and 0.50 grains per 100 standard cubic feet (annually).

**$NH_3$** - Proper monitoring and operation of the SCR systems will limit $NH_3$ to 7 ppmvd, corrected to 15% oxygen.

**VII. AIR QUALITY ANALYSIS:** Air dispersion modeling was performed in accordance with the Texas Commission on Environmental Quality (TCEQ) and EPA guidelines using AEROMOD. A significance analysis was initially conducted to determine if a full analysis would be required.

Proposed $SO_2$ emissions are less than the significance level (40 tpy). Modeling for PSD compliance demonstration is not required but was performed to verify compliance with the NAAQS as is required for the state permit. The $SO_2$ emissions as indicated in the table below do not exceed *de minimis*.

Start-up and shutdown (SS) emissions for $NO_x$ were not modeled separately since this is an annual standard. BEC will not exceed the maximum proposed annual tpy values represented in the application, which includes the MSS short-term rate; therefore, the annual $NO_x$ demonstration already verifies compliance.

SS CO emissions were modeled for the short-term impacts (1-hour and 8-hour). For the 1-hour demonstration the maximum short-term SS rate was used to demonstrate compliance. For the 8-hour demonstration the maximum SS hourly rate was pro-rated over a 5-hour period. This is because the permit limits warm starts to periods that do not exceed 5-hours. This entire demonstration is overly conservative since a turbine startup has a significantly shorter transient period than 1-hour and CO emissions are not expected to be emitted at the allowable rate for a continuous hour.

The purpose of the ozone ambient impact analysis is to demonstrate that a new major source or major modification of an existing major source that could emit 100 tpy or more of $NO_x$ or VOCs would not cause or contribute to a violation of the 8-hour ozone standard in attainment or unclassifiable areas. An ozone analysis was performed by the applicant following the current TCEQ guidance. The ozone analysis conducted by the applicant shows that the project is $NO_x$-dominanted. Based on historical analyses using the EKMA model, $NO_x$-dominated sources would not be expected to a have a discernible impact on the maximum ozone concentration in the area.

The project's maximum off-property GLCs are as follows:

| Pollutant | Averaging Period | Project GLC (Fg/$m^3$) | De Minimis |
|---|---|---|---|

| | | | (Fg/m$^3$) |
|---|---|---|---|
| $SO_2$ | 3-hour | 2 | 25 |
| | 24-hour | 1 | 5 |
| | annual | 0.1 | 1 |
| $PM_{10}$ | 24-hour | **6.8** | 5 |
| | annual | 0.8 | 1 |
| CO | 1-hour | 146 | 2000 |
| | 8-hour | 65 | 500 |
| CO (SS) | 1-hour | 1096 | 2000 |
| | 8-hour | 173 | 500 |
| $NO_x$ | annual | 0.97 | 1 |

**VIII. NATIONAL AMBIENT AIR QUALITY STANDARDS ANALYSIS:** The NAAQS analysis shows that the predicted concentrations for criteria pollutants $NO_x$, CO, $SO_2$ are below the *de minimis* levels, except $PM_{10}$. A full modeling analysis for $PM_{10}$ showed that the $PM_{10}$ emissions from the proposed project would not cause or contribute to an exceedance of the NAAQS.

| Full NAAQS analysis | | | | | |
|---|---|---|---|---|---|
| Pollutant | Averaging Period | NAAQS Modeling Result ($\mu g/m^3$) | Background Concentration ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) | NAAQS Standard ($\mu g/m^3$) |
| $PM_{10}$ | 24-hour | 16 | 60 | 76 | 150 |

**IX. INCREMENT ANALYSIS:**

Table 5. Modeling Results for PSD Increment

| Pollutant | Scenario | Averaging Time | GLCmax (Fg/m$^3$) | Increment (Fg/m$^3$) |
|---|---|---|---|---|
| $PM_{10}$ | Normal | 24-hr | 16 | 30 |

**X. AIR QUALITY MONITORING:** Predicted concentrations were below the monitoring *de minimis* levels; therefore, a PSD preconstruction monitoring applicability analysis was not triggered.

**XI. ADDITIONAL IMPACTS ANALYSIS:**

Growth analyses evaluate impacts from the general commercial, residential, and industrial growth associated with the project, within the AOI. The Jack County Power Generation Plant expansion project is expected to use personnel and labor resources available in the immediate area and is not expected to result in an increase to the local population. Additionally, the project is not expected to affect public services such as schools, hospitals, or police and fire response.

The impacts from the proposed project and associated growth are not expected to have adverse impact of soil, vegetation or visibility.

A Class 1 analysis is not required because the proposed project is located more than 200 km from the nearest Class 1 area and the emissions from the proposed project will not impact the Class 1 area.

**XII. AIR TOXICS REVIEW:** A State Effects Evaluation Analysis has been performed for the non-criteria pollutant ammonia to demonstrate that the public health and welfare are protected.

| Pollutant | Averaging Period | Total GLC ($Fg/m^3$) | Percent of State Standard ($Fg/m^3$) |
|---|---|---|---|
| $NH_3$ | 1-hour | 14 | 17 |

**XIII. CONCLUSION:** The Brazos Electric Power Cooperative Inc has proposed controls that represent BACT for the new turbine project at Jack County Generation Facility. Modeling analysis indicated that the proposed project will not violate the NAAQS or cause any consumption of the PSD increment. In addition, the modeling predicted no exceedance of ESLs at all receptors for non-criteria contaminants evaluated. **Therefore, the Executive Director of TCEQ proposes a preliminary determination of approval for BEC to construct the electric power generating facility, as proposed.**

## Headers

Preliminary Determination Summary

Permit Numbers 83801 and PSD-TX-1117

Page

# Section 1 - Document

**TECHNICAL BRIEFING SHEET**

Brazos Electric Power Cooperative Inc

Permit No.: 83801 and PSD-TX-1117

**PROJECT DESCRIPTION:** Brazos Electric Power Cooperative Inc (BEC) proposes to construct two new combustion turbines (GE 7FAs with a nominal capacity of approximately 171 MW) each with a 600 MMBtu/hr duct burner and a steam turbine (approximately 342 MW) at the existing Jack County Generation Facility. Ancillary equipment that will also be built includes an emergency diesel generator, a cooling tower, chillers and miscellaneous storage tanks.

**REVIEW:** The increased emissions will exceed the significant emission threshold for $NO_x$, CO, VOC, $PM/PM_{10}$; therefore, PSD review is required for these pollutants.

**BACT:**

**NOx** - The use of DLN and SCR to control $NO_x$ emissions to 2 ppmvd while firing natural gas in the proposed turbines is consistent with the top levels of control for combined cycle turbines included in the RBLC and therefore satisfies BACT requirements.

**$PM/PM_{10}$** - Utilization of pipeline quality natural gas, good combustion practices, drift eliminators on the cooling tower and efficient operations will limit $PM/PM_{10}$.

**CO/VOC** - Good combuster design, good combustion practices with the addition of an oxidation catalyst will control CO to a level of 11 ppmvd @ 15% $O_2$ and VOC to 3 ppmvd@15%.

**$NH_3$** - Proper monitoring and operation of the SCR systems will limit $NH_3$ to 7 ppmvd, corrected to 15% oxygen.

**START-UP/SHUTDOWN** - A search of the RBLC database of both large and small turbines (simple/combined cycle) resulted in one entry that addressed startup and shutdown emissions (SS). The SS emission rates proposed by BEC for this project were deemed to be consistent with other air quality applications.

**AIR QUALITY ANALYSES:** Air dispersion modeling was performed in accordance with TCEQ and EPA guidelines. The results indicated that the maximum concentrations of all criteria pollutants with the exception of $PM_{10}$ are less than the *de minimis* thresholds established for NAAQS and PSD

increment regulatory periods. A further analysis was performed and the analysis indicated that $PM_{10}$ would not violate the NAAQS or the PSD increment. $NH_3$ is below the ESL Standard.

**ADDITIONAL IMPACTS:** Project is not expected to affect the visibility, soils, nor vegetation in the area. There are no Class I areas within 200 km of the facility

**CONCLUSION:** The Executive Director has made a preliminary decision to issue this permit.

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