

**ENGINEERING EVALUATION REPORT
PG&E Co., HUNTERS POINT POWER PLANT
PLANT NUMBER 24
APPLICATION NUMBER 7375**

INTRODUCTION

This application is to bank Interchangeable Emission Reduction Credits (IERCs), in accordance with District Regulation 2, Rule 9, from the source below at PG&E Co.'s Hunters Point Power Plant in San Francisco, CA.

**S-7 Boiler No. 7 Electric Generation, Combustion Engineering Boiler,
1720 MMBtu/hr heat input**

The District previously approved IERCs for this boiler under application number 22504. That application included three IERC credit generation periods (CGP₁, CGP₂ and CGP₃) for the period January 1, 1997 through December 31, 1999. The original application also included IERCs for S-3, S-4, S-5, and S-6 Babcock & Wilson Boilers; 670 MMBtu/hr each for the same credit generation periods (CGP₁, CGP₂ and CGP₃). This new banking application is for one additional credit generation period (CGP):

CGP₄ January 1, 2000 through December 31, 2000

In this application, PG&E originally applied for IERCs from all boilers at the Hunters Point Power Plant: S-3, S-4, S-5, S-6 Boilers; 670 MMBtu/hr each and S-7 Boiler; 1720 MMBtu/hr. PG&E had applied for IERCs for S-3, S-4, S-5, S-6, and S-7 for the credit generation periods CGP₄ (January 1 through December 31, 2000), CGP₅ (January 1 through December 31, 2001), and CGP₆ (January 1 through December 31, 2002). At PG&E's request on May 13 and 22, 2003, the application was amended to bank IERCs solely from S-7 Combustion Engineering Boiler; 1720 MMBtu/hr for only one credit generation period, CGP₄, to cover January 1 through December 31, 2000.

According to PG&E's data logs, S-3 Boiler was permanently shutdown on June 29, 2000. S-4, S-5, and S-6 Boilers were permanently shutdown on July 24, 2000. S-7 Boiler at Hunters Point will be retired as soon as the California Independent System Operator (CAISO) and the Federal Energy Regulatory Commission (FERC) authorize PG&E to terminate its Reliability Must Run (RMR) Contract with CAISO.

All boilers that were in operation (S-3, S-4, S-5, and S-6) and the one remaining in operation (S-7) are subject to Regulation 9, Rule 11, which limits NO_x emissions from electric power generating steam boilers. Specifically, this source is part of an Advanced Technology Alternative Emission Control Plan (ATAECP) pursuant to Section 9-11-309, for sources under common ownership. Under an ATAECPP, an individual source is not required to meet a specific NO_x emission limit. Rather, all sources under the ATAECPP are limited to a system-wide average NO_x emission rate. For the calendar year 2000 or CGP₄, the system-wide NO_x limit was 0.105 pounds of NO_x emissions per million BTU of heat input (lb NO_x/MM BTU).

The reduction in NO_x emissions, for which PG&E can bank IERCs, are due to the use of lower emitting combustion practices. These include:

1. Modification of the gas burner rings for staged combustion. This technique creates an increase in the combustion gas residence time in fuel rich zones, reducing the formation of NO_x.
2. Biased firing of burners to achieve fuel-rich and air-rich zones. Therefore primary combustion can occur at a lower flame temperature (fuel-rich zone) and the secondary combustion can occur at lower bulk gas temperature (air-rich zone) to minimize NO_x formation.
3. Routing flue gas to the forced draft inlets for better flue gas-combustion air mixing.
4. Installation of an oxygen trim system for optimal excess air operation.
5. Installation of new gas recirculation fans and motors.
6. Installation of new oxygen and gas flow measuring instruments.
7. Installation of new flue gas ducts.
8. Improved operating procedures and training of Operations and Maintenance personnel.

IERC CALCULATIONS

The procedure for calculating IERCs is described in Regulation 2, Rule 9, Sections 602 and 603. The following IERC calculations are based on hourly NOx emissions and heat input data provided by PG&E. Because this application is for additional credit generation periods for a particular emission reduction activity at a source that has previously generated IERCs, the baseline for this application is the same baseline that was used in the previous IERC application for PG&E (Application Number 22504) but modified to include only the S-7 Boiler. The hourly NOx emissions and heat input for S-3, S-4, S-5, and S-6 will be removed from the original baseline, which included all boilers at the Hunters Point Power Plant (S-3 through S-7).

Determine Baseline Period:

The baseline period for S-7 was determined for PG&E’s original IERC banking application. Per Regulation 2, Rule 9, Section 602 (Reg. 2-9-602.1), the baseline period for a source is the 5-year period immediately preceding the initial credit generation period. The initial credit generation period, CGP₁ (where the subscript “1” represents the first credit generation period), is determined by the completion date of the *first* IERC banking application. PG&E’s IERC banking application number 22504 (AN 22504) was deemed complete on June 7, 1999. Per Reg. 2-9-204, the initial credit generation period “shall not be more than 30 months prior to the submittal of the first complete IERC banking application for a particular emission reduction activity”. The baseline and initial credit generation period satisfy the requirements of Section 2-9-204.

The baseline period and credit generation periods (CGPs) for S-7 are summarized below.

Baseline:	Jan. 1, 1992 – Dec. 31, 1996
CGP ₁	Jan. 1, 1997 – Dec. 31, 1997 (already approved in AN 22504)
CGP ₂	Jan. 1, 1998 – Dec. 31, 1998 (already approved in AN 22504)
CGP ₃	Jan. 1, 1999 – Dec. 31, 1999 (already approved in AN 22504)
CGP ₄	Jan. 1, 2000 – Dec. 31, 2000

Determine Baseline Throughput:

Baseline throughput is the lesser of actual throughput or permitted throughput during the baseline period. There were no permit conditions limiting fuel usage for S-7 during the baseline period. Therefore, the baseline throughput is the actual fuel usage reported by PG&E. The data to determine the baseline throughput for S-7 is found in Appendix A of AN 22504.

<i>Calendar Year</i>	<i>Natural Gas Input, MMBtu/yr</i>	<i>Oil Input, MMBtu/yr</i>	<i>Total Input, MMBtu/yr</i>
1992	10,012,892	7,188	10,020,080
1993	6,293,970	33,725	6,327,695
1994	9,076,731	1,770,975	10,847,706
1995	8,419,826	0	8,419,826
1996	7,609,103	0	7,609,103
Total	41,412,522	1,811,888	43,224,410

The gas and oil throughput data for the Hunters Point Power Plant were summarized from EPA data groups of the CEM (Continuous Emission Monitor) computers, which use hourly averages based on 15-minute averages. The raw CEM data can be accessed at the EPA website. Appendix A of AN 22504 contains the data summaries. The CEMs are regularly source tested to verify compliance with the District Regulation 1-522.6 that requires accuracy within 5% of CEM full scale or 10% of applicable emission standard.

Determine Baseline Emissions & Baseline Emission Rate:

Baseline emissions are the actual NOx emissions that occurred during the baseline period. The NOx emissions from S-7 were measured by a CEM. As mentioned above, raw CEM data can be accessed at the EPA website. The average annual emission rates calculated from EPA data groups are summarized below. Emissions and fuel data can be found in Appendix A of AN 22504.

Calendar Year	Natural Gas Emissions, ton/yr	Natural Gas Emission Factor, lb/MMBtu	Oil Emissions, ton/yr	Oil Emission Factor, lb/MMBtu
1992	678.93	0.1356	2.05	0.5704
1993	419.73	0.1334	2.44	0.1447
1994	551.79	0.1216	452.17	0.5106
1995	502	0.1192	0	NA
1996	450.2	0.1183	0	NA
Total	2,602.65 tons		456.66 tons	

However, under the ATAECF, oil firing is not allowed under Regulation 9-11-309. Therefore the emissions from oil firing must be adjusted to the levels that would have occurred if natural gas had been fired instead of oil by using the applicable gas emission factor.

$$\begin{aligned}
 1992: & 0.1356 \text{ lb/MMBtu} \times 7,188 \text{ MMBtu} & = 975 \text{ lb} & = 0.49 \text{ tons} \\
 1993: & 0.1334 \text{ lb/MMBtu} \times 33,725 \text{ MMBtu} & = 4,499 \text{ lb} & = 2.25 \text{ tons} \\
 1994: & 0.1216 \text{ lb/MMBtu} \times 1,770,975 \text{ MMBtu} & = 215,351 \text{ lb} & = 107.68 \text{ tons} \\
 & & \text{Total} & = 110.42 \text{ tons}
 \end{aligned}$$

$$\text{Total Emissions} = 2,602.65 \text{ ton} + 110.42 \text{ ton} = 2,713.07 \text{ ton}$$

The **baseline emission rate** is calculated by dividing the baseline emission by the baseline throughput.

$$(2,713.07 \text{ ton/yr}) (2000 \text{ lb/ton}) / (43,224,410 \text{ MMBtu}) = \mathbf{0.1255 \text{ lb NO}_x/\text{MM BTU}}$$

Determine the Baseline-Adjusted Emissions (A):

The District cannot approve IERCs for an emission reduction that is required by a District rule, RACT, BARCT, etc. during a given credit generation period. To prevent this, the baseline emission rate must be adjusted (reduced) to reflect any rule or provision that is in effect during the credit generation period. Since requirements may change over time, it is possible to have different baseline adjusted emission rates for different credit generation periods.

The baseline emission rate calculated above is 0.1255 lb NOx/MM BTU. However, source S-7 was subject to system-wide NOx emission rate limits of 0.105 lb/MM BTU for the calendar year 2000 per Reg. 9-11-309. Because the system-wide NOx limits in Reg. 9-11-309 are less than the actual baseline emission rate, the baseline emission rate must be reduced to the Reg. 9-11 limits.

The adjusted baseline emission rate is:

$$0.105 \text{ lb/MM BTU for CGP}_4 (2000)$$

The baseline-adjusted emissions are calculated by multiplying the *baseline adjusted emission rate* by the *baseline throughput* and by the *duration* of the CGP. The baseline-adjusted emission (A_x where x represents the CGP number) is:

$$\begin{aligned}
 A_4 &= (366 \text{ days}) (\text{yr}/366 \text{ days}) (0.105 \text{ lb/MM BTU}) (8,644,882 \text{ MM BTU/yr}) / (2000 \text{ lb/ton}) \\
 &= \mathbf{453.86 \text{ tons NO}_x}
 \end{aligned}$$

Determine the Actual Emissions (B) During the Credit Generation Period:

PG&E provided spreadsheets containing heat input and NOx emission data for all of the units in their system-wide average. In addition to data for the S-7 Boiler, data for S-3, S-4, S-5, S-6 Boilers were also included since they were operational for half of the year 2000. Data for boilers, S-3 through S-6 will be used to determine compliance with the ATAECF in Section 9-11-309. Total NOx emissions for the CGP were determined by totaling all of the hourly NOx emissions for the entire CGP. Total heat input was determined the same way. The emission rate for the CGP was calculated by dividing total NOx emissions by the total heat input. A summary of the monthly heat input and NOx emissions for the year 2000 are summarized in the spreadsheet attached to this evaluation report.

<i>CGP</i>	<i>Total NOx Emissions, lb</i>	<i>Total Heat Input, MMBtu</i>	<i>Emission Rate, lb/MMBtu</i>
CGP ₄	371,158	4,882,286	0.0760

From the table above, actual emissions (B) for CGP₄ is:

$$B_4 = 371,158 \text{ lb} \times (\text{ton}/2000 \text{ lb}) = 185.58 \text{ tons}$$

Determine Credit Generation Period Non-Curtailment Emissions (C):

The non-curtailment emissions (C) are calculated by multiplying the baseline throughput by the emission rate (lb NOx / MM BTU) and the duration of the CGP. The baseline throughput was 8,644,882 MM BTU/yr. The emissions rate for the CGP is in the table above.

$$C_4 = (8,644,882 \text{ MM BTU/yr}) (0.0760 \text{ lb/MM BTU}) (366 \text{ days}) (\text{yr}/366 \text{ days}) / (2000 \text{ lb/ton}) = 328.60 \text{ tons}$$

Calculate IERCs for the Credit Generation Period:

IERCs are calculated by subtracting the greater of either the actual emissions (B) or the non-curtailment emissions (C) from the baseline emissions (A). For CGP₄, the non-curtailment emissions are greater than the actual emissions.

$$\text{CGP}_4: \quad \text{IERCs} = A_4 - C_4 = 453.86 \text{ tons} - 328.60 \text{ tons} = 125.26 \text{ tons of NOx}$$

STATEMENT OF COMPLIANCE

For an emission reduction to be banked as an IERC, the reduction must be real, permanent, quantifiable, enforceable and surplus (Section 2-1-301.2).

Real: The emission reductions evaluated in this application are real. There was an actual decrease in emissions to the atmosphere, as is evident from continuous emission monitoring (CEM) data.

Permanent: As defined in Section 2-9-213, permanent means that the emission reduction exists for the duration of the credit generation period (CGP). Since all of the CGPs in this application have already ended, the emission reductions have already occurred, and therefore, are permanent.

Quantifiable: These emission reductions are quantifiable. The emission calculations were performed using NOx CEM data and heat input records.

Enforceable: As defined in Section 2-9-209, enforceable means that there is credible evidence during the credit generation periods to verify compliance with Regulation 2, Rule 9. The evaluation of this banking application is based on NOx CEM data and heat input. The District periodically tests this CEM for accuracy. Based on these Field Accuracy Tests, the NOx CEM is operating properly.

Surplus: As defined in Section 2-9-218, surplus means that the emission reductions are not required by Reasonably Available Control Technology (RACT), Best Available Retrofit Control Technology (BARCT), or any other rule in

effect during the credit generation period. In addition, emissions reductions must exceed any reduction required by the most recent Clean Air Plan or Air Quality Management Plan.

The District's most recent plan is the 2001 Ozone Attainment Plan (OAP). This OAP contains an emission inventory for the year 2000, and projected emission inventories for subsequent years broken out by source category. To determine whether or not the IERCs requested by PG&E are surplus to the OAP, staff compared the 2000 emission inventory with actual emissions, ERC usage, and IERC usage in 2000. This was done for all facilities that have generated or used IERCs to date. The 2000 emission inventory exceeded the sum of actual emissions plus ERC and IERC usage. Therefore, the IERCs requested in this application are surplus. The 'IERC Surplus Determination' spreadsheet is attached to this evaluation report

Regulation 9, Rule 11, Section 309 contains NO_x emission rate limits that were applicable to this source during the credit generation period. The original baseline emissions for this IERC banking application were reduced based on this NO_x emission rate limit. See the above discussion regarding *baseline-adjusted emissions*.

Adjustment to IERC for District Regulation 9-11-309:

The NO_x emission rate limits in Reg. 9-11-309 apply to the system-wide average emissions of the units operated by PG&E. There were 5 sources located at all of PG&E's facilities that are part of the system-wide average, which is called an *Advanced Technology Alternative Emission Control Plan (ATAECP)*. As part of an ATAECPP, emissions from a low-emitting source can be averaged with emissions from a high-emitting source, to meet the system-wide average limit in Reg. 9-11-309. Before granting IERCs for S-7 at the Hunters Point facility, the District had to verify that PG&E met the system-wide average NO_x limits without relying on emissions from S-7 at Hunters Point. This was done by subtracting the NO_x emissions and heat input for S-7 at Hunters Point from the system-wide NO_x emissions and heat input. For each hour during the portion of the year that S-3, S-4, S-5, and S-6 Boilers were in operation during the credit generation period (CGP₄), the District calculated a new average NO_x emission rate for the system, excluding the contribution from S-7 at Hunters Point. On February 15, 2000, there were 8 hours during which the adjusted NO_x emissions rates exceeded the allowable NO_x emission rate of 0.105 lb/MMBtu in Reg. 9-11-309. During the period of exceedance, 19.1283 lbs (0.0096 tons) of excess NO_x was emitted. After S-3, S-4, S-5, and S-6 Boilers were shutdown, the S-7 NO_x emission rate exceeded the limit of 0.105 lb/MMBtu in Reg. 9-11-309 for 2 hours on November 19, 2000. There were 3.4276 lbs (0.001714 tons) of excess NO_x emitted into the air. The NO_x in excess of the limit in Reg. 9-11-309 will be deducted from the IERCs.

CGP₄: IERCs = 125.26 – 0.0096 – 0.001714 = 125.25 tons of NO_x

After adjustment of IERCs, the remainder of the emission reductions in this IERC banking application was not needed by PG&E to meet their system-wide average. These IERCs are thus surplus.

PUBLIC COMMENT

The amount of IERCs for the CGP exceeds 40 tons. Therefore, this application is subject to the public comment provisions of Section 2-9-405. Before approving this banking application, the District must publish a notification of the preliminary decision to approve the IERCs. Following publication, there will be a 30-day public comment period, during which the District will accept written comments.

TOXIC RISK SCREENING ANALYSIS

There is no net increase in emissions of toxic compounds that will result from this IERC banking application. Therefore, a Toxic Risk Screening Analysis is not required.

CEQA

The District will issue a Notice of Exemption for this application. Pursuant to Regulation 2-1-312.10, review of this application to bank emission reductions pursuant to Regulation 2, Rule 9 is exempt from CEQA review because it can be seen with clarity that review and approval of such applications have no potential for causing a significant environmental impact.

RECOMENDATION

Staff recommends the District issue a Notice of Exemption for CEQA and a preliminary decision to approve the following IERCs for emission reductions that occurred at PG&E Hunters Point Power Plant.

IERC Banking Certificate #7-E 125.25 Tons of Nitrogen Oxides		
<u>Source #</u>	<u>Baseline Period</u>	<u>Credit Generation Period</u>
S-7, Boiler No. 7	1/1/92 – 12/31/96	1/1/00 – 12/31/00
Effective Date:	January 1, 2001	
Expiration Date:	December 31, 2005	

By: _____
Air Quality Engineer II
Date: August 19, 2003

**PG&E Co., Hunters Point Power Plant
Monthly Summary of NOx and Heat Input
Application Number 7375**

CGP#4: January 1, 2000 through December 31, 2000

	NOx lb	Heat MMBtu
January	0.0	0.0
February	0.0	0.0
March	28486.6	398022.2
April	32306.9	414039.3
May	33854.3	430960.4
June	7951.1	109432.1
July	24876.2	397162.7
August	30669.8	473597.2
September	36703.3	518558.7
October	39325.8	554200.3
November	50484.7	634240.8
December	86499.3	952072.1
Totals:	371158.0	4882285.7

CGP Average: 0.0760 lb NOx/MMBtu