

**ENGINEERING EVALUATION REPORT  
SHELL MARTINEZ REFINERY  
PLANT NO. 11  
APPLICATION NO. 6979**

**INTRODUCTION**

This application is to bank Interchangeable Emission Reduction Credits (IERCs), in accordance with District Regulation 2, Rule 9, from the sources listed below at the Shell Martinez Refinery in Martinez, CA.

S-1507	CO Boiler #1
S-1509	CO Boiler #2
S-1512	CO Boiler #3

The emission reductions are the result of combustion modifications to CO Boilers No. 1, No. 2 and No. 3 that occurred on June 8, 1999, April 29, 1999, and October 28, 1998, respectively. Shell has already banked IERCs from these sources for the initial credit generation periods (CGP #1) immediately following the combustion modifications to each source. IERCs from CO Boilers 1 and 2 were banked under application numbers 439 and 1820. IERCs from CO Boiler 3 were banked under application numbers 27765 and 1820.

This application is to bank IERCs from all three CO Boilers for the credit generation period of July 1, 2001 through June 30, 2002. This is the fourth credit generation period (CGP<sub>4</sub>) for CO Boilers 1 and 2, and the fifth credit generation period (CGP<sub>5</sub>) for CO Boiler 3. IERCs for this application are calculated using the same baseline periods that were used in the previous IERC banking applications.

**IERC CALCULATIONS**

The procedure for calculating IERCs is described in Regulation 2, Rule 9, Sections 602 and 603. The IERC calculations to follow are based on daily NOx CEM concentrations, NOx emissions and steam production rates provided by Shell. Baseline data used in this application is the same data used in previous IERC applications from Shell. The data for each CGP was provided by Shell in this banking application. District staff audited this data by comparing it with data previously submitted as part of monthly emission reports for the CO Boilers.

***Determine Baseline Period:***

The baseline periods were already determined in the original IERC banking applications for the CO Boilers. The baseline periods and credit generation periods (CGPs) for the CO Boilers are summarized in Table 1. ***The credit generation periods for this current IERC banking application are highlighted in bold italics print.***

**Table 1 – CO Boiler Baselines and Credit Generation Periods**

	<b>COB 1</b>	<b>COB 2</b>	<b>COB 3</b>
<b>Baseline</b>	6/8/94 – 6/7/99	4/29/94 – 4/28/99	11/7/93 – 11/6/98
<b>CGP<sub>1</sub></b>	6/8/99 – 9/26/99	4/29/99 – 9/26/99	11/7/98 – 4/30/99
<b>CGP<sub>2</sub></b>	9/27/99 – 8/27/00	9/27/99 – 8/27/00	5/1/99 – 4/30/00
<b>CGP<sub>3</sub></b>	8/28/00 – 6/30/01	8/28/00 – 6/30/01	5/1/00 – 8/27/00
<b>CGP<sub>4</sub></b>	<b><i>7/1/01 – 6/30/02</i></b>	<b><i>7/1/01 – 6/30/02</i></b>	8/28/00 – 6/30/01
<b>CGP<sub>5</sub></b>	N/A	N/A	<b><i>7/1/01 – 6/30/02</i></b>

Per Regulation 2, Rule 9, Section 602 (Reg. 2-9-602), the baseline period for a source is the 5-year period immediately preceding the initial credit generation period. The initial credit generation period is determined by the completion date of the *first* IERC banking application. IERC banking applications 439 (CO Boilers 1 and 2) and 27765 (CO Boiler 3) were deemed complete on October 20, 1999, and September 3, 1999, respectively. 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 periods in Table 1 satisfy the requirements of Section 2-9-204.

**Determine Baseline Throughputs:**

Baseline throughput is the lesser of actual throughput or permitted throughput during the baseline period. Since none of the CO Boilers has a permit condition that limits throughput, the actual throughput is used. Average NOx emissions and throughput rates are summarized for the baselines and credit generation periods in Table 2 through 4.

**TABLE 2 – Summary of NOx Emissions & Steam Production from COB #1**

<b>CO Boiler 1</b>	<b>Baseline 5-Yr Ave.</b> 6/8/94 – 6/7/99	<b>CGP<sub>4</sub></b> 7/1/01 – 6/30/02
<b>Ave. NOx (lb/hr)</b>	84.96	46.7
<b>Ave. Steam (klb/hr)</b>	122.88	102.9
<b>NOx (lb) / Steam (klb)</b>	0.691	0.454

**TABLE 3 – Summary of NOx Emissions & Steam Production from COB #2**

<b>CO Boiler 2</b>	<b>Baseline 5-Yr Ave.</b> 4/29/94 – 4/28/99	<b>CGP<sub>4</sub></b> 7/1/01 – 6/30/02
<b>Ave. NOx (lb/hr)</b>	84.31	44.0
<b>Ave. Steam (klb/hr)</b>	124.11	118.7
<b>NOx (lb) / Steam (klb)</b>	0.679	0.371

**TABLE 4 – Summary of NOx Emissions & Steam Production from COB #3**

<b>CO Boiler 3</b>	<b>Baseline 5-Yr Ave.</b> 11/7/93 – 11/6/98	<b>CGP<sub>5</sub></b> 7/1/01 – 6/30/02
<b>Ave. NOx (lb/hr)</b>	80.46	41.8
<b>Ave. Steam (klb/hr)</b>	126.37	119.9
<b>NOx (lb) / Steam (klb)</b>	0.637	0.349

From Tables 2 through 4 above, the average steam production rates (throughputs) over the respective baseline periods are:

- CO Boiler 1 122.88 thousand pounds per hour (klb/hr)
- CO Boiler 2 124.11 klb/hr
- CO Boiler 3 126.37 klb/hr

**Determine Baseline Emissions:**

From Tables 2 through 4 above, the average hourly NOx emission rates over the respective baseline periods are:

CO Boiler 1	84.96 lb/hr
CO Boiler 2	84.31 lb/hr
CO Boiler 3	80.46 lb/hr

Baseline emissions are calculated by multiplying the hourly NOx emission rate by 8760 hr/year.

CO Boiler 1	$(84.96 \text{ lb/hr}) (8760 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 372.1 \text{ tons/yr}$
CO Boiler 2	$(84.31 \text{ lb/hr}) (8760 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 369.3 \text{ tons/yr}$
CO Boiler 3	$(80.46 \text{ lb/hr}) (8760 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 352.4 \text{ tons/yr}$

**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 CO Boilers have been subject to the 300 ppm NOx limit (at 3% oxygen) in Regulation 9, Rule 10, Section 303.1 since May 31, 1995. Because NOx emissions from the CO Boilers were less than 300 ppm during the respective baseline periods, no adjustment is necessary. The 150 ppm limit in Reg. 9-10-304 became effective on July 1, 2002. The credit generation period in this application is prior to the 7/1/02 effective date of Reg. 9-10-304. Therefore, it is not necessary to adjust the baseline emission rate to account for the 150 ppm NOx limit.

All three CO Boilers at Shell are subject to a permit condition limiting combined NOx emissions to 6770 lb/day, averaged over any consecutive 365-day period. This permit condition became effective on June 7, 1995.

Converting this limit into units of lb/hr yields:

$$[(6770 \text{ lb/day}) / (3 \text{ CO Boilers})] / (24 \text{ hr/day}) = 94.0 \text{ lb/hr per CO Boiler}$$

For both CO Boilers 1 and 2, annualized NOx emissions during the first year of the 5-year baseline period exceeded the above 94 lb/hr limit. Therefore, the baseline emissions for CO Boilers 1 and 2 must be adjusted. By substituting 94.0 lb/hr for year 1 of the baseline period, the 5-year baseline averages are:

CO Boiler 1:	83.68 lb/hr
CO Boiler 2:	82.99 lb/hr

The baseline-adjusted emissions for CO Boilers 1 and 2 are:

<b>A (COB 1)</b>	$(83.68 \text{ lb/hr}) (8760 \text{ hr/yr}) / (2000 \text{ lb/ton}) = \mathbf{366.5 \text{ tons NOx/yr}}$
<b>A (COB 2)</b>	$(82.99 \text{ lb/hr}) (8760 \text{ hr/yr}) / (2000 \text{ lb/ton}) = \mathbf{363.5 \text{ tons NOx/yr}}$

For CO Boiler 3, the baseline-adjusted emissions are the same as the baseline emissions.

**A (COB 3) = 352.4 tons of NOx/yr**

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

Actual emissions during each CGP are determined by multiplying the hourly average NOx emissions for the particular CGP by the duration of that CGP. The duration of the credit generation period is 365 days. Average NOx emission rates during the CGP are taken from Tables 2, 3 and 4 above.

Actual emissions (B<sub>x</sub> where x represents the CGP number) are:

$$B_4 \text{ (COB 1)} = (46.7 \text{ lb/hr}) (24 \text{ hr/day}) (365 \text{ days}) / (2000 \text{ lb/ton}) = \mathbf{204.5 \text{ tons of NOx}}$$

$$B_4 \text{ (COB 2)} = (44.0 \text{ lb/hr}) (24 \text{ hr/day}) (365 \text{ days}) / (2000 \text{ lb/ton}) = \mathbf{192.7 \text{ tons of NOx}}$$

$$B_5 \text{ (COB 3)} = (41.8 \text{ lb/hr}) (24 \text{ hr/day}) (365 \text{ days}) / (2000 \text{ lb/ton}) = \mathbf{183.1 \text{ tons of NOx}}$$

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

The non-curtailment emissions (C<sub>x</sub> where x represents the CGP number) are calculated by multiplying the baseline throughput (steam production rate) by the emission rate (lb NOx / klb steam) for that CGP. From Tables 2, 3 and 4, the emission rates are:

$$\text{CGP}_4 \text{ emissions rate (COB 1)} = 0.454 \text{ lb NOx / klb steam}$$

$$\text{CGP}_4 \text{ emissions rate (COB 2)} = 0.371 \text{ lb NOx / klb steam}$$

$$\text{CGP}_5 \text{ emissions rate (COB 3)} = 0.349 \text{ lb NOx / klb steam}$$

$$C_4 \text{ (COB 1)} =$$

$$(122.88 \text{ klb steam/hr})(0.454 \text{ lb NOx/klb steam})(24 \text{ hr/day})(365 \text{ days}) / (2000 \text{ lb/ton})$$

$$= \mathbf{244.3 \text{ tons of NOx}}$$

$$C_4 \text{ (COB 2)} =$$

$$(124.11 \text{ klb steam/hr})(0.371 \text{ lb NOx/klb steam})(24 \text{ hr/day})(365 \text{ days}) / (2000 \text{ lb/ton})$$

$$= \mathbf{201.7 \text{ tons of NOx}}$$

$$C_5 \text{ (COB 3)} =$$

$$(126.37 \text{ klb steam/hr})(0.349 \text{ lb NOx/klb steam})(24 \text{ hr/day})(366 \text{ days}) / (2000 \text{ lb/ton})$$

$$= \mathbf{193.2 \text{ tons of NOx}}$$

**Calculate IERCs for the Credit Generation Period:**

For a given source and 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 each CGP in this application, the non-curtailment emissions are greater than the actual emissions. Therefore, IERCs will be calculated by subtracting non-curtailment emissions from the baseline emissions (IERCs = A – C).

$$\text{COB 1 (CGP}_4\text{):} \quad \text{IERCs} = 366.5 \text{ tons} - 244.3 \text{ tons} = \mathbf{122.2 \text{ tons of NOx}}$$

$$\text{COB 2 (CGP}_4\text{):} \quad \text{IERCs} = 363.5 \text{ tons} - 201.7 \text{ tons} = \mathbf{161.8 \text{ tons of NOx}}$$

$$\text{COB 3 (CGP}_5\text{):} \quad \text{IERCs} = 352.4 \text{ tons} - 193.2 \text{ tons} = \mathbf{159.2 \text{ tons of NOx}}$$

### ***IERC Banking Certificate***

IERCs are valid for 5 years following the end of the credit generation period. Because the credit generation period for each of the three CO Boilers is the same, the IERCs will be combined into a single IERC Banking Certificate.

**IERC Banking Certificate #8-D** (effective 7/1/02, expires 6/30/07)  
**443.2 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 the CGP in this application has 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 and emission data, and steam production data.

***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 actual steam production data and NOx CEM and emission data.

***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 is not aware of any EPA guidance on RACT for CO Boilers. In the absence of such guidance, the District considers the 300 ppm NOx limit in Regulation 9, Rule 10, Section 303.1 to constitute RACT for CO Boilers during this credit generation period. This limit became effective on May 31, 1995. Respective emissions during the baseline period and credit generation period for the CO Boilers were below the current 300 ppm limit. Therefore, it is not necessary to further reduce those emissions for RACT.

Regulation 9, Rule 10, Section 304.1 contains a NOx limit of 150 ppm. The District considers this limit to constitute BARCT. This limit became effective on July 1, 2002. Since the 150 ppm limit was not in effect during the baseline or credit generation periods, it is not necessary to adjust emissions for BARCT at this time.

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 Shell are surplus to the OAP, staff compared the 2001 and 2002 emission inventories with actual emissions, ERC usage, and IERC usage in 2001 and 2002. This was done for all

facilities that have generated or used IERCs to date. The 2001 and 2002 emission inventories exceeded the sum of actual emissions plus ERC and IERC usage. Therefore, the IERCs requested in this application are surplus.

**PUBLIC COMMENT**

The amount of IERCs 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 our 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.

**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 and a public notice for our preliminary decision to approve the following IERCs for emission reductions that occurred at Shell.

<b>IERC Banking Certificate #8-D</b>		<b>443.2 Tons of Nitrogen Oxides</b>	
<u>Source #</u>	<u>Baseline Period</u>	<u>Credit Generation Period</u>	
S-1507 CO Boiler #1	6/8/94 – 6/7/99	7/1/01 – 6/30/02	
S-1509 CO Boiler #2	4/29/94 – 4/28/99	7/1/01 – 6/30/02	
S-1512 CO Boiler #3	11/7/93 – 11/6/98	7/1/01 – 6/30/02	
<b>Effective Date:</b>	<b>July 1, 2002</b>		
<b>Expiration Date:</b>	<b>June 30, 2007</b>		

By: \_\_\_\_\_  
 Supervising Air Quality Engineer  
 Date: July 15, 2003