DRAFT ENGINEERING EVALUATION REPORT
SHELL OIL PRODUCTS
PLANT NO. 11
APPLICATION NO. 30006

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, 2, and 3 have previously been banked under application numbers 27765, 439, 1820, 6979, 10368, 14858, 16772, 21415, 25198, and 28247.

This application is to bank IERCs from all three CO Boilers for the following credit generation periods:

July 1, 2015 through June 30, 2016 (366 days)
July 1, 2016 through June 30, 2017 (365 days)
July 1, 2017 through June 30, 2018 (365 days)

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 by Shell as part of monthly emission reports for the CO Boilers, as required by the Clean Fuels Project permit conditions, for select months during the credit generation periods.

Determine Baseline Period:
The baseline periods were 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 Boilers Baseline and Credit Generation Periods

	COB 1	COB 2	COB 3
Baseline	6/8/94 – 6/7/99	4/29/94 – 4/28/99	11/7/93 – 11/6/98
CGP_1	6/8/99 – 9/26/99	4/29/99 – 9/26/99	11/7/98 – 4/30/99
CGP_2	9/27/99 – 8/27/00	9/27/99 – 8/27/00	5/1/99 – 4/30/00
CGP_3	8/28/00 – 6/30/01	8/28/00 – 6/30/01	5/1/00 – 8/27/00
CGP_4	7/1/01 – 6/30/02	7/1/01 – 6/30/02	8/28/00 – 6/30/01
CGP_5	7/1/02 – 6/30/03	7/1/02 – 6/30/03	7/1/01 – 6/30/02
CGP_6	7/1/03 – 3/31/04	7/1/03 – 3/31/04	7/1/02 – 6/30/03
CGP_7	4/1/04 – 6/30/04	4/1/04 – 6/30/04	7/1/03 – 3/31/04
CGP_8	7/1/04 – 6/30/05	7/1/04 – 6/30/05	4/1/04 – 6/30/04
CGP_9	7/1/05 – 6/30/06	7/1/05 – 6/30/06	7/1/04 – 6/30/05
CGP_{10}	7/1/06 – 6/30/07	7/1/06 – 6/30/07	7/1/05 – 6/30/06
CGP_{11}	7/1/07 – 6/30/08	7/1/07 – 6/30/08	7/1/06 – 6/30/07
CGP_{12}	7/1/08 – 6/30/09	7/1/08 – 6/30/09	7/1/07 – 6/30/08
CGP_{13}	7/1/09 – 6/30/10	7/1/09 – 6/30/10	7/1/08 – 6/30/09
CGP_{14}	7/1/10 – 6/30/11	7/1/10 – 6/30/11	7/1/09 – 6/30/10
CGP_{15}	7/1/11 – 6/30/12	7/1/11 – 6/30/12	7/1/10 – 6/30/11
CGP_{16}	7/1/12 – 6/30/13	7/1/12 – 6/30/13	7/1/11 – 6/30/12
CGP_{17}	7/1/13– 6/30/14	7/1/13– 6/30/14	7/1/12 – 6/30/13
CGP_{18}	7/1/14 – 6/30/15	7/1/14 – 6/30/15	7/1/13– 6/30/14
CGP_{19}	***7/1/15 – 6/30/16***	***7/1/15 – 6/30/16***	7/1/14 – 6/30/15
CGP_{20}	***7/1/16– 6/30/17***	***7/1/16– 6/30/17***	***7/1/15 – 6/30/16***
CGP_{21}	***7/1/17 – 6/30/18***	***7/1/17 – 6/30/18***	***7/1/16– 6/30/17***
CGP_{22}			***7/1/17 – 6/30/18***

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.

Baseline Information:

The original baseline data is summarized in Table 2. This is the same baseline data that was used for all previous IERC banking applications for the CO Boilers.

Table 2– Baseline Data at 300 ppm NOx
(lb/ hr average)

	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Ave.
COB 1	100.40	75.18	78.07	85.33	85.82	84.96
COB 2	100.60	79.59	77.79	70.58	92.99	84.31
COB 3	91.33	91.38	70.09	59.07	90.43	80.46
Average	***97.446***	***82.049***	***75.317***	***71.661***	***89.748***	

Table 3 – Original IERC 5-Year Baseline Data

		CO Boiler 1 6/8/94 –6/7/99	CO Boiler 2 4/29/94 – 4/28/99	CO Boiler 3 11/7/93 – 1/6/98
Ave. NOx Emissions	**lb/hr**	84.96	84.31	80.46
Ave. Steam Production	**klb/hr**	122.88	124.11	126.37
NOx/Steam ratio	**lb/klb**	0.691	0.679	0.637

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 in Table 3 above.

Determine Baseline Emissions:

From Table 3, 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 8,760 hr/year.

CO Boiler 1 (84.96 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = 372.1 tons/yr
CO Boiler 2 (84.31 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = 369.3 tons/yr
CO Boiler 3 (80.46 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = 352.4 tons/yr

These are the baseline emissions used for the initial IERC banking application. However, these emissions must be reduced for this banking application, as discussed below.

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. Therefore, 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 following rules, provisions, and limits were established after the CO Boilers were originally permitted:

- In June 1995 permit condition #12271, Part 85 was amended to limit total NOx emissions from all three boilers to 5,452 lb/day. This condition limit is equivalent to 75.72 lb NOx/hr for each boiler [(5,452 lbNOx/day / 24 hr/day)/3].
- On July 1, 2002 Regulation 9-10-304 became effective. This limits NOx from CO Boilers to 150 ppm (at 3% O_2).

- On May 22, 2012 the Shell EPA Consent decree became effective as a minor revision to Shell's Title V Permit. Limits from the CD are specific to each CO Boiler, and there is a rolling 24 hour limit and a rolling 365 day limit on each boiler. The limits are expressed at 0% O_2 in the permit as shown in Table 4.

Table 4 – EPA Consent Decree Limits on CO Boilers at 0% O_2

CO Boiler	Rolling 24 hour NOx Limit (ppm at 0% O_2)	Rolling 365 day NOx Limit (ppm at 0% O_2)
COB 1	168.4	130.6
COB 2	156.9	127.4
COB 3	142.7	113.1

To convert these limits to the same measurement as the District limits of ppm at 3% O_2; multiply the concentration at 0% by (20.95-3)/20.95 = 0.857. The converted limits are shown in Table 5.

Table 5 – EPA Consent Decree Limits Converted to 3% O_2

CO Boiler	Rolling 24 hour NOx Limit (ppm at 3% O_2)	Rolling 365 day NOx Limit (ppm at 3% O_2)
COB 1	144.3	111.9
COB 2	134.4	109.2
COB 3	122.3	96.9

- On January 1, 2015, the average operating day limit in Section 304.7 of Regulation 9-10 became effective. This limits NOx from CO Boilers to 125 ppm (at 3% O_2).
- On August 1, 2015 part 24 of permit condition 25134 became effective. This condition limits total NOx emissions from all three boilers to 468 tons/yr = 2,564 lb/day, annual average. This condition limit is equivalent to 35.61 lb NOx/hr for each boiler [(2,564 lb NOx/day / 24 hr/day)/3].
- On December 31, 2015 the average calendar year limit in Section 304.7 of Regulation 9-10 became effective. This limits NOx from CO Boilers to 85 ppm (at 3% O_2).

The baseline data will be adjusted to account for each of these limitations. The most restrictive adjusted emission rate will be used to calculate the Baseline-Adjusted Emissions (A).

Adjusting the baseline data to account for NOx limit in Permit Condition 12271 (Effective June 1995):

The NOx limit of 5,452 lb/day is equivalent to 75.72 lb/hr per COB. The baseline data In Table 2 was reviewed and for any year in which the average emissions for all 3 boilers was greater than 75.72 lb/hr, staff substituted 75.72 lb/hr for each CO Boiler for that year. Years 1 and 2 were adjusted accordingly. Table 6 summarizes the results of this adjustment.

Table 6 – Baseline Data Adjusted for 5,452 lb/day NOx Limit

	Baseline Adjusted NOx Emissions (lb/hr average)					
	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Ave.
COB 1	75.72	75.72	75.72	72.78	70.85	**74.16**
COB 2	75.72	75.72	74.75	64.62	77.21	**73.60**
COB 3	75.72	75.72	69.46	57.86	75.79	**70.91**
Average	***75.72***	***75.72***	***73.31***	***65.09***	***74.62***	

Adjusting the baseline data to account for the 150 ppm NOx Standard:

Because there is a subsequent more stringent 125 ppm and 85 ppm NOx standards covering the entire credit generating period for all three sources this adjustment is not necessary.

Adjusting the baseline data to account for the Consent Decree NOx limits (Effective May 22, 2012):

The baseline data was reviewed on a daily basis and lowered for any day the actual daily concentration was greater than the new daily limits outlined in Table 5 above. The annual average NOx for each year during the baseline was also reviewed and lowered to the new annual average NOx limits in Table 5. Tables 7 and 8 summarize the results of this adjustment which show that the annual average NOx limits in the Consent Decree result in the most restrictive adjustments to the baseline to date.

Table 7– Baseline Data Adjusted for Rolling 24-hour NOx Limits in Consent Decree

	Baseline Adjusted NOx Emissions (lb/hr average)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**5-Yr Ave.**
COB 1	85.22	72.14	74.96	70.69	68.78	**74.36**
COB 2	78.04	71.93	71.01	59.92	70.50	**70.28**
COB 3	66.73	67.75	64.22	54.05	65.07	**63.56**
Average	**76.66**	**70.60**	**70.06**	**61.55**	**68.12**	

Table 8 – Baseline Data Adjusted for Annual Average NOx Limits in Consent Decree

	Baseline Adjusted NOx Emissions (lb/hr average)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**5-Yr Ave.**
COB 1	66.17	62.89	64.69	61.61	59.65	**63.00**
COB 2	63.44	61.62	65.02	56.82	62.78	**61.93**
COB 3	56.58	53.94	54.10	53.36	54.38	**54.47**
Average	**62.06**	**59.48**	**61.27**	**57.26**	**58.93**	

Adjusting the baseline data to account for the 125 ppm NOx Standard (Effective January 2015):

The baseline data was reviewed on a daily basis and for any day during the 5-year period baseline period when the average NOx concentration was greater than 125 ppm the daily NOx emission was lowered accordingly. This was done by multiplying the actual emissions (lb/hr) by the ratio of the NOx concentrations. For example, if the actual daily NOx concentration was 185 ppm and the daily NOx emissions were 90 lb/hr, the adjusted NOx emissions were calculated as follows:

Example NOx adjustment to 125 ppm: (125 ppm/185 ppm) (90 lb/hr) = 60.81 lb/hr

This calculation was performed for each day during the baseline period that has a concentration greater than 125 ppm. Table 9 summarizes the results of this adjustment and shows that Consent Decree annual average NOx limits in Table 8 remain the most restrictive adjustments to the baseline to date.

Table 9 – Baseline Data Adjusted for 125 ppm NOx Standard

	Baseline Adjusted NOx Emissions (lb/hr average)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**5-Yr Ave.**
COB 1	73.89	65.46	68.71	62.39	61.01	**66.29**
COB 2	72.60	68.07	67.48	56.51	66.17	**66.17**
COB 3	68.18	69.23	65.08	54.63	66.31	**64.69**
Average	***71.56***	***67.58***	***67.09***	***57.84***	***64.50***	

Adjusting the baseline data to account for the Permit Condition 25134 (Effective August 1, 2015):

The NOx limit of 2,564 lb/day is equivalent to 35.61 lb/hr per COB. The baseline data In Table 2 was reviewed and for any year in which the average emissions for all 3 boilers was greater than 35.6 lb/hr the average hourly emissions were adjusted accordingly. Table 10 summarizes the results of this adjustment and shows that the daily NOx limit in Permit Condition 25134 is now the most restrictive adjustment to the baseline to date.

Table 10 – Baseline Data Adjusted for 2,564 lb/day NOx Limit

	Baseline Adjusted NOx Emissions (lb/hr average)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**5-Year Ave.**
COB 1	35.61	35.61	35.61	35.61	35.61	**35.61**
COB 2	35.61	35.61	35.61	35.61	35.61	**35.61**
COB 3	35.61	35.61	35.61	35.61	35.61	**35.61**
Average	***35.61***	***35.61***	***35.61***	***35.61***	***35.16***	

Adjusting the baseline data to account for the 85 ppm NOx Standard (Effective December 1, 2015):

The baseline data was reviewed on a daily basis and for any day during the 5-year period baseline period when the average NOx concentration was greater than 85 ppm the daily NOx emission was lowered accordingly. This was done by multiplying the actual emissions (lb/hr) by the ratio of the NOx concentrations. For example, if the actual daily NOx concentration was 185 ppm and the daily NOx emissions were 90 lb/hr, the adjusted NOx emissions were calculated as follows:

Example NOx adjustment to 85 ppm: (85 ppm/185 ppm) (90 lb/hr) = 41.35 lb/hr

This calculation was performed for each day during the baseline period that has a concentration greater than 85 ppm. Table 11 summarizes the results of this adjustment and shows that the daily NOx limit in Permit Condition 25134 remains the most restrictive adjustment to the baseline to date.

↑ in Table 10

Table 11 – Baseline Data Adjusted for 85 ppm NOx Standard

	Baseline Adjusted NOx Emissions (lb/hr average)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**5-Yr Ave.**
COB 1	50.26	47.78	49.14	46.80	45.31	**47.86**
COB 2	49.38	47.97	50.61	44.23	48.86	**48.21**
COB 3	49.63	47.30	47.46	46.81	47.70	**47.78**
Average	***49.76***	***47.68***	***49.07***	***45.94***	***47.29***	

Table 12 summarizes the most restrictive baseline adjustment that will be used for each credit generation period (CGP).

Table 12 – Most Restrictive Adjustments

CGP#	Source	Period	# of days	Most Restrictive Adjusted Baseline	Average Hourly NOx (lb/hr)
19	COB1	July 1, 2015 through July 31, 2015	31	Consent Decree Annual Average	63.0
19	COB2	July 1, 2015 through July 31, 2015	31	Consent Decree Annual Average	61.93
19	COB1 and COB2	August 1, 2015 through June 30, 2016	335	Permit Condition 25134	35.6
20	COB1 and COB2	July 1, 2016 through June 30, 2017	365	Permit Condition 25134	35.6
20	COB 3	July 1, 2015 through July 31, 2015	31	Consent Decree Annual Average	54.47
20	COB 3	August 1, 2015 through June 30, 2016	335	Permit Condition 25134	35.6
21	COB1, COB2, and COB3	July 1, 2016 through June 30, 2017	365	Permit Condition 25134	35.6
22	COB3	July 1, 2016 through June 30, 2017	365	Permit Condition 25134	35.6

Baseline Adjusted Emissions (A_x where *x* represents the CGP number):

7/1/15 – 6/30/16

A_{19} (COB1) =

((63.0 lb/hr)(24 hr/day)(31 days) + (35.6 lb/hr)(24 hr/day)(335 days))/2,000 lb/ton = **166.55 tons of NOx**

A_{19} (COB2) =

((61.93 lb/hr)(24 hr/day)(31 days) + (35.6 lb/hr)(24 hr/day)(335 days))/2,000 lb/ton = **166.15 tons of NOx**

A_{20} (COB3) =

((54.47 lb/hr)(24 hr/day)(31 days) + (35.6 lb/hr)(24 hr/day)(335 days))/2,000 lb/ton = **163.37 tons of NOx**

7/1/16 – 6/30/17

A_{20} (COB1) =
(35.6 lb/hr)(8,760 hr/yr)/2,000 lb/ton = **155.93 tons of NOx**

A_{20} (COB2) =
(35.6 lb/hr)(8,760 hr/yr)/2,000 lb/ton = **155.93 tons of NOx**

A_{21} (COB3) =
(35.6 lb/hr)(8,760 hr/yr)/2,000 lb/ton = **155.93 tons of NOx**

7/1/17 – 6/30/18

A_{21} (COB1) =
(35.6 lb/hr)(8,760 hr/yr)/2,000 lb/ton = **155.93 tons of NOx**

A_{21} (COB2) =
(35.6 lb/hr)(8,760 hr/yr)/2,000 lb/ton = **155.93 tons of NOx**

A_{22} (COB3) =
(35.6 lb/hr)(8,760 hr/yr)/2,000 lb/ton = **155.93 tons of NOx**

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. Average NOx emission rates during each CGP were provided by Shell. Staff compared this data with Shell's monthly reports required by the Clean Fuels Project permit conditions. The emissions in this application are consistent with the data previously submitted by Shell. Tables 13, 14, and 15 summarize the CO Boiler data for the credit generations periods covered by this application.

Table 13 - CO Boiler Data: (7/1/15 – 6/30/16)

	CGP #	NOx Emissions lb/hr	Steam Production klb/hr	Em. rate (NOx/steam) lb/klb
COB 1	19	29.2	108.4	0.269
COB 2	19	29.9	114.0	0.262
COB 3	20	27.7	112.4	0.246

Table 14 - CO Boiler Data: (7/1/16 – 6/30/17)

	CGP #	NOx Emissions lb/hr	Steam Production klb/hr	Em. rate (NOx/steam) lb/klb
COB 1	20	21.5	93.4	0.230
COB 2	20	22.9	114.3	0.200
COB 3	21	22.4	110.2	0.203

Table 15 - CO Boiler Data: (7/1/17 – 6/30/18)

	CGP #	NOx Emissions lb/hr	Steam Production klb/hr	Em. rate (NOx/steam) lb/klb
COB 1	21	28.7	116.4	0.247
COB 2	21	22.5	101.8	0.221
COB 3	22	24.9	108.9	0.229

Actual NOx emissions (B_x where *x* represents the CGP number) are:

7/1/15 – 6/30/16 (366 days = 8,784 hrs)

B_{19} (COB 1) = (29.2 lb/hr) (8,784 hr/yr) / (2,000 lb/ton) = **128.2 tons of NOx**

B_{19} (COB 2) = (29.9 lb/hr) (8,784 hr/yr) / (2,000 lb/ton) = **131.3 tons of NOx**

B_{20} (COB 3) = (27.7 lb/hr) (8,784 hr/yr) / (2,000 lb/ton) = **121.7 tons of NOx**

7/1/16 – 6/30/17 (365 days = 8,760 hrs)

B_{20} (COB 1) = (21.5 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = **94.2 tons of NOx**

B_{20} (COB 2) = (22.9 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = **100.3 tons of NOx**

B_{21} (COB 3) = (22.4 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = **98.1 tons of NOx**

7/1/17 – 6/30/18 (365 days = 8,760 hrs)

B_{21} (COB 1) = (28.7 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = **125.7 tons of NOx**

B_{21} (COB 2) = (22.5 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = **98.6 tons of NOx**

B_{22} (COB 3) = (24.9 lb/hr) (8,760 hr/yr) / (2,000 lb/ton) = **109.1 tons of NOx**

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

The non-curtailment emissions (C_x 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. Baseline throughputs are in Table 3, and CGP emission rates are in Tables 13, 14, and 15.

7/1/15 – 6/30/16 (366 days = 8,784 hrs)

C_{19} (COB 1) =
(122.88 klb steam/hr)(0.269 lb NOx/klb steam)(8,784 hr) / (2,000 lb/ton) = **145.2 tons of NOx**

C_{19} (COB 2) =
(124.11 klb steam/hr)(0.262 lb NOx/klb steam)(8,784 hr) / (2,000 lb/ton) = **142.8 tons of NOx**

C_{20} (COB 3) =
(126.37 klb steam/hr)(0.246 lb NOx/klb steam)(8,784 hr) / (2,000 lb/ton) = **136.5 tons of NOx**

7/1/16 – 6/30/17 (365 days = 8,760 hrs)

C_{20} (COB 1) =
(122.88 klb steam/hr)(0..230 lb NOx/klb steam)(8,760 hr) / (2,000 lb/ton) = **123.8 tons of NOx**

C_{20} (COB 2) =
(124.11 klb steam/hr)(0.200 lb NOx/klb steam)(8,760 hr) / (2,000 lb/ton) = **108.7 tons of NOx**

C_{21} (COB 3) =
(126.37 klb steam/hr)(0.203 lb NOx/klb steam)(8,760 hr) / (2,000 lb/ton) = **112.4 tons of NOx**

7/1/17 – 6/30/18 (365 days = 8,760 hrs)

C_{21} (COB 1) =
(122.88 klb steam/hr)(0.247 lb NOx/klb steam)(8,760 hr) / (2,000 lb/ton) = **132.9 tons of NOx**

C_{21} (COB 2) =
(124.11 klb steam/hr)(0.221 lb NOx/klb steam)(8,760 hr) / (2,000 lb/ton) = **120.1 tons of NOx**

C_{22} (COB 3) =
(126.37 klb steam/hr)(0.229 lb NOx/klb steam)(8,760 hr) / (2,000 lb/ton) = **126.8 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-adjusted emissions (A).

7/1/15 – 6/30/16

COB 1 (CGP_{19}):	**IERCs** = $A_{19} - C_{19}$ = 166.6 tons – 145.2 tons =	**21.4 tons of NOx**
COB 2 (CGP_{19}):	**IERCs** = $A_{19} - C_{19}$ = 166.15 tons – 142.8 tons =	**23.4 tons of NOx**
COB 3 (CGP_{20}):	**IERCs** = $A_{20} - C_{20}$ = 163.37 tons – 136.5 tons =	**26.9 tons of NOx**
		71.7 tons of NOx

7/1/16 – 6/30/17

COB 1 (CGP_{20}):	**IERCs** = $A_{20} - C_{20}$ = 155.93 tons – 123.8 tons =	**32.1 tons NOx**
COB 2 (CGP_{20}):	**IERCs** = $A_{20} - C_{20}$ = 155.93 tons – 108.7 tons =	**47.2 tons NOx**
COB 3 (CGP_{21}):	**IERCs** = $A_{21} - C_{21}$ = 155.93 tons – 112.4 tons =	**43.5 tons NOx**
		122.8 tons NOx

7/1/17 – 6/30/18

COB 1 (CGP_{21}):	**IERCs** = $A_{21} - C_{21}$ = 155.93 tons – 132.9 tons =	**23.0 tons NOx**
COB 2 (CGP_{21}):	**IERCs** = $A_{21} - C_{21}$ = 155.93 tons – 120.1 tons =	**35.8 tons NOx**
COB 3 (CGP_{22}):	**IERCs** = $A_{22} - C_{22}$ = 155.93 tons – 126.8 tons =	**29.1 tons NOx**
		87.9 tons NOx

IERC Banking Certificate

IERCs are valid for 5 years following the end of the credit generation period. In this banking application there are three time periods during which credit is generated. The IERCs will be issued as follows.

IERC Banking Certificate #8-W (covers 7/1/15 – 6/30/16, effective 7/1/16, expires 6/30/21)
71.7 Tons of NOx

IERC Banking Certificate #8-X (covers 7/1/16 – 6/30/17, effective 7/1/17, expires 6/30/22)
122.8 Tons of NOx

IERC Banking Certificate #8-Y (covers 7/1/17 – 6/30/18, effective 7/1/18, expires 6/30/23)
87.9 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 2-9-301.2).

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 85 ppm NOx limit in Regulation 9, Rule 10, Section 304 to constitute RACT/BARCT for CO Boilers. However, on May 22, 2012 the District approved Shell's application (number 22287) to add NOx concentration limits on each CO Boiler as required by Shell's EPA Consent Decree. These limits are more stringent than the 150 ppm NOx limit in Regulation 9, Rule 10, Section 304 and are specific to each CO Boiler. In addition, on August 1, 2015 permit condition 25134 was imposed to limit total annual NOx emissions to 468 tons per year; which is equivalent to 35.6 lb/hr/COB and more stringent than the Shell EPA Consent Decree. Therefore, during the first 31 days of the first credit generation period in this application, the Shell EPA Consent Decree annual limits were the most stringent limits in effect and thereafter, the limits in Condition 25134 were the most stringent. Emissions during the baseline period were reduced accordingly.

The amount of IERCs generated in each calendar year from 2015 through 2018 exceeds the amount of IERCs used in each respective year. In 2018, the sum amount of IERCs in emission inventories exceeds the sum of actual emissions, the IERCs used, and the IERCs generated. Therefore, the IERCs requested in this application are surplus. The details are tabulated in Appendix A of this evaluation report.

PUBLIC COMMENT

The amount of IERCs exceeds 40 tons for each of the credit generation periods in this application. 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. The District published a notification inviting written public comment in the Contra Costa Times on , 2020. During the 30-day public comment period ending , 2020, the District received no 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 categorically 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.

IERC Banking Certificate #8-W 71.7 Tons of Nitrogen Oxides

Source #	Baseline Period	Credit Generation Period
S-1507 CO Boiler #1	6/8/94 – 6/7/99	7/1/15 – 6/30/16
S-1509 CO Boiler #2	4/29/94 – 4/28/99	7/1/15 – 6/30/16
S-1512 CO Boiler #3	11/7/93 – 11/6/98	7/1/15 – 6/30/16

Effective Date: **July 1, 2016**
Expiration Date: **June 30, 2021**

IERC Banking Certificate #8-X 122.8 Tons of Nitrogen Oxides

Source #	Baseline Period	Credit Generation Period
S-1507 CO Boiler #1	6/8/94 – 6/7/99	7/1/16 – 6/30/17
S-1509 CO Boiler #2	4/29/94 – 4/28/99	7/1/16 – 6/30/17
S-1512 CO Boiler #3	11/7/93 – 11/6/98	7/1/16 – 6/30/17

Effective Date: **July 1, 2017**
Expiration Date: **June 30, 2022**

IERC Banking Certificate #8-Y 87.9 Tons of Nitrogen Oxides

Source #	Baseline Period	Credit Generation Period
S-1507 CO Boiler #1	6/8/94 – 6/7/99	7/1/16 – 6/30/17
S-1509 CO Boiler #2	4/29/94 – 4/28/99	7/1/16 – 6/30/17
S-1512 CO Boiler #3	11/7/93 – 11/6/98	7/1/16 – 6/30/17

Effective Date: **July 1, 2018**
Expiration Date: **June 30, 2023**

By:___(signed by Anne Werth)_____ Date:_____
Air Quality Engineer

			2000				2001				2002				2003			
PN	Name	S-#	NOx Emission Inventory [1] (Tons)	Actual Emissions [2] (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	NOx Emission Inventory [1] (Tons)	Actual Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory (Tons)	Actual Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)
12626	Valero			1749.4	554.1	26.5		1019.3	1284.2	43.8		916.5	950.2	266.9		923.1	483.8	421.3
		S-3	1152.7				948.2				587.3				512.2			
		S-4	646.7				532.0				286.3				249.7			
11	Shell			622.9	408.1	56.3		626.1	364.9	44.5		654.6	354.8	290.1		712.1	189.5	368.5
		S-1507	193.5				159.2				229.4				200.1			
		S-1509	207.3				170.5				210.1				183.2			
		S-1512	214.0				176.1				237.8				74.2			
26	Mirant Potrero																	
		S-1	454.1	399.3	70.9	0.0	494.2	447.1	94.2	0.0	142.2	94.8	34.3	0.0	81.9	199.3	0.0	0.0
24	PG&E Hunters Pt.			272.2	125.2	0.0		170.0	124.5	0.0		99.5	0.0	0.0			0.0	0.0
		S-3	46.4				50.5				0.0				0.0			
		S-4	39.4				42.9				0.0				0.0			
		S-5	49.7				54.0				0.0				0.0			
		S-6	44.4				48.4				0.0				0.0			
		S-7	129.1				140.5				99.5				57.3	107.9		
16	ConocoPhillips																	
		S-438																
		Totals:	*3177.5*	*3043.7*	*1158.3*	*82.8*	*2816.5*	*2262.4*	*1867.8*	*88.4*	*1792.6*	*1765.4*	*1339.3*	*557.0*	*1358.6*	*1942.4*	*673.3*	*789.8*

			2004				2005				2006				2007			
PN	Name	S-#	"Adjusted" Inventory [3] (Tons)	Actual Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual [2] Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual [2] Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)
12626	Valero			648.9	589.4	507.5		770.8	537.2	495.6		752	556	507.1		668.3	608.7	453.2
		S-3	512.2				434.6				434.6				434.6			
		S-4	249.7				211.8				211.8				211.8			
11	Shell			738.5	180.9	157.2		698.6	129.0	157.3		546	316.2	132.3		618	329.6	27.9
		S-1507	200.1				169.7				169.7				169.7			
		S-1509	183.2				155.5				155.5				155.5			
		S-1512	207.4				176.0				176				176			
26	Mirant Potrero				0.0	12.8			0.0	15.5	no credits used				no credits used			
		S-1	81.9	204.7			81.9	43.4										
24	PG&E Hunters Pt.				0.0	1.1		61.7	0.0	62.3	Shut down 5/15/06				Shut down 5/15/06			
		S-3	0.0				0.0											
		S-4	0.0				0.0											
		S-5	0.0				0.0											
		S-6	0.0				0.0											
		S-7	57.3	199.6			57.3											
16	ConocoPhillips				2.2	0.0			6.3	0.0			7.3	0.0			6.2	4.6
		S-438	49.9	14.1			42.4	15.3			42.4	15.3			42.4	15.4		
		Totals:	*1541.7*	*1805.8*	*772.5*	*678.6*	*1329.3*	*1589.8*	*672.5*	*730.6*	1190	1313.3	879.5	639.4	1190	1301.7	944.5	485.7

			2008				2009				2010				2011			
PN	Name	S-#	"Adjusted" Inventory [3] (Tons)	Actual Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual Emissions (Tons)	IERCs Generated	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual [2] Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual [2] Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)
12626	Valero			656.3	617.4	373.3		599.5	515.8	359.4		584	548.3	332.2	617.5	624.4		306.4
		S-3	434.6				434.6				459.4							
		S-4	211.8				211.8				224							
11	Shell			513.8	380.7	5.8		511.9	218.7	44.0		445.8		0.04	724.1	407.3	487.5	1.86
		S-1507	169.7				169.7				179.4							
		S-1509	155.5				155.5				164.3							
		S-1512	176				176				186							
16	ConocoPhillips			14.1	5.2	7.1		14.0	1.4	8.9		13.6		3.4	15.9	8.6		1.97
		S-438	42.4				42.4				44.8							
		Totals:	***1190.0***	***1184.2***	***1003.3***	***386.2***	***1190.0***	***1125.4***	***735.9***	***412.3***	***1257.9***	***1043.4***	***548.3***	***335.6***	***1357.5***	***1040.3***	***487.5***	***310.2***

			2012				2013				2014				2015			
PN	Name	S-#	"Adjusted" Inventory [3] (Tons)	Actual Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual [2] Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)	"Adjusted" Inventory [3] (Tons)	Actual [2] Emissions (Tons)	IERCs Generated (Tons)	IERCs Used (Tons)
12626	Valero		639.3	0		301.1	639.3	0.0	0.0	251.7	639.3	0	0	295.7	656.6	0	0	316.9
		S-3		Shut down														
		S-4		Shut down														
11	Shell		749.6	345	437	2.32	749.6	434.9	333.8	0.0	749.6	355.3	329.8	0.11	770	388.4	179.7	0.1
		S-1507																
		S-1509																
		S-1512																
21359	Phillips66		16.4	8.6		0.17	16.4	8.6	0.0	0.1	16.4	3.2	9.1	3.3	16.9	12.3	0.0	0.5
		S-438																
		Totals:	***1405.3***	***353.6***	***437.0***	***303.6***	***1405.3***	***443.5***	***333.8***	***251.8***	***1405.3***	***358.5***	***338.9***	***299.1***	***1443.5***	***400.7***	***179.7***	***317.5***

Notes

(1) 2000 NOx inventory from 2001 Ozone Attainment Plan (OAP) inventory; 2002 NOx inventory from 2005 Ozone Strategy
2005 NOx inventory from 2010 Clean Air Plan

(2) Actual emissions from the following references for each facility
Valero: IERC Banking AN 4398 (00-01); AN 11890 (02-03); AN 15662 (04-06); AN 18880 (07); AN 19792 (08); Data Bank (09-15)
Shell: monthly reports based on CEM data; Data Bank (2004-05)
Mirant Potrero: IERC Banking App. No. 6473 (2000-02); Data Bank (2003-04)
PG&E Hunters Pt.: IERC Banking App. No. 7375 (2000-02), Data Bank (2003-04); 68,546,938 therm/yr x 0.018 lb/MM BTU (2005)
ConocoPhillips (Phillips 66): Data Bank (2004-13, 2015, 2016). For 2014 information provided by plant using CEM data.

(3) Adjusted NOx inventories based on ratios in subsequent years of respecitve "Plans"

2001 Shell & Valero: ratio = 20.4/24.8 for refinery ext. combustion
PGE/Mirant: ratio = 18.5/17.0 for power plants
2002 No adjustment, because emissions are based on the 2002 base year for the 2005 Ozone Strategy
2003-04 Shell, Cononco-Phillips & Valero:
ratio = (16.5/18.92 for refinery ext. combustion) x (2002 Em. Inventory)
PGE/Mirant:
ratio = (2.8/4 86 for power plants) x (2002 Em. Inventory)
2005-09 Shell, Conoco-Phillips & Valero:
ratio = (14.0/18.92 for refinery ext. combustion) x (2002 Em. Inventory)
PGE/Mirant:
ratio = (2.8/4 86 for power plants) x (2002 Em. Inventory)
2010 Shell, Conoco-Phillips & Valero:
ratio = (14.8/18.92 for refnery ext. combustion) x (2002 Em. Inventory)
Subsequent calculations based on 2010 CAP inventory, w/ 2005 Base Year
2011 Shell, Conoco-Phillips & Valero
ratio = (14.2/13.7 for refinery ext. combustion) x (2005 Em. Inventory)
2012-14 Shell, Phillips66 & Valero
ratio = (14.7/13.7 for refinery ext. combustion) x (2005 Em. Inventory)
2015-16 Shell, Phillips66 & Valero
ratio = (15.1/13.7 for refinery ext. combustion) x (2005 Em. Inventory)

Attainment Plan Banking Allowances

Year	ERC ton/day	IERC ton/day	Totals Ton/year
2000	7.6	0	2774
2001	7.6	7.4	5475
2002	8.1	3.5	4234
2003	8.1	3.5	4234
2004	8.1	5.3	4891
2005	8.1	7.2	5584.5
2006	8.1	7.2	5584.5
2007	8.1	7.2	5584.5
2008	8.1	7.2	5584.5
2009	8.1	7.2	5584.5
2010	8.1	4.3	4526
2011	7.2	4.9	4416.5
2012	7.2	4.9	4416.5
2013	7.2	4.9	4416.5
2014	7.2	4.9	4416.5
2015	7.2	4.9	4416.5

NOx ERC Use by Year

Year	ERCs Used (Ton/year)	Running Total (Ton/year)
2000	252.5	252.5
2001	278.7	531.2
2002	462.3	993.5
2003	252.7	1246.2
2004	118.0	1364.2
2005	322.0	1686.2
2006	123.0	1809.2
2007	245.9	2055.1
2008	207.2	2262.3
2009	5.0	2267.3
2010	37.9	2305.2
2011	57.4	2362.6
2012	0.3	2362.9
2013	44.2	2407.1
2014	1.0	2408.1
2015	52.8	2460.9

SURPLUS CALCULATIONS

Year 2000-02, 2004, 2006-14: IERCs generated exceed IERCs used. Therefore, IERCs generated are surplus.

Surplus Test: IERCs used exceeds IERCs generated (subject to change, based on future IERC banking applications)
(Plan Emission Inventory + Banking Allowance in Emission Inventory) - (Actual Emissions + ERCs Used + IERCs Generated) >= 0

Year 2003: (1358.6 + 4234 tons) - (1942.4 + 1246.2 + 673.3 tons) >= 0 ? True. Therefore, IERCs are surplus.

Year 2005: (1329.3 + 5584.5 tons) - (1589.8 + 1686.2 + 672.5 tons) >= 0 ? True. Therefore, IERCs are surplus.

Year 2015: (1435.5 + 4416.5 tons) - (400.7 + 2460.9 + 179.7 tons) >= 0 ? True. Therefore, IERCs are surplus.

Last revision: January 2017