

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING DIVISION</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 18	PAGE 1
	APPL. NO. 528567	DATE 6/1/2012
	PROCESSED BY KEN COATS	CHECKED BY

PERMIT TO CONSTRUCT

COMPANY NAME AND ADDRESS

University of Southern California, University Park
3434 South Grand Avenue, CDF
Los Angeles, CA 90089-3161
FACILITY ID # 800265

CONTACT: Mr. Angel Burgos, (626) 318-7475

EQUIPMENT LOCATION

McClintock W 34th Childs Street
Los Angeles, CA 90089

EQUIPMENT DESCRIPTION:

A/N 528567:

MODIFICATION TO THE EXISTING BOILER DESCRIBED BY P/N F35853 BELOW,

BOILER, KEWANEE, FIRETUBE TYPE, MODEL NO. L3S-350-GO2, SERIAL NO. 0-5758, RATED AT 14,700,000 BTU/HR, NATURAL GAS FIRED, WITH ONE INDUSTRIAL COMBUSTION LOW-NOX BURNER, MODEL NO. LNDG-175-P-20, AND FLUE GAS RECIRCULATION

BY THE REMOVAL OF THE EXISTING LOW NOX BURNER, INDUSTRIAL COMBUSTION, MODEL NO. LNDG-175-P-20, AND THE ADDITION OF A NEW LOW NOX BURNER, INDUSTRIAL COMBUSTION, 14,700,000 BTU/HR, MODEL NO. PF-NTD-147-GX-9S-6

A/N 530923:

MODIFICATION TO THE EXISTING BOILER DESCRIBED BY P/N F55042 BELOW,

BOILER, KEWANEE, FIRETUBE TYPE, MODEL NO. L-3S-350-GO2, SERIAL NO. 07396, RATED AT 14,700,000 BTU/HR, NATURAL GAS FIRED, WITH ONE INDUSTRIAL COMBUSTION LOW NOX BURNER, MODEL NO. LNDG-175P-20, SERIAL NO. 41779-1, EQUIPPED WITH A 20 HP COMBUSTION AIR FLOWER AND A INDUCED DRAFT FLUE GAS RECIRCULATION SYSTEM.

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BY THE REMOVAL OF THE EXISTING LOW NOX BURNER, INDUSTRIAL COMBUSTION, MODEL NO. LNDG-175-P-20 AND THE ADDITION OF A NEW LOW NOX BURNER INDUSTRIAL COMBUSTION MODEL FP-NTD-147-GX-9S-6

A/N 524292:

MODIFICATION TO THE EXISTING BOILER, DESCRIBED BY P/N F55044 BELOW,

BOILER, KEWANEE, FIRETUBE TYPE, MODEL NO. L-3S-350-GO2, SERIAL NO. P9993, RATED AT 14,700,000 BTU/HR, NATURAL GAS FIRED, WITH ONE INDUSTRIAL COMBUSTION LOW-NOX BURNER, MODEL NO. LNDG-175P-20, SERIAL NO. 41778-1, EQUIPPED WITH A 20 HP COMBUSTION AIR BLOWER AND AN INDUCED DRAFT FLUE GAS RECIRCULATION SYSTEM.

BY THE REMOVAL OF THE EXISTING LOW-NOX BURNER, INDUSTRIAL COMBUSTION, MODEL NO. LNDG-175-P-20, AND THE ADDITION OF A NEW LOW NOX BURNER, INDUSTRIAL COMBUSTION, 14,700,000 BTU/HR, MODEL NO. PF-NTD-147-GX-9S-6

A/N 530919

MODIFICATION TO THE EXISTING BOILER, DESCRIBED BY P/N D95991 BELOW,

BOILER, KEWANEE, MODEL NO. KX-85, SERIAL NO. N1223, RATED AT 8,800,000 BTU/HR, NATURAL GAS FIRED, WITH A COMBUSTION AIR BLOWER, AN INDUSTRIAL COMBUSTION LOW-NOX BURNER, AND AN IDUCED DRAFT FLUE GAS RECIRCULATION SYSTEM

BY THE REMOVAL OF THE EXISTING LOW-NOX BURNER, INDUSTRIAL COMBUSTION, AND THE ADDITION OF A NEW LOW NOX BURNER, INDUSTRIAL COMBUSTION, 9,000,000 BTU/HR, MODEL NO. PF-NTH-090-GX-9S-4

A/N 530921

MODIFICATION TO THE EXISTING BOILER, DESCRIBED BY P/N D95992 BELOW,

BOILER, KEWANEE, MODEL NO. KX-85, SERIAL NO. N1223, RATED AT 8,800,000 BTU/HR, NATURAL GAS FIRED, WITH A COMBUSTION AIR BLOWER, AN INDUSTRIAL COMBUSTION LOW-NOX BURNER, AND AN IDUCED DRAFT FLUE GAS RECIRCULATION SYSTEM

BY THE REMOVAL OF THE EXISTING LOW-NOX BURNER, INDUSTRIAL COMBUSTION, AND THE ADDITION OF A NEW LOW NOX BURNER, INDUSTRIAL COMBUSTION, 9,000,000 BTU/HR, MODEL NO. PF-NTH-090-GX-9S-4

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A/N 530917

MODIFICATION TO THE EXISTING BOILER, DESCRIBED BY P/N D95990 BELOW,

BOILER, KEWANEE, MODEL NO. L3S-300G, SERIAL NO. R4740, RATED AT 12,800,000 BTU/HR, NATURAL GAS FIRED, WITH A 15 HP COMBUSTION AIR BLOWER, AN INDUSTRIAL COMBUSTION LOW-NOX BURNER, AND AN IDUCED DRAFT FLUE GAS RECIRCULATION SYSTEM

BY THE REMOVAL OF THE EXISTING LOW-NOX BURNER, INDUSTRIAL COMBUSTION, AND THE ADDITION OF A NEW LOW NOX BURNER, INDUSTRIAL COMBUSTION, 12,500,000 BTU/HR, MODEL NO. PF-NTD-125-GX-9S-4

A/N 530916

MODIFICATION TO THE EXISTING BOILER, DESCRIBED BY P/N D95989 BELOW,

BOILER, KEWANEE, MODEL NO. L3S-300G, SERIAL NO. R4784, RATED AT 12,800,000 BTU/HR, NATURAL GAS FIRED, WITH A 15 HP COMBUSTION AIR BLOWER, AN INDUSTRIAL COMBUSTION LOW-NOX BURNER, AND AN IDUCED DRAFT FLUE GAS RECIRCULATION SYSTEM

BY THE REMOVAL OF THE EXISTING LOW-NOX BURNER, INDUSTRIAL COMBUSTION, AND THE ADDITION OF A NEW LOW NOX BURNER, INDUSTRIAL COMBUSTION, 12,500,000 BTU/HR, MODEL NO. PF-NTD-125-GX-9S-4

A/N 530924

MODIFICATION TO THE EXISTING BOILER, DESCRIBED BY P/N F15565 BELOW,

BOILER, KEWANEE, FIRETUBE TYPE, MODEL KR86-7, SERIAL NO. N-4003, RATED AT 10,680,000 BTU/HR, NATURAL GAS FIRED, WITH ONE INDUSTRIAL COMBUSTION BURNER, MODEL NO. LNDG-145S, A 15 HP COMBUSTION AIR BLOWER AND AN IDUCED DRAFT FLUE GAS RECIRCULATION SYSTEM

BY THE REMOVAL OF THE EXISTING LOW-NOX BURNER, INDUSTRIAL COMBUSTION, AND THE ADDITION OF A NEW LOW NOX BURNER, INDUSTRIAL COMBUSTION, 9,000,000 BTU/HR, MODEL NO. PF-NTH-110-GX-9S-4

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BACKGROUND

The University of Southern California – University Park (USC) is the main campus of the USC system of colleges and medical facilities. The facility is in Title V and does not participate in the RECLAIM program. USC operates several boilers, which, based on the maximum rated heat input, are subject to Rule 1146. Each of the boiler is a Group III unit. As such USC was required to submit a Rule 1146 Compliance Plan by January 1, 2011 as well as applications for Permits to Construct for each boiler to achieve a NOx emission rate of 9 ppmv at 3% O2. The eight boilers will be modified by the removal of the old low NOx burners and the installation of new low NOx burners to comply with the required NOx emission limits by the required compliance date of January 1, 2013. There are several boilers which are identical and therefore the identical boilers are each assessed at 50% of the processing fee. The application details are shown below:

Application No.	Equipment	Fee
528567	Boiler, 14.7 MMBTU/hr	\$3,359.43
530923	Boiler, 14.7 MMBTU/hr	\$1,679.72
524292	Boiler, 14.7 MMBTU/hr	\$1,679.72
530919	Boiler, 8.8 MMBTU/hr	\$3,359.43
530921	Boiler, 8.8 MMBTU/hr	\$1,679.72
530917	Boiler, 12.8 MMBTU/hr	\$3,359.43
530916	Boiler, 12.8 MMBTU/hr	\$1,679.72
530924	Boiler, 10.68 MMBTU/hr	\$3,359.43
530912	Title V De Minimis Modification	\$873.58

COMPLIANCE REVIEW

A review of the District compliance database indicates that there was one NOV issued to USC on 6/29/2011 for a violation which occurred on 3/1/2011 for failure to submit form 500-SAM for period of 7/1/2010 through 12/31/2010 and 500 ACC for period of 1/1/2010 through 12/31/2010 in a timely manner. The AQMD database indicates that the facility is in compliance as of the date of this evaluation. There are no additional compliance activity for this facility.

EMISSIONS

Emissions Prior to Modifications

Emissions prior to modifications for each boiler are shown below and are based on natural gas usage, a heat rate of 1,020 BTU/scf, the maximum heat input on the old permits, the permitted NOx and CO emission limits from the old permit, and AP-42 factors for the remaining pollutants. The table below shows the details:

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Equipment	A/N	Old A/N	Permitted Emission Limit, ppmv	Heat Input MMBTU/hr	NG HHV BTU/scf	Max Flow Rate scf/hr
Boiler No. 1	530919	310331	NOx: 30 CO: 400	8.8	1,020	8,627.45
Boiler No. 2	530917	310330	NOx: 30 CO: 400	12.8		12,549.02
Boiler No. 3	530924	339018	NOx: 30 CO: 400	10.68		10,470.59
Boiler No. 4	530923	405128	NOx: 20 CO: 50	14.7		14,411.76
Boiler No. 5	530921	310332	NOx: 30 CO: 400	8.8		8,627.45
Boiler No. 6	530916	310329	NOx: 30 CO: 400	12.8		12,549.02
Boiler No. 7	524292	405130	NOx: 20 CO: 50	14.7		14,411.76
Boiler No. 8	528567	370757	NOx: 20 CO: 400	14.7		14,411.76

Mass emissions for each boiler are shown below. Mass emissions of NOx and CO are based on the corresponding concentration in ppmv and the conversion factor of 1.28:

$$\text{NOx EF} = 1.28 * 30 = 38.40 \text{ lb/mm scf}$$

$$\text{CO EF} = 1.28 * 400 = 512 \text{ lb/mm scf}$$

Boiler No. 1 A/N 530919	NOx (30 ppmv)	CO (400 ppmv)	VOC	PM10	SOx
EF (lb/mm scf)	38.40	512	5.5	7.6	0.6
Hourly (lb/hr)	0.331	4.42	0.0475	0.0656	0.00518
Monthly (lb/month)	241.63	3,226.60	34.68	47.89	3.78
Yearly (lb/yr)	2,899.56	38,719.20	416.10	574.66	45.38
Yearly (ton/yr)	1.45	19.36	0.208	0.287	0.023
30DA (lb/day)	8.05	107.55	1.16	1.60	0.126

$$\text{NOx EF} = 1.28 * 30 = 38.40 \text{ lb/mm scf}$$

$$\text{CO EF} = 1.28 * 400 = 512 \text{ lb/mm scf}$$

Boiler No. 2 A/N 530917	NOx (30 ppmv)	CO (400 ppmv)	VOC	PM10	SOx
EF (lb/mm scf)	38.40	512	5.5	7.6	0.6
Hourly (lb/hr)	0.481	6.42	0.069	0.0954	0.00752
Monthly (lb/month)	351.13	4,686.60	50.37	69.64	5.49
Yearly (lb/yr)	4,213.56	56,239.20	604.44	835.70	65.88
Yearly (ton/yr)	2.11	28.12	0.302	0.418	0.033
30DA (lb/day)	11.70	156.22	1.68	2.32	0.183

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NO_x EF = 1.28*30 = 38.40 lb/mm scf

CO EF = 1.28*400 = 512 lb/mm scf

Boiler No. 3 A/N 530924	NO _x (30 ppmv)	CO (400 ppmv)	VOC	PM10	SO _x
EF (lb/mm scf)	38.40	512	5.5	7.6	0.6
Hourly (lb/hr)	0.402	5.36	0.0576	0.0796	0.00628
Monthly (lb/month)	293.46	3,912.80	42.05	58.11	4.58
Yearly (lb/yr)	3,512.52	46,953.60	504.58	697.30	55.01
Yearly (ton/yr)	1.76	23.48	0.252	0.348	0.028
30DA (lb/day)	9.78	130.42	1.40	1.94	0.153

NO_x EF = 1.28*20 = 25.60 lb/mm scf

CO EF = 1.28*50 = 64 lb/mm scf

Boiler No. 4 A/N 530923	NO _x (20 ppmv)	CO (50 ppmv)	VOC	PM10	SO _x
EF (lb/mm scf)	25.60	64	5.5	7.6	0.6
Hourly (lb/hr)	0.369	0.922	0.0793	0.11	0.00865
Monthly (lb/month)	269.37	673.06	57.89	80.30	6.31
Yearly (lb/yr)	3,232.44	8,076.72	694.67	963.60	75.77
Yearly (ton/yr)	1.62	4.04	0.347	0.482	0.037
30DA (lb/day)	8.97	22.44	1.93	2.67	0.21

NO_x EF = 1.28*30 = 38.40 lb/mm scf

CO EF = 1.28*400 = 512 lb/mm scf

Boiler No. 5 A/N 530921	NO _x (30 ppmv)	CO (400 ppmv)	VOC	PM10	SO _x
EF (lb/mm scf)	38.40	512	5.5	7.6	0.6
Hourly (lb/hr)	0.331	4.42	0.0475	0.0656	0.00518
Monthly (lb/month)	241.63	3,226.60	34.68	47.89	3.78
Yearly (lb/yr)	2,899.56	38,719.20	416.10	574.66	45.38
Yearly (ton/yr)	1.45	19.36	0.208	0.287	0.023
30DA (lb/day)	8.05	107.55	1.16	1.60	0.126

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NO_x EF = 1.28*30 = 38.40 lb/mmscf

CO EF = 1.28*400 = 512 lb/mmscf

Boiler No. 6 A/N 530916	NO _x (30 ppmv)	CO (400 ppmv)	VOC	PM10	SO _x
EF (lb/mmscf)	38.40	512	5.5	7.6	0.6
Hourly (lb/hr)	0.481	6.42	0.069	0.0954	0.00752
Monthly (lb/month)	351.13	4,686.60	50.37	69.64	5.49
Yearly (lb/yr)	4,213.56	56,239.20	604.44	835.70	65.88
Yearly (ton/yr)	2.11	28.12	0.302	0.418	0.033
30DA (lb/day)	11.70	156.22	1.68	2.32	0.183

NO_x EF = 1.28*20 = 25.60 lb/mmscf

CO EF = 1.28*50 = 64 lb/mmscf

Boiler No. 7 A/N 524292	NO _x (20 ppmv)	CO (50 ppmv)	VOC	PM10	SO _x
EF (lb/mmscf)	25.60	64	5.5	7.6	0.6
Hourly (lb/hr)	0.369	0.922	0.0793	0.11	0.00865
Monthly (lb/month)	269.37	673.06	57.89	80.30	6.31
Yearly (lb/yr)	3,232.44	8,076.72	694.67	963.60	75.77
Yearly (ton/yr)	1.62	4.04	0.347	0.482	0.037
30DA (lb/day)	8.97	22.44	1.93	2.67	0.21

NO_x EF = 1.28*20 = 25.60 lb/mmscf

CO EF = 1.28*400 = 512 lb/mmscf

Boiler No. 8 A/N 528567	NO _x (20 ppmv)	CO (400 ppmv)	VOC	PM10	SO _x
EF (lb/mmscf)	25.60	512	5.5	7.6	0.6
Hourly (lb/hr)	0.369	7.37	0.0793	0.11	0.00865
Monthly (lb/month)	269.37	5,386.54	57.89	80.30	6.31
Yearly (lb/yr)	3,232.44	64,638.47	694.67	963.60	75.77
Yearly (ton/yr)	1.62	32.32	0.347	0.482	0.037
30DA (lb/day)	8.97	179.55	1.93	2.67	0.21

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Emissions After Modifications

The applicant has submitted a performance warranty for each low NOx burner which indicates that the new units will comply with the emission limits of 9 ppmv for NOx at 3% oxygen. Therefore, emissions after the proposed modifications will be based on 9 ppmv NOx at 3% O2, CO emissions will be based on 50 ppmv at 3% O2 (both guaranteed by the burner manufacturer) and the remaining pollutants will be based on AP-42 emission factors, and the maximum heat input of the new low NOx burners.

Equipment	A/N	Emission Limit, ppmv	Heat Input MMBTU/hr	NG HHV BTU/scf	Max Flow Rate scf/hr
Boiler No. 1	530919	NOx: 9 CO: 50	9.0	1,020	8,823.53
Boiler No. 2	530917	NOx: 9 CO: 50	12.5		12,254.90
Boiler No. 3	530924	NOx: 9 CO: 50	11.0		10,784.31
Boiler No. 4	530923	NOx: 9 CO: 50	14.7		14,411.76
Boiler No. 5	530921	NOx: 9 CO: 50	9.0		8,823.53
Boiler No. 6	530916	NOx: 9 CO: 50	12.5		12,254.90
Boiler No. 7	524292	NOx: 9 CO: 50	14.7		14,411.76
Boiler No. 8	528567	NOx: 9 CO: 50	14.7		14,411.76

NOx EF = 1.28*9 = 11.52 lb/mmscf

CO EF = 1.28*50 = 64 lb/mmscf

Max Burner Rating = 9,000,000 BTU/hr

Boiler No. 1 A/N 530919	NOx (9 ppmv)	CO (400 ppmv)	VOC	PM10	SOx
EF (lb/mmscf)	11.52	64	5.5	7.6	0.6
Hourly (lb/hr)	0.102	0.565	0.0485	0.0671	0.00529
Monthly (lb/month)	74.46	412.24	35.41	48.98	3.86
Yearly (lb/yr)	893.52	4,946.82	424.86	587.80	46.34
Yearly (ton/yr)	0.447	2.47	0.212	0.294	0.023
30DA (lb/day)	2.48	13.74	1.18	1.63	0.13

NOx EF = 1.28*9 = 11.52 lb/mmscf

CO EF = 1.28*50 = 64 lb/mmscf

Max Burner Rating = 12,500,000 BTU/hr

Boiler No. 2 A/N 530917	NOx (9 ppmv)	CO (400 ppmv)	VOC	PM10	SOx
EF (lb/mmscf)	11.52	64	5.5	7.6	0.6
Hourly (lb/hr)	0.141	0.784	0.0674	0.0931	0.00735
Monthly (lb/month)	102.93	572.55	49.20	67.96	5.37
Yearly (lb/yr)	1,235.16	6,870.59	590.42	815.56	64.39
Yearly (ton/yr)	0.618	3.44	0.295	0.408	0.032
30DA (lb/day)	3.43	19.08	1.64	2.27	0.179

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NO_x EF = 1.28*9 = 11.52 lb/mmscf

CO EF = 1.28*50 = 64 lb/mmscf

Max Burner Rating = 11,000,000 BTU/hr

Boiler No. 3 A/N 530924	NO _x (9 ppmv)	CO (400 ppmv)	VOC	PM10	SO _x
EF (lb/mmscf)	11.52	64	5.5	7.6	0.6
Hourly (lb/hr)	0.124	0.690	0.0593	0.0819	0.00647
Monthly (lb/month)	90.52	503.84	43.29	59.79	4.72
Yearly (lb/yr)	1,086.24	6,046.12	519.47	717.44	56.68
Yearly (ton/yr)	0.543	3.02	0.259	0.358	0.028
30DA (lb/day)	3.01	16.79	1.44	1.99	0.15

NO_x EF = 1.28*9 = 11.52 lb/mmscf

CO EF = 1.28*50 = 64 lb/mmscf

Max Burner Rating = 14,700,000 BTU/hr

Boiler No. 4 A/N 530923	NO _x (9 ppmv)	CO (50 ppmv)	VOC	PM10	SO _x
EF (lb/mmscf)	11.52	64	5.5	7.6	0.6
Hourly (lb/hr)	0.166	0.922	0.0792	0.11	0.00865
Monthly (lb/month)	121.18	673.06	57.82	80.30	6.31
Yearly (lb/yr)	1,454.16	8,076.72	693.79	963.60	75.77
Yearly (ton/yr)	0.727	4.04	0.347	0.482	0.0379
30DA (lb/day)	4.03	22.44	1.92	2.67	0.21

NO_x EF = 1.28*9 = 11.52 lb/mmscf

CO EF = 1.28*50 = 64 lb/mmscf

Max Burner Rating = 9,000,000 BTU/hr

Boiler No. 5 A/N 530921	NO _x (9 ppmv)	CO (400 ppmv)	VOC	PM10	SO _x
EF (lb/mmscf)	11.52	64	5.5	7.6	0.6
Hourly (lb/hr)	0.102	0.565	0.0485	0.0671	0.00529
Monthly (lb/month)	74.46	412.24	35.41	48.98	3.86
Yearly (lb/yr)	893.52	4,946.82	424.86	587.80	46.34
Yearly (ton/yr)	0.447	2.47	0.212	0.294	0.023
30DA (lb/day)	2.48	13.74	1.18	1.63	0.13

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NO_x EF = 1.28*9 = 11.52 lb/mmescf

CO EF = 1.28*50 = 64 lb/mmescf

Max Burner Rating = 12,500,000 BTU/hr

Boiler No. 6 A/N 530916	NO _x (9 ppmv)	CO (400 ppmv)	VOC	PM10	SO _x
EF (lb/mmescf)	11.52	64	5.5	7.6	0.6
Hourly (lb/hr)	0.141	0.784	0.0674	0.0931	0.00735
Monthly (lb/month)	102.93	572.55	49.20	67.96	5.37
Yearly (lb/yr)	1,235.16	6,870.59	590.42	815.56	64.39
Yearly (ton/yr)	0.618	3.44	0.295	0.408	0.032
30DA (lb/day)	3.43	19.08	1.64	2.27	0.179

NO_x EF = 1.28*9 = 11.52 lb/mmescf

CO EF = 1.28*50 = 64 lb/mmescf

Max Burner Rating = 14,700,000 BTU/hr

Boiler No. 7 A/N 524292	NO _x (9 ppmv)	CO (50 ppmv)	VOC	PM10	SO _x
EF (lb/mmescf)	11.52	64	5.5	7.6	0.6
Hourly (lb/hr)	0.166	0.922	0.0792	0.11	0.00865
Monthly (lb/month)	121.18	673.06	57.82	80.30	6.31
Yearly (lb/yr)	1,454.16	8,076.72	693.79	963.60	75.77
Yearly (ton/yr)	0.727	4.04	0.347	0.482	0.0379
30DA (lb/day)	4.03	22.44	1.92	2.67	0.21

NO_x EF = 1.28*9 = 11.52 lb/mmescf

CO EF = 1.28*50 = 64 lb/mmescf

Max Burner Rating = 14,700,000 BTU/hr

Boiler No. 8 A/N 528567	NO _x (9 ppmv)	CO (400 ppmv)	VOC	PM10	SO _x
EF (lb/mmescf)	11.52	64	5.5	7.6	0.6
Hourly (lb/hr)	0.166	0.922	0.0792	0.11	0.00865
Monthly (lb/month)	121.18	673.06	57.82	80.30	6.31
Yearly (lb/yr)	1,454.16	8,076.72	693.79	963.60	75.77
Yearly (ton/yr)	0.727	4.04	0.347	0.482	0.0379
30DA (lb/day)	4.03	22.44	1.92	2.67	0.21

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Each of the emission summaries below show the 30 day averages for the pre and post modifications from each boiler. There are no emission increases from the eight boilers as shown below.

		NOx	CO	VOC	PM10	SOx
Boiler No. 1 Boiler No. 5	Pre Modification	8.05	107.55	1.16	1.60	1.26
	Post Modification	2.48	13.74	1.18	1.63	1.30
	Increase (Yes/No)	No	No	No	No	No

		NOx	CO	VOC	PM10	SOx
Boiler No. 2 Boiler No. 6	Pre Modification	11.70	156.22	1.68	2.32	0.18
	Post Modification	3.43	19.08	1.64	2.32	0.18
	Increase (Yes/No)	No	No	No	No	No

		NOx	CO	VOC	PM10	SOx
Boiler No. 4 Boiler No. 7	Pre Modification	8.97	22.44	1.93	2.67	0.21
	Post Modification	4.03	22.44	1.93	2.67	0.21
	Increase (Yes/No)	No	No	No	No	No

		NOx	CO	VOC	PM10	SOx
Boiler No. 3	Pre Modification	9.78	130.42	1.40	1.94	0.15
	Post Modification	3.01	16.79	1.44	1.94	0.15
	Increase (Yes/No)	No	No	No	No	No

		NOx	CO	VOC	PM10	SOx
Boiler No. 8	Pre Modification	8.97	179.55	1.93	2.67	0.21
	Post Modification	4.03	22.44	1.93	2.67	0.21
	Increase (Yes/No)	No	No	No	No	No

RULE EVALUATION

Rule 212 – Standards for Approving Permits and Issuing Public Notice

The facility is located within 1,000 feet of the boundary of two schools, however, there are no emission increases from the facility due to the modification. Therefore, a 30 day Public Notice is not required.

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Rule 401 – Visible Emissions

Compliance with this rule is expected under normal operation.

Rule 402 – Nuisance

Compliance with this rule is expected under normal operation.

Rule 404 – Particulate Matter – Concentration

This rule limits the PM emissions. Compliance is anticipated.

Rule 407 – Liquid and Gaseous Air Contaminants

This rule limits CO to 2,000 ppmv. Compliance is expected.

Rule 409 – Combustion Contaminants

This rule specifies that PM emissions from combustion shall be less than 0.1 g/scf, corrected to 12% CO₂ concentration. Compliance is anticipated.

Rule 431.1 – Sulfur Content of Gaseous Fuels

The boilers will be fired exclusively with PUC grade pipeline quality natural gas. The sulfur content of the natural gas meets the criteria specified in this rule. Compliance is anticipated.

Rule 1146 – NOx Emissions from Boilers, Steam Generators, and Process Heaters

This rule applies to boilers and heaters whose heat input rates are greater than 5 MMBTU/hr . The boilers each have a heat input of greater than 5 MMBTU/hr but less than 20 MMBTU/hr. Therefore, each boiler is subject to Rule 1146. Each boiler is a Group III unit. The rule requires Group III units to meet the 9 ppmv NOx emission limit by 1/1/2013 when firing with natural gas. The installation of the low NOx burners will ensure compliance with the 9 ppmv limit for each boiler.

Regulation XIII – New Source Review

For each boiler, there is a net emission reduction in NOx and no increases in CO and the remaining pollutants due to the proposed installation of the low NOx burners. Therefore, Reg XIII is not triggered.

Rule 1401 – New Source Review of Toxic Air Contaminants

The boilers are located within 1,000 feet of a school. Therefore a health risk assessment (HRA) is required. The impact of toxic air contaminants is analyzed using the AQMD Rule 1401 spreadsheet. A copy of the analysis is included in the file. The Tier 2 analysis results are as follows:

Parameter	A/N 530919	A/N530917	A/N530924	A/N 530923	A/N 530921	A/N 530916	A/N 525292	A/N 528567
MICRr	2.07EE-08	2.79EE-08	2.46EE-08	3.29EE-08	2.07EE-08	2.79EE-08	3.29EE-08	3.29EE-08
MICRc	2.36EE-09	3.11EE-09	2.73EE-09	3.65EE-09	2.36EE-09	3.11EE-09	3.65EE-09	3.65EE-09

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The MICR levels for each boiler are below 1 in a million and the total hazard indices for each target organ for each boiler are below 1.0. Cancer burden for each boiler is not computed because the MICRs are below 1 in a million. Therefore, the risk level is acceptable and compliance is expected.

Regulation XVII – Prevention of Significant Deterioration (PSD)

This regulation applies to emissions of attainment pollutants, CO and NOx. This regulation is triggered if there are increases in NOx and CO emissions. Since there are no increases in these pollutants, PSD is not triggered.

Regulation XXX – Title V

USC University Park is in the Title V program. The modification to the boilers by the addition of the low NOx burners is a de minimis permit revision to the Title V permit and is subject to the Title V requirements. Therefore, this permit revision is subject to a 45-day EPA review and comment period.

RECOMMENDATION

Issue revised Permits to Construct for each boiler with the following conditions.

CONDITIONS

A/N's 530916, 530917, 530919, 530921, 530924, 528567

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
[RULE 204]
2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
[RULE 204]
3. ON OR AFTER JANUARY 1, 2013, THIS BOILER SHALL NOT EMIT MORE THAN 9 PPM OF OXIDES OF NITROGEN (NOX), CALCULATED AS NO2, AND NOT MORE THAN 400 PPM OF CARBON MONOXIDE (CO), ALL MEASURED BY VOLUME ON A DRY BASIS AT 3% OXYGEN AND AVERAGED OVER A PERIOD OF 15 CONSECUTIVE MINUTES.
[RULE 1146, RULE 1303(B)(2)-OFFSET]
4. THIS BOILER SHALL BE FIRED ON NATURAL GAS ONLY
[RULE 1146]
5. THIS BOILER SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS OF RULE 1146, INCLUDING THE SOURCE TESTING REQUIREMENTS OF RULE 1146(D)(6) AND (8).
[RULE 1146]

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6. THIS BOILER SHALL NOT BE OPERATED UNLESS THE FLUE GAS RECIRCULATION SYSTEM IS IN FULL OPERATION. THE FLUE GAS RECIRCULATION SYSTEM SHALL BE IN FULL USE WITHIN ONE MINUTE AFTER THE MAIN FLAME IS ESTABLISHED.
[RULE 1146, RULE 1303(B)(2)-OFFSET]

7. THE OWNER OR OPERATOR OF THIS EQUIPMENT SHALL CONDUCT SOURCE TESTS UNDER THE FOLLOWING CONDITIONS:
 - A. SOURCE TESTING SHALL BE CONDUCTED WITHIN 60 DAYS AFTER INITIAL START-UP UNLESS OTHERWISE APPROVED IN WRITING BY THE EXECUTIVE OFFICER.
 - B. THE SOURCE TESTS SHALL BE PERFORMED TO VERIFY COMPLIANCE WITH THE NOX AND CO EMISSION LIMITS SPECIFIED IN CONDITION NO. 3.
 - C. THE TESTS SHALL BE CONDUCTED WHILE THE BOILER IS FIRING AT MAXIMUM, AVERAGE, AND MINIMUM FIRING RATES.
 - D. WRITTEN NOTICE OF THE SOURCE TESTS SHALL BE SUBMITTED TO THE DISTRICT (ADDRESSED TO SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, P.O. BOX 4941, DIAMOND BAR, CA 91765) AT LEAST 10 DAYS PRIOR TO TESTING SO THAT AN OBSERVER MAY BE PRESENT.
 - E. TWO COMPLETE COPIES OF THE SOURCE TEST REPORTS SHALL BE SUBMITTED TO THE DISTRICT WITHIN 30 DAYS AFTER THE TEST. THE REPORT SHALL INCLUDE, BUT NOT BE LIMITED TO EMISSIONS RATES IN POUNDS PER HOUR AND CONCENTRATIONS IN PPMV AT THE OUTLET OF THE HEATER, MEASURED ON A DRY BASIS AT 3% OXYGEN. THE FOLLOWING OPERATING DATA SHALL ALSO BE INCLUDED FOR EACH FIRING RATE:
 - I. THE EXHAUST FLOW RATES, IN ACTUAL CUBIC FEET PER MINUTE (ACFM).
 - II. THE FIRING RATES, IN BTU PER HOUR.
 - III. THE EXHAUST TEMPERATURE, IN DEGREES FAHRENHEIT.
 - IV. THE OXYGEN CONTENT OF THE EXHAUST GASES, IN PERCENT.
 - V. THE FUEL FLOW RATE.
 - F. A TESTING LABORATORY CERTIFIED BY THE CALIFORNIA AIR RESOURCES BOARD IN THE REQUIRED TEST METHODS FOR CRITERIA POLLUTANT TO BE MEASURED, AND IN COMPLIANCE WITH DISTRICT RULE 304 (NO CONFLICT OF INTEREST) SHALL CONDUCT THE TEST.
 - G. SAMPLING FACILITIES SHALL COMPLY WITH THE DISTRICT GUIDELINES FOR CONSTRUCTION OF SAMPLING AND TESTING FACILITIES PURSUANT TO RULE 217.
[RULE 1146, RULE 1303(B)(2)-OFFSET]

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PERIODIC MONITORING

8. THE OPERATOR SHALL DETERMINE COMPLIANCE WITH THE NO_x EMISSION LIMITS EITHER BY: (a) CONDUCTING A SOURCE TEST AT LEAST ANNUALLY USING AQMD METHOD 100.1 OR 7.1; OR (b) CONDUCTING A TEST AT LEAST ANNUALLY USING A PORTABLE ANALYZER AND AQMD APPROVED TEST METHOD. THE TEST SHALL BE CONDUCTED WHEN THE EQUIPMENT IS OPERATING UNDER NORMAL CONDITIONS TO DEMONSTRATE COMPLIANCE WITH THE RULE 1146 CONCENTRATION LIMIT. THE OPERATOR SHALL COMPLY WITH ALL GENERAL TESTING, REPORTING, AND RECORDKEEPING REQUIREMENTS IN SECTIONS E AND K OF THIS PERMIT.
[RULE 3004(a)(4)]

9. THE OPERATOR SHALL DETERMINE COMPLIANCE WITH THE CO EMISSION LIMITS EITHER BY: (a) CONDUCTING A SOURCE TEST AT LEAST ANNUALLY USING AQMD METHOD 100.1 OR 7.1; OR (b) CONDUCTING A TEST AT LEAST ANNUALLY USING A PORTABLE ANALYZER AND AQMD APPROVED TEST METHOD. THE TEST SHALL BE CONDUCTED WHEN THE EQUIPMENT IS OPERATING UNDER NORMAL CONDITIONS TO DEMONSTRATE COMPLIANCE WITH THE RULE 1146 CONCENTRATION LIMIT. THE OPERATOR SHALL COMPLY WITH ALL GENERAL TESTING, REPORTING, AND RECORDKEEPING REQUIREMENTS IN SECTIONS E AND K OF THIS PERMIT.
[RULE 3004(a)(4)]

EMISSIONS AND REQUIREMENTS

10. THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:

NOX: 9 PPMV, RULE 1146
CO: 400 PPMV, RULE 1146
CO: 2,000 PPMV, RULE 407
PM: 0.1 GR/DSCF, RULE 409
[RULE 1146, RULE 407, RULE 409]

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A/N's 530923, 524292

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
[RULE 204]
2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
[RULE 204]
3. THIS BOILER SHALL BE FIRED ON NATURAL GAS ONLY
[RULE 1146]
4. ON OR AFTER JANUARY 1, 2013, THIS BOILER SHALL NOT EMIT MORE THAN 9 PPM OF OXIDES OF NITROGEN (NOX), CALCULATED AS NO₂, AND NOT MORE THAN 50 PPM OF CARBON MONOXIDE (CO), ALL MEASURED BY VOLUME ON A DRY BASIS AT 3% OXYGEN AND AVERAGED OVER A PERIOD OF 15 CONSECUTIVE MINUTES.
[RULE 1146, RULE 1303(B)(2)-OFFSET]
5. THIS BOILER SHALL NOT BE OPERATED UNLESS THE FLUE GAS RECIRCULATION SYSTEM IS IN FULL OPERATION. THE FLUE GAS RECIRCULATION SYSTEM SHALL BE IN FULL USE WITHIN ONE MINUTE AFTER THE MAIN FLAME IS ESTABLISHED.
[RULE 1146, RULE 1303(B)(2)-OFFSET]
6. THE OWNER OR OPERATOR OF THIS EQUIPMENT SHALL CONDUCT SOURCE TESTS UNDER THE FOLLOWING CONDITIONS:
 - A. SOURCE TESTING SHALL BE CONDUCTED WITHIN 60 DAYS AFTER INITIAL START-UP UNLESS OTHERWISE APPROVED IN WRITING BY THE EXECUTIVE OFFICER.
 - B. THE SOURCE TESTS SHALL BE PERFORMED TO VERIFY COMPLIANCE WITH THE NOX AND CO EMISSION LIMITS SPECIFIED IN CONDITION NO. 3.
 - C. THE TESTS SHALL BE CONDUCTED WHILE THE BOILER IS FIRING AT MAXIMUM, AVERAGE, AND MINIMUM FIRING RATES.
 - D. WRITTEN NOTICE OF THE SOURCE TESTS SHALL BE SUBMITTED TO THE DISTRICT (ADDRESSED TO SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, P.O. BOX 4941, DIAMOND BAR, CA 91765) AT LEAST 10 DAYS PRIOR TO TESTING SO THAT AN OBSERVER MAY BE PRESENT.
 - E. TWO COMPLETE COPIES OF THE SOURCE TEST REPORTS SHALL BE SUBMITTED TO THE DISTRICT WITHIN 30 DAYS AFTER THE TEST. THE REPORT SHALL INCLUDE, BUT NOT BE LIMITED TO EMISSIONS RATES IN POUNDS PER HOUR AND CONCENTRATIONS IN PPMV AT THE OUTLET OF THE HEATER, MEASURED ON A

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DRY BASIS AT 3% OXYGEN. THE FOLLOWING OPERATING DATA SHALL ALSO BE INCLUDED FOR EACH FIRING RATE:

- I. THE EXHAUST FLOW RATES, IN ACTUAL CUBIC FEET PER MINUTE (ACFM).
 - II. THE FIRING RATES, IN BTU PER HOUR.
 - III. THE EXHAUST TEMPERATURE, IN DEGREES FAHRENHEIT.
 - IV. THE OXYGEN CONTENT OF THE EXHAUST GASES, IN PERCENT.
 - V. THE FUEL FLOW RATE.
- F. A TESTING LABORATORY CERTIFIED BY THE CALIFORNIA AIR RESOURCES BOARD IN THE REQUIRED TEST METHODS FOR CRITERIA POLLUTANT TO BE MEASURED, AND IN COMPLIANCE WITH DISTRICT RULE 304 (NO CONFLICT OF INTEREST) SHALL CONDUCT THE TEST.
- G. SAMPLING FACILITIES SHALL COMPLY WITH THE DISTRICT GUIDELINES FOR CONSTRUCTION OF SAMPLING AND TESTING FACILITIES PURSUANT TO RULE 217. [RULE 1146, RULE 1303(B)(2)-OFFSET]
7. THE BURNER SHALL BE EQUIPPED WITH A CONTROL SYSTEM TO AUTOMATICALLY REGULATE COBUSTION AIR, FUEL AND RECIRCULATED FLUE GAS AS THE BOILER LOAD VARIES. THIS AUROMATIC CONTROL SYSTEM SHALL BE ADJUSTED AND TUNED AT LEAST TWICE A YEAR ACCORDING TO THE MANUFACTURERS SPECIFICATIONS TO ASSURE ITS ABILITY TO REPEAT THE SAME PERFORMANCE AT THE SAME FIRING RATE. [RULE 1146, RULE 1303(b)(2) – OFFSET]
8. RECORDS OF SUCH ADJUSTMENTS TUNE-UPS AND CALIBRATIONS AS STATED INCONDITION NO. 7 SHALL BE KEPT FOR AT LEAST FIVE YEARS AND MADE AVAILABLE TO THE EXECUTIVE OFFICER UPON REQUEST. [RULE 1303(b)(2) – OFFSET]

PERIODIC MONITORING

9. THE OPERATOR SHALL DETERMINE COMPLIANCE WITH THE NO_x EMISSION LIMITS EITHER BY: (a) CONDUCTING A SOURCE TEST AT LEAST ANNUALLY USING AQMD METHOD 100.1 OR 7.1; OR (b) CONDUCTING A TEST AT LEAST ANNUALLY USING A PORTABLE ANALYZER AND AQMD APPROVED TEST METHOD. THE TEST SHALL BE CONDUCTED WHEN THE EQUIPMENT IS OPERATING UNDER NORMAL CONDITIONS TO DEMONSTRATE COMPLIANCE WITH THE RULE 1146 CONCENTRATION LIMIT. THE OPERATOR SHALL COMPLY WITH ALL GENERAL TESTING, REPORTING, AND RECORDKEEPING REQUIREMENTS IN SECTIONS E AND K OF THIS PERMIT. [RULE 3004(a)(4)]
10. THE OPERATOR SHALL DETERMINE COMPLIANCE WITH THE CO EMISSION LIMITS EITHER BY: (a) CONDUCTING A SOURCE TEST AT LEAST ANNUALLY USING AQMD METHOD 100.1 OR 7.1; OR (b) CONDUCTING A TEST AT LEAST ANNUALLY USING A PORTABLE ANALYZER AND AQMD APPROVED TEST METHOD. THE TEST SHALL BE CONDUCTED WHEN THE EQUIPMENT IS OPERATING UNDER NORMAL CONDITIONS TO

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DEMONSTRATE COMPLIANCE WITH THE RULE 1146 CONCENTRATION LIMIT. THE OPERATOR SHALL COMPLY WITH ALL GENERAL TESTING, REPORTING, AND RECORDKEEPING REQUIREMENTS IN SECTIONS E AND K OF THIS PERMIT.
[RULE 3004(a)(4)]

EMISSIONS AND REQUIREMENTS

11. THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:

NOX: 9 PPMV, RULE 1146
CO: 50 PPMV, RULE 1303(b)(2) – OFFSETS
CO: 400 PPMV, RULE 1146
CO: 2,000 PPMV, RULE 407
PM: 0.1 GR/DSCF, RULE 409
[RULE 1146, RULE 407, RULE 409]