APPENDIX E

SUPPORTING CALCULATIONS FOR
ALCOA, INC. AGREED ORDER 2000-0032-AIR

REGIONAL STRATEGY

APRIL 2000 REVISION

IEA

International Environmental Associates, Inc.

FAX

International Environmental Associates, Inc.
5718 Westheimer, Suite 1000
Houston, TX 77057
***Fax:** 713/623-5050*
Email: dselfert@ieainc.com

Date: November 29, 1999

To: James Randall **Company:** TNRCC

Fax No.: 512-239-1300

From: David Selfert **Phone:** 713-623-5047

Total Pages (Including Cover): 5

PLEASE CALL 713-623-5047
IF DOCUMENT IS NOT RECEIVED PROPERLY.

COMMENTS:

James Randall,

Per your conversation with Mark Bryson of the Alcoa, Inc. facility in Rockdale, Texas, I am sending the following updated information on the Boiler 2 Standard Permit application:

- Table 1 with revised actual NO_x emissions.
- Table 2 with the revised maximum NO_x emission rate.
- Table 1(a) with the corrected lb/hr and tpy NO_x emission rates.
- Revised Section 3.2 and 3.3 with the corrected NO_x emission values.

If you have any questions, please call me at 713-623-5047.

Regards,

David Selfert

Table 1

NO_X Emission Rates
Boiler 2 Existing and Proposed Actual Emissions
Alcoa Inc. - Rockdale, Texas

EPN	Existing Emissions				Proposed Emissions				Change (tpy)
	Emission Factor, lb/hr [1]	Hours/Year [2]	(lb/hr)	(tpy)	Emission Factor [3]	Units	Gross Heat Output (MMBtu/hr) [4]	(tpy)	
17A	1,478.1	8,146.0	1,478.1	6,020.4	0.80	lb/MMBtu	1,335.4	4,351.3	-1,669.1

[1] Existing NO_X emission factor is based on Alcoa Sampling Data in 1998.

[2] Hours of operation are from the 1998 Emissions Inventory.

[3] Proposed NO_X emission factor is based on the simulated studies conducted at Alcoa on a similar boiler.

[4] Gross heat output is based on 121.4 MW gross heat output (in 1998) and conversion factor of 11,000 Btu/kW-hr .

Table 2

Criteria Pollutants Maximum Proposed Emission Rates
Boiler 2 Proposed Emissions
Alcoa Inc. - Rockdale, Texas

Emissions from Lignite Firing

EPN	Hours of Operation per Year [1]	NOX Emissions [3]			CO Emissions [4]		
		Emission Factor, lb/MMBtu [2]	(lb/hr)	(tpy)	Emission Factor, ppm [2]	(lb/hr)	(tpy)
17A	8,760	0.80	1,168.0	5,115.8	150.0	224.3	982.3

[1] Hours of operation is based on maximum hours of operation (8,760) in a year.
[2] NOX and CO proposed emission factor is based on simulated studies conducted at Alcoa on a similar boiler
[3] NOX proposed emissions are based on maximum boiler rating of 134 MW (1,460 MMBtu/hr).
[4] CO proposed emissions are based on the following:

CO conversion: 1 ppm CO =	1.14	mg/m3 =	7E-08	lb/cf
Volumetric Flow =	350,000	scfm		
Therefore, 150 ppm CO =	224.3	lb/hr		
=	982.3	tons/yr		

Emissions from Diesel Firing

EPN	Annual Diesel Usage (Gal.) [1]	NOX Emissions			CO Emissions		
		Emission Factor, lb/10^3 Gal [2]	lb/hr [3]	(tpy) [4]	Emission Factor, lb/10^3 Gal [2]	lb/hr [3]	(tpy) [4]
17A	140,000	24	36	1.7	5.0	7.5	0.4

[1,4] Annual emissions is based on 1998 annual diesel usage of 140,000 gallons.
[2] Emission factors are based on EPA's AP-42 Table 1.3.1 (09/98) for No. 2 oil fired boilers (> 100 MmBtu/hr).
[3] Short-term (lb/hr) emissions are based on a maximum diesel flow of 25 GPM.

Proposed Emissions Summary from Boiler 2

EPN	NOX Emissions		CO Emissions	
	lb/hr [1]	tons/yr [2]	lb/hr [1]	tons/yr [2]
17A	1,168.0	5,115.8	224.3	982.3

[1] Short-term (lb/hr) emissions are the maximum of lignite firing and diesel firing short-term emission rates.
[2] Annual (tons/yr) emission are from lignite firing as lignite firing has higher emission rates.

PERMIT NO. ____ ____ PERMIT TYPE: CONSTRUCTION [X] AMENDMENT [ ] ERATION [ ] RENEWAL [ ]

ACCOUNT ID NO. MM-0001-T

DATE 11/29/99

TABLE 1(a)
EMISSION SOURCES

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA					EMISSION POINT DISCHARGE PARAMETERS											
EMISSION POINT [1]		COMPONENT OR AIR CONTAMINANT NAME (2)	AIR CONTAMINANT EMISSION RATE		UTM COORDINATES OF EMISSION PT. [5]			SOURCE								
								HEIGHT ABOVE GROUND [ft.]	HEIGHT ABOVE STRUCT. [ft.] [6(A)]	STACK EXIT DATA			FUGITIVES			
NUMBER	NAME		LB/HR [3]	TONS/YR [4]	ZONE	EAST [meters]	NORTH [meters]			DIA. [ft.] [6(B)]*	VEL. [fps] [6(C)]	TEMP. [°F] [6(D)]	LENGTH [ft.] [7(A)]*	WIDTH [ft.] [7(B)]	AXIS DEG. [7(C)]	E/W OF NORTH [7(D)]*
EPN 17A* FIN P17-2	BOILER 2	NOX CO	1,168.0 224.3	5,115.8 982.3	14	685606	3382997	265		17	200	325				
EPN FIN																
EPN FIN																
EPN FIN																
EPN FIN																
EPN FIN																
EPN FIN																
EPN FIN																
EPN FIN																

EPN = EMISSION POINT NUMBER
FIN = FACILITY IDENTIFICATION NUMBER

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 480 feet.
TNRCC STANDARD CONDITIONS ARE 68°F AND 14.7 PSIA [GENERAL RULE 101.1]

Boiler 1 (P17-1) and Boiler 2 (P17-2) vent through emission point 17A. The emissions are only shown for Boiler 2.

3.0 EMISSION RATES

The emissions from the Boiler 2 (FIN: P17-2) are criteria pollutants (NO_X, SO_2, VOC, CO, and particulate matter) emissions. The emission source associated with the proposed modification of the Boiler 2 is the boiler stack (EPN: 17A). The emission of NO_X will decrease from the proposed modification and the emissions of PM_{10}, SO_2, and VOC will not change. CO levels will be maintained at 150 ppm (or less) to achieve the maximum NOx emission reductions. The actual existing and actual proposed emission calculation for NO_X details are shown in Table 1. Table 2 presents the proposed criteria pollutants emission rates. The TNRCC Table 1(a) for emission sources and Table 6 for the Boiler 2 are included in Attachment A.

3.1 EXISTING NO_X ACTUAL EMISSIONS

The existing NO_X actual emissions are based on Alcoa Sampling Data and the actual hours of operation of the emission source. This emission estimates data was extracted from the 1998 TNRCC emissions Inventory. The total existing NO_X emissions from Boiler 2 were 6,020.4 tons/year (see Table 1).

3.2 PROPOSED NO_X ACTUAL EMISSIONS

The proposed NO_X actual emissions are based on simulated studies conducted on a boiler at the Alcoa site and vendor targets. The gross heat output from Boiler 2 is based on the actual 1998 gross heat output of 121.4 MW. The total proposed NO_X actual emissions from Boiler 2 are 4,351.3 tons/year (see Table 1).

3.3 NO_X ACTUAL EMISSIONS SUMMARY

The NO_X actual emissions are based on the actual hours of operation and actual gross heat output of Boiler 2 in 1998. The decrease in NO_X emissions from the proposed modification is 1,669.1 tons/year (see Table 1).

3.4 PROPOSED CRITERIA POLLUTANTS EMISSIONS

The proposed modification of Boiler 2 will not change emissions of PM_{10}, SO_2, and VOC. The proposed emissions of NO_X and CO are based on simulated studies conducted on a boiler at the Alcoa site. The proposed maximum emissions from lignite firing are estimated using maximum hours of operation of 8,760 hours per year and maximum gross heat output of 134 MW (1,460 MMBtu/hr) from Boiler 2.

Alcoa uses diesel as a start-up fuel in Boiler 2. Proposed NO_X and CO emissions from diesel firing are based on EPA's AP-42 emission factors (Section 1.3, Table 1.3.1). Short-term emissions are based on maximum diesel flow of 25 GPM and annual emissions are based on a 1998 maximum annual diesel usage of 140,000 gallons.

The proposed NO_X and CO emissions summary details are shown in Table 2 and are included in TNRCC Table 1(a). The overall short-term emissions from Boiler 2 are the maximum emissions of either lignite firing or diesel firing. The annual emissions are based on lignite firing as lignite firing has higher emission rates.

James,

Janis wanted me to give you the logic for the lbs/hour rate that will go into our agreed order for NO_x

The 1997 EI data is:

	Tons/Yr	lbs/hr
Unit 1	6582.7	1565.7
Unit 2	5449.0	1565.7
Unit 3	7428.9	1832.9
	19460.6	4964.3
-30%	5838.2	1489.3
AgreedOrder	13622.4	3475.0

The logic used is similar to that used for Standard Permit 42739 except that 1997 data was used

If you have any questions, call me at 512 446-8670

Thanks,

Mark Bryson
Alcoa

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

December 1, 1999

Mr. W. T. Eckert
Power and Mining Manager
Alcoa Inc.
P.O. Box 472
Rockdale, Texas 76567

Re: Standard Permit No. 42739
Modification to Boiler No. 2
Rockdale, Milam County
Account ID No. MM-0001-T

Dear Mr. Eckert:

This is in response to your Standard Permit Registration, Form PI-1S, concerning the proposed project. We understand that the proposed project involves modification of the windbox compartment of Boiler No. 2 (a grandfathered facility) under the Pollution Control Project Standard Permit. As a result of this modification, emissions of nitrogen oxides from Boiler No. 2 will be reduced to a level not to exceed 1168.0 lb/hr and 5115.8 ton/year, and emissions of carbon monoxide will increase to a level not to exceed 224.3 lb/hr and 982.3 ton/year.

After evaluation of the information which you have furnished, we have determined that your proposed project meets the requirements for a standard permit if constructed and operated as described in your registration. This standard permit was authorized by the Commissioners pursuant to 30 Texas Administrative Code Section 116.617(1). A copy of the standard permit rule in effect at the time of this registration is enclosed. You must operate in accordance with all requirements of the enclosed standard permit rule.

You are reminded that these facilities must be in compliance with all rules and regulations of the Texas Natural Resource Conservation Commission (TNRCC) and of the U.S. Environmental Protection Agency at all times. Please be advised that the emissions reductions associated with this Pollution Control Standard Permit project may or may not be sufficient to demonstrate compliance with rules relating to any future Voluntary Emissions Reduction Permit application which may be filed by Alcoa.

Re: Standard Permit No. 42739

Your cooperation in this matter is appreciated. If you have any questions concerning this standard permit, please call Mr. James B. Randall, P.E., at (512) 239-1078 or write the assigned engineer at Texas Natural Resource Conservation Commission, Office of Permitting, Remediation, and Registration, Air Permits Division (MC-162), P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

Jeffrey A. Saitas, P.E.
Executive Director

JS/JR/ss

Enclosures

cc: Mr. Salal Tahiri, Manager, Air Program, Waco

November 11, 1999

Mr. Skip Clark
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: Permit Application No. 42739
Account Number MM-0001-T

Dear Mr. Clark:

This letter is a follow-up to our telephone conversation this morning concerning the referenced permit. A review of the standard permit application indicates that we may not have been clear on the carbon monoxide (CO) increases that will occur as part of the project. The boiler will have to be operated at higher CO levels than today to achieve the maximum NO_x reductions possible. The increase in CO emissions will be over the significant level as defined in 40 CFR 52.21 (b)(23).

The regulation at 30 TAC 116.617 (8)(A) reads as follows: *the net emissions increase may not: (i) considering the emission reductions that will result from the project, cause or contribute to a violation of any national ambient air quality standard, (ii) cause or contribute to a violation of any Prevention of Significant Deterioration (PSD) increment; or (iii) cause or contribute to a violation of any PSD visibility limitation.*

CO emitted at 150 ppm or less from Boiler 2 will not cause or contribute to a violation of the national ambient air quality standard for CO. There is not a PSD increment for CO, so there is no increment to violate. There are not any CO issues related to visibility limitations.

If you have concerns or do not agree with the above statements, please contact me. If you have any questions, please call me at 512 446-8670.

Sincerely,

Mark H. Bryson
Operations Environmental Superintendent

cc: Zoe Rascoe – TNRCC Region 9

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

1999 October 29

Ms. Victoria J. L. Hsu, P.E., Director
Air Permits Division (MC 162)
Texas Natural Resource
Conservation Commission
P. O. Box 13087
Austin, TX 78711-3087

42703

Re: TNRCC Account No. MM0001T
Standard Permit Application for Pollution Control Project

Dear Ms. Hsu:

Enclosed with this letter is a standard permit application for a pollution control project at the Unit No. 2 boiler of the power plant at Rockdale Operations. This project involves the installation of separate overfire air in the boiler which will decrease NO_x emissions. The results of this project will be the basis of a Voluntary Emission Reduction Permit to be filed next year under 30 TAC Chapter 116 Subchapter H. By copy of this letter the standard permit fee of $450 is transmitted to the TNRCC Cashier.

If you have any questions. or if you need additional information, please call me at 512 446-8670.

Sincerely,

Mark Bryson
Operations Environmental
Superintendent

cc: Zoe Rascoe - TNRCC Waco
Cashier – TNRCC (Permit fee check only)

Texas NA[illegible]AL RESOURCE CONSERVATION[illegible]OMMISSION

STANDARD PERMIT REGISTRATION

(Air Quality Standard Permit)

FORM PI-1S

Please print or type all information. Please contact the CORE Section of the New Source Review Division with any questions at (512) 239-1250 or FAX (512) 239-1300. Written inquiries may be addressed to: Texas Natural Resource Conservation Commission, Office of Air Quality, New Source Review Division (MC-162), P.O. Box 13087, Austin TX 78711-3087. The registrant is encouraged to use an administrative completeness checklist, available on request, to assist in providing the required information.

Forward application only to New Source Review Division (MC-162) P.O. Box 13087, Austin, TX 78711-3087; Forward fees only (if applicable) to Cashier, TNRCC, P.O. Box 13088, Austin, TX 78711-3088.

VERY IMPORTANT!

I. A. Is CONFIDENTIAL information part of this registration? [ ]-YES [X]-NO
If YES, is each "confidential" page so marked in big red letters? [ ]-YES [ ]-NO

B. Is this registration in response to, or related in any way to, a Notice of Violation at this location? [ ]-YES [X]-NO
If YES, date of Notice of Violation: _____ and the specific TNRCC rule(s) violated: _____

C. Are the new facilities or changes to existing facilities represented in this registration required to be permitted as a disposal facility under the Taxes Solid Waste Disposal Act? [ ]-YES [X]-NO

II. REGISTRANT INFORMATION

42739

A. **PERMITTEE:** Alcoa Inc.
(Entity legally responsible for permit; i.e., Owner or Operator of the facility)
Permittee's Texas State Comptroller's Tax ID No.: 24-1486092
Permittee's Address (Person, Title, Address): W. T. Eckert, Power and Mining Manager
P.O. Box 472, Rockdale, TX 76567
Telephone (512) 446-8226 Fax (512) 446-8755
Permittee's Technical Contact (Person, Title, Address): Mark H. Bryson, Operations Env. Superintendent
P.O. Box 472, Rockdale, TX 76567
Telephone (512) 446-8670 Fax (512) 446-8755

B. **OWNER OF FACILITY:** Alcoa Inc.
(If different from permittee; include names of proprietor/general partner(s) if applicable)
Owner's Texas State Comptroller's Tax ID No.: 24-1486092
Owner's Address (Person, Title, Address): _____

C. **PRINCIPAL COMPANY PRODUCT OR BUSINESS:** Primary Aluminum Manufacturing
Plant SIC Code: 3334

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III. PROJECT CLASSIFICATION (Check all applicable blocks):

A. [X] 30 TAC Chapter 116, §116.617 - Standard Permit list
B. [ ] 30 TAC Chapter 116, §116.620 - Installation/modification of Oil and Gas Facilities
C. [ ] 30 TAC Chapter 116, §116.621 - Municipal solid waste landfills
D. [ ] List Permit Numbers for all existing related and/or affected air quality permits:
None

IV. FACILITY PHYSICAL LOCATION:

A. Name of Plant or Site: Rockdale Operations
B. Street Address: FM 1786, 6 Miles SW of Rockdale, Texas
C. Nearest City: Rockdale County: Milam Site Zip Code: 76567
D. Plant Site TNRCC Air Quality Account Number: MM - 0001 - T

V. FACILITY TYPE AND OPERATING SCHEDULE:

A. Name of Facility to be Permitted: Boiler 2
B. Facility Type (Check one): [X] Permanent, [ ] Portable.
C. Facility Operating Schedule: (24)Hours/day; (7)Days/week; (52)Weeks/year
( ) Seasonal - explain: _____

VI. SUBMIT THE FOLLOWING GENERAL INFORMATION:

A. Submit a current area map containing a true north arrow, the entire plant property, and the location of the property relative to prominent geographical features such as highways, roads, streams, and significant landmarks such as buildings, residences, and schools. All areas within one mile of any plant boundary must appear on this map. **Attachment B**

B. Submit a plot plan of the plant property clearly showing all property lines, affected emission points, buildings, tanks, process vessels, and other process equipment. The plot plan must be scaled, must indicate a true north arrow, must reference a plant bench mark (located by Latitude/Longitude or Universal Transverse Mercator [UTM] coordinates), and must be dated. Attachment B

C. Submit a process description and process flow diagram. Section 2.0

D. Submit a Table 1(a), the basis of emissions estimates (including fugitive emissions), quantification of all emission increases and decreases associated with the project being registered, information that describes efforts to be taken to minimize any collateral emissions increases that will result from the project, a description of the project and related processes, and a description of any equipment being installed. Attachment A

VERY IMPORTANT!

E. Franchise Tax. Submit a copy of a Certificate of Good Standing from the State Comptroller's Office with each registration if the permittee is a corporation. Attachment C

F. Permit Fee. A permit fee is required by Regulation VI Section 116.614. Please forward the fee only to Cashier, TNRCC, P.O. Box 13088, Austin, TX 78711-3088.

VII. GENERAL REQUIREMENTS:

Submit itemized information and/or analysis demonstrating that all applicable general requirements as specified in TNRCC Sections 116.610, 116.617, 116.620, and 116.621 are met. **Each paragraph of the applicable sections must be addressed in this registration.** Atmospheric dispersion modeling may be required as part of the air quality impact analysis. Section 4.0

VIII. A **COPY OF THIS REGISTRATION** and all attachments must be sent by the registrant to (A) the Air Program of the appropriate TNRCC Regional Office, and (B) to any local air pollution control program having jurisdiction. Copies of the registration were sent to:

A. TNRCC Regional Office (city): WACO

B. Local Programs: 1. _____

2. _____

[X]-NO LOCAL PROGRAMS.

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IX. PROFESSIONAL ENGINEER SEAL. Is the estimated capital cost of the project for which registration is made greater than $2 million dollars? [ ]-YES [X]-NO.

If **YES**, registration must be submitted under seal of a Texas registered Professional Engineer, unless exemption is claimed pursuant to the Texas Engineering Practice Act (TEPA).

[ ] - Exemption from this P.E. seal requirement is claimed pursuant to TEPA Section _____

X. I, **W. T. Eckert** Power and Mining Manager

- Please print or type) (Title: Owner, Plant Manager, President, Vice President, Environmental Director, etc.)

state that I have knowledge of the facts herein set forth and that the Same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which registration is made will not in any way violate any provision of the Texas Health & Safety Code (THC), Chapter 382, Texas Clean Air Act, as amended, or any of the rules and regulations of the Texas Natural Resource Conservation Commission adopted under Chapter 382 or any local governmental ordinance or resolution pursuant to the Texas Clean Air Act. I further state that I have read and understand Section 382.091, THC, which defines CRIMINAL OFFENSES for certain violations, including intentionally or knowingly making or causing to be made false material statements or representations in this registration, and Section 382.092, THC, pertaining to CRIMINAL PENALTIES.

DATE 10/28/99 SIGNATURE _____

NOTE - ORIGINAL SIGNATURE *IN INK* IS REQUIRED.

NOTE TO APPLICANT: Please mark an "X" in the column labeled "Applicant use" to indicate that the information has been provided. You may also use the column labeled "Comments & Discussion" to further explain your action.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
NEW SOURCE REVIEW PROGRAM
AIR QUALITY STANDARD PERMIT APPLICATION (PI-1S)
ADMINISTRATIVE COMPLETENESS CHECKLIST

TNRCC use only

COMPANY_____ PROJ No.:_____ PROJ TYPE:_____ CORE ENGR:_____ RECORD No.:_____
REGION_____ COUNTY_____ Tech. Contact:_____ Phone: _____
DATE RECD by CORE:_____ Comments _____ DATE ADMIN COMP:_____
DATE RECD by TECH. ENGR:_____ Comments_____ TECH. ENGR:_____ TECHNICAL SECT.:_____

<------ TNRCC use only ------>

PI-1 REF	REQUIRED INFORMATION	Applicant use	DATE ADMN COMPLETE	COMPLETE	NOT SUBMITTED	NOTHING COMMENTS & DISCUSSION
I.	A. CONFIDENTIAL Information?(1)	X				[ ]YES [X]NO
	CONFIDENTIAL pages marked?	NA				[ ]YES [ ]NO
	B. NOV related notification	X				[ ]YES [X]NO
	C. Waste disposal facility	X				[ ]YES [X]NO
II.	A. Permittee Name, Tax ID & Addr.	X				
	Technical Contact (addr,phone)	X				
	B. Owner Name, Tax ID & Address	X				
	C. Product/Business & SIC Code	X *				
III.	A. §116.617	X				
	B. §116.620	NA				
	C. §116.621	NA				
	D. Related air permits	X				
IV.	A. Plant/Site Name	X				
	B. Address of Facility	X				
	C. Nearest City, County and Zip	X *				
	D. TNRCC Air Quality Acct. No.	X *				
V.	A. Name of Facility	X				
	B. Facility Type	X				[X]PERMANENT [ ]PORTABLE
	C. Operating Schedule	X				
VI.	A. Area Map	X				
	B. Plot Plan	X				
	C. Process information	X				[ ]Present Permit No._____
	Process description	X				
	Process flow diagram	X				
	D. Emissions Information	X				[ ]Present Permit No._____
	Table1(a)	X				
	E. Franchise Tax Certificate	X *				[ ]N/A [X]Certificate good thru_11_/_15/_99_
	F. Permit Fee Required?	X				[X]YES [ ]NO
VII.	Regulation VI Rules					
	116.610(a)(1) Emission Increase	X				
	116.610(a)(2) Schedule	X				
	116.610(a)(3) NSPS	X				
	116.610(a)(4) HAPs	X				
	116.610(a)(5) MACT	X				
	116.610(a)(6) Registration	X				
	116.610(b) PSD & Nonattainment	X				NEW MAJOR SOURCE/MODIFICATION? [ ]YES [X]NO
	116.610(c) Circumvention	X				
VIII.	Copy to TNRCC Regional Office	X				[X]YES City - _WACO_____
	Copy to Local Program(s)	X *				[ ]YES [X]N/A
XI.	Application sealed by P.E?	X				[ ]YES [X]N/A
XII.	Authorizing Signature/Date	X				

TNRCC Use Only

Affected regulation _____
Date postmarked _____
Date registration received _____
Date by which registrant must be notified of agency objections _____

* *These items will not result in the application being considered administratively deficient; however, they MUST be submitted prior to final action or approval of the application.*

(1) *CONFIDENTIAL information MUST be clearly marked on each page and separated from non-confidential information. The application must include a non-confidential version describing the confidential information for the public file. To be considered confidential, each page must be marked "CONFIDENTIAL" at the time of submittal.*

BIRDIE KRISTOFF
ALCOA
PO BOX 472
09044400
ROCKDALE, TX 76567-0472

Visa® Purchasing Account **1097**

Date 10-29-99

17-2/910

Pay to the order of Texas Natural Resource Cons. Commission $ 450.00

Four Hundred Fifty and 00/100---------- Dollars

Security features included. Details on back.

USbank. U.S. Bank National Association ND Fargo, ND 58125 (09130)

PAYABLE THROUGH U.S. Bank National Association Minneapolis, MN 55440

For MM0001T Standard Permit App Birdie Kristoff MP

⑆091000022⑆480004327328⑈ 1097

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Alcoa Inc.
Rockdale Operations
Rockdale, Texas

42733

TNRCC Account No. : MM-0001-T

TNRCC Standard Permit Application
Power Plant Boiler 2

Prepared By

International Environmental Associates, Inc.
5718 Westheimer, Suite 1000
Houston, Texas 77057

10/21/99

TABLE OF CONTENTS

Section

1.0 INTRODUCTION

Alcoa Inc. (Alcoa) owns and operates a primary aluminum manufacturing facility located near Rockdale, Milam County, Texas. Alcoa is proposing to modify the existing Boiler 2 steam generating unit in the power plant area of the Rockdale facility.

The proposed project involves modification of the Boiler 2 main windbox to add Separated Overfire Air (SOFA) to implement the Low NO_X Concentric Firing System (LNCFS) offset air capability. These proposed modifications would reduce NO_X emissions significantly while maintaining acceptable operation of the boiler processes.

Alcoa requests a Texas Natural Resource Conservation Commission (TNRCC) Standard Permit to modify the Boiler 2 main windbox and install other associated equipment and accessories under TNRCC Regulation §116.617 "Standard Permits for Pollution Control Projects". Currently, Boiler 2 is authorized to operate under TNRCC Grandfathered Status. The emission source affected by the proposed modification as part of the standard permit is as follows:

- Boiler 2 (FIN:P17-2)

TNRCC's Standard Permit application form PI-1S, the PI-1S checklist form, TNRCC Table 1(a) and Table 6 are presented in Attachment A.

1.1 FACILITY LOCATION

Alcoa is located in Rockdale, Milam County, Texas. The area map and plot plan for the facility are included in Attachment B. These Figures show the location of the Alcoa facility, location of Boiler 2, and the associated emission point. There are no schools within 3,000 feet of the facility as indicated on the area map.

1.2 PROJECT DESCRIPTION

The proposed project includes the following:

- Replacement of existing coal nozzle tips with a reduced area coal nozzle tip.
- Replacement of existing lower and upper Closed Coupled Overfire Air (CCOFA) nozzle tips and top and bottom auxiliary air nozzle tips with one-piece horizontally adjustable air nozzle tips.
- Replacement of existing oil tip with a reduced area oil tip.
- Addition of four SOFA tips on each corner.
- Elimination of one of the two fuel air dampers in each coal compartment.

The detailed process description of the proposed project is given in the process description section of this standard permit application.

1.3 PROJECT JUSTIFICATION

Replacement of existing fuel and air firing system with a Low NO_X Concentric Firing System (LNCFS) Level III system has the advantage of reducing NO_X emissions. The LNCFS Level III firing system uses a combination of SOFA and CCOFA systems. Approximately, 30% of SOFA and 20% of CCOFA would be the air flow arrangement used in this proposed windbox modification project. According to the vendor, this combination of both SOFA and CCOFA

system has proven to be the most effective configuration for maximum NO_X reduction on this type of boiler.

The proposed Boiler 2 windbox modification project is an environmentally friendly project, which will reduce the NO_X emissions from 27% to 41% of the current values. Based on the simulated studies conducted on one of the boilers by Alcoa, actual NO_X emissions are estimated to decrease by approximately 1,700 to 2,500 tons/year (see Section 3, Emissions Estimates). The proposed project involving the modification of Boiler 2 is initiated by Alcoa voluntarily and not due to any regulatory requirement by TNRCC or any federal rule.

Alcoa believes that the proposed Boiler 2 modification project is a pollution prevention initiative project at the source of generation by equipment and process modification and voluntary implementation of techniques to reduce NO_X emissions. Therefore, Alcoa requests TNRCC issue a Standard Permit construction authorization for the proposed Boiler 2 modification project.

1.4 PROJECT SCHEDULE

Alcoa proposes to begin the proposed Boiler 2 modification project in December 1999 and to start operation in March 2000.

1.5 PERMIT FEES AND FRANCHISE TAX CERTIFICATE

A check payable to "Texas Natural Resource Conservation Commission" for $450 to cover the TNRCC Standard Permit Fees (TNRCC §116.614) is enclosed. A Franchise Tax Certificate (Certificate of Good Standing) for the proposed Boiler 2 modification project is presented in Attachment C.

2.0 PROCESS DESCRIPTION

Boiler 2 (FIN: P17-2) is used to produce steam to run the steam turbine. The steam turbine-generator produces electricity for powering the aluminum smelting operations at the Alcoa Rockdale Operations. Boiler 2 is tangentially fired and has a maximum rating at approximately 134 MW. Dry lignite from the lignite dryers is used as the primary fuel and diesel is used as startup fuel. An electrostatic precipitator (ESP) controls the combustion particulate matter emissions from Boiler 2. The ESP is used to separate and collect suspended solids from the flue gas leaving the Boiler 2. After exiting the ESP, the emissions from Boiler 2 are released to the atmosphere through a stack (EPN: 17A).

In the proposed modification, the Boiler 2 main windbox will be re-tipped as required to operate a Separated Overfire Air (SOFA) system to implement the Low NO_x Concentric Firing System (LNCFS) offset air capability. The LNCFS will use the existing burners and air registers (with area modifications discussed earlier) in each corner and a SOFA compartment with 4 air registers located above the existing windbox. The adjustable LNCFS features horizontally adjustable nozzle tips that allow field tuning of the offset air. In addition to the main windbox nozzle tip modification, one of the two fuel air dampers will be eliminated in each coal compartment which provides an improved fuel air damper control. After modification to the Boiler 2 windbox, the air for the burner will include approximately 30% of SOFA and 20% of CCOFA.

The process flow diagram for the proposed Boiler 2 is presented in Figure 1.

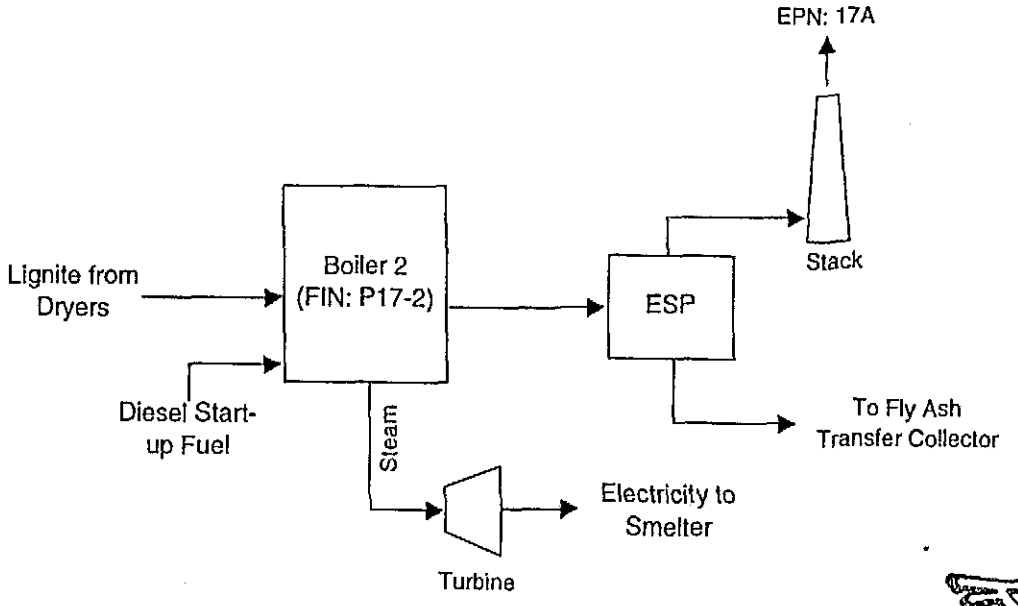

Figure 1
Boiler 2 Process Flow Diagram
Alcoa Inc., Rockdale, Texas

3.0 EMISSION RATES

The emissions from the Boiler 2 (FIN: P17-2) are criteria pollutants (NO_X, SO_2, VOC, CO, and particulate matter) emissions. The emission source associated with the proposed modification of the Boiler 2 is the boiler stack (EPN: 17A). The emission of NO_X will decrease from the proposed modification and the emissions of PM_{10}, SO_2, and VOC will not change. CO levels will be maintained at 150 ppm (or less) to achieve the maximum NOx emission reductions. The actual existing and actual proposed emission calculation for NO_X details are shown in Table 1. Table 2 presents the proposed criteria pollutants emission rates. The TNRCC Table 1(a) for emission sources and Table 6 for the Boiler 2 are included in Attachment A.

3.1 EXISTING NO_X ACTUAL EMISSIONS

The existing NO_X actual emissions are based on Alcoa Sampling Data and the actual hours of operation of the emission source. This emission estimates data was extracted from the 1998 TNRCC emissions Inventory. The total existing NO_X emissions from Boiler 2 were 6,020.4 tons/year (see Table 1).

3.2 PROPOSED NO_X ACTUAL EMISSIONS

The proposed NO_X actual emissions are based on simulated studies conducted on a boiler at the Alcoa site and vendor targets. The gross heat output from Boiler 2 is based on the actual 1998 gross heat output of 121.4 MW. The total proposed NO_X actual emissions from Boiler 2 are 4079.3 tons/year (see Table 1).

3.3 NO_X ACTUAL EMISSIONS SUMMARY

The NO_X actual emissions are based on the actual hours of operation and actual gross heat output of Boiler 2 in 1998. The decrease in NO_X emissions from the proposed modification is 1941.1 tons/year (see Table 1).

3.4 PROPOSED CRITERIA POLLUTANTS EMISSIONS

The proposed modification of Boiler 2 will not change emissions of PM_{10}, SO_2, and VOC. The proposed emissions of NO_X and CO are based on simulated studies conducted on a boiler at the Alcoa site. The proposed maximum emissions from lignite firing are estimated using maximum hours of operation of 8,760 hours per year and maximum gross heat output of 134 MW (1,460 MMBtu/hr) from Boiler 2.

Alcoa uses diesel as a start-up fuel in Boiler 2. Proposed NO_x and CO emissions from diesel firing are based on EPA's AP-42 emission factors (Section 1.3, Table 1.3.1). Short-term emissions are based on maximum diesel flow of 25 GPM and annual emissions are based on a 1998 maximum annual diesel usage of 140,000 gallons.

The proposed NO_x and CO emissions summary details are shown in Table 2 and are included in TNRCC Table 1(a). The overall short-term emissions from Boiler 2 are the maximum emissions of either lignite firing or diesel firing. The annual emissions are based on lignite firing as lignite firing has higher emission rates.

Table 1

NO_X Emission Rates
Boiler 2 Existing and Proposed Actual Emissions
Alcoa Inc. - Rockdale, Texas

EPN	Existing Emissions				Proposed Emissions				Change (tpy)
	Emission Factor, lb/hr [1]	Hours/Year [2]	(lb/hr)	(tpy)	Emission Factor [3]	Units	Gross Heat Output (MMBtu/hr) [4]	(tpy)	
17A	1,478.1	8,146.0	1,478.1	6,020.4	0.75	lb/MMBtu	1,335.4	4,079.3	-1,941.1

[1] Existing NO_X emission factor is based on Alcoa Sampling Data in 1998.

[2] Hours of operation are from the 1998 Emissions Inventory.

[3] Proposed NO_X emission factor is based on the simulated studies conducted at Alcoa on a similar boiler.

[4] Gross heat output is based on 121.4 MW gross heat output (in 1998) and conversion factor of 11,000 Btu/kW-hr .

Table 2

Criteria Pollutants Maximum Proposed Emission Rates
Boiler 2 Proposed Emissions
Alcoa Inc. - Rockdale, Texas

Emissions from Lignite Firing

EPN	Hours of Operation per Year [1]	NOX Emissions [3]			CO Emissions [4]		
		Emission Factor, lb/MMBtu [2]	(lb/hr)	(tpy)	Emission Factor, ppm [2]	(lb/hr)	(tpy)
17A	8,760	0.75	1,095.0	4,796.1	150.0	224.3	982.3

[1] Hours of operation is based on maximum hours of operation (8,760) in a year.
[2] NOX and CO proposed emission factor is based on simulated studies conducted at Alcoa on a similar boiler.
[3] NOX proposed emissions are based on maximum boiler rating of 134 MW (1,460 MMBtu/hr).
[4] CO proposed emissions are based on the following:

CO conversion: 1 ppm CO =	1.14	mg/m3 =	7E-08	lb/cf
Volumetric Flow =	350,000	scfm		
Therefore, 150 ppm CO =	224.3	lb/hr		
=	982.3	tons/yr		

Emissions from Diesel Firing

EPN	Annual Diesel Usage (Gal.) [1]	NOX Emissions			CO Emissions		
		Emission Factor, lb/10^3 Gal [2]	lb/hr [3]	(tpy) [4]	Emission Factor, lb/10^3 Gal [2]	lb/hr [3]	(tpy) [4]
17A	140,000	24	36	1.7	5.0	7.5	0.4

[1, 4] Annual emissions is based on 1998 annual diesel usage of 140,000 gallons.
[2] Emission factors are based on EPA's AP-42 Table 1.3.1 (09/98) for No. 2 oil fired boilers (> 100 MmBtu/hr).
[3] Short-term (lb/hr) emissions are based on a maximum diesel flow of 25 GPM.

Proposed Emissions Summary from Boiler 2

EPN	NOX Emissions		CO Emissions	
	lb/hr [1]	tons/yr [2]	lb/hr [1]	tons/yr [2]
17A	1,095.0	4,796.1	224.3	982.3

[1] Short-term (lb/hr) emissions are the maximum of lignite firing and diesel firing short-term emission rates.
[2] Annual (tons/yr) emission are from lignite firing as lignite firing has higher emission rates.

4.0 REGULATORY ANALYSIS

The proposed modification of the Boiler 2 will comply with the TNRCC applicable Standard Permit rules and regulations. The specific TNRCC regulations are addressed in this section to demonstrate that the proposed modification of the Boiler 2 project will meet all applicable TNRCC Standard Permitting requirements.

TNRCC §116.610 – Applicability
The proposed Boiler 2 modification project meets the requirements for a TNRCC Standard Permit.

TNRCC §116.611 – Registration Requirements
The proposed Boiler 2 modification project will be registered with TNRCC as required for a TNRCC Standard Permit.

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TNRCC §116.614 – Standard Permit Fees
The proposed Boiler 2 modification project will be registered by remitting the necessary fees ($450) as required for a TNRCC Standard Permit.

TNRCC §116.615 – General Conditions
Alcoa will comply with all the applicable General Conditions of §116.615.

TNRCC §116.617 – Standard Permits for Pollution Control Projects

> *This standard permit applies to the installation of emissions control equipment or implementation of control techniques as required by any governmental standard, or undertaken voluntarily, or to replace existing emission control equipment or control techniques. This standard permit also authorizes the substitution of compounds used in manufacturing processes for the purpose of complying with governmental standards or to reduce emission effects.*

The proposed Boiler 2 modification project is a pollution prevention initiative project at the source of generation by process modification. The proposed Boiler 2 modification project is not due to any state or federal regulatory requirement. There will be a 2,126.5 tons/year decrease in the NO_X emissions from the proposed Boiler 2 modification project.

> *(1) The emissions limitations of § 106.261(3) or (4) and § 106.262(3) of this title (relating to Facilities (Emission Limitations), and Facilities (Emission and Distance Limitations)), referenced in § 116.610(a)(1) of this title (relating to Applicability) do not apply to this standard permit. This standard permit cannot be used if the registrant receives notification that in the opinion of the executive director there are significant health effects concerns resulting from an increase in emissions of any air contaminant other than those for which a National Ambient Air Quality Standard has been established, until those concerns are addressed by the registrant to the satisfaction of the executive director.*
>
> *(2) The time period of 45 days in § 116.611(b) of this title (relating to Registration Requirements) is modified to 30 days.*

(3) Section 116.615(4) and (5) of this title (relating to General Conditions) are not applicable to this standard permit.

(4) Replacement projects are subject to the following:

(A) The replacement emissions control equipment or control technique must be at least as effective an air pollution control method as the emissions control equipment or control technique being replaced. Equipment installed under this section is subject to all applicable testing and recordkeeping requirements.

(B) The replacement of emissions control equipment or control technique under this section is not limited to the method of control currently in place. Any type of control equipment or control technique may be replaced with any other type of control equipment or control technique as long as all other requirements of this standard permit are met.

(C) If the replacement project does not result in an increase in emissions of any air contaminant, the owner or operator of the facility shall submit registration notice not later than 30 days after the operation of the replacement project begins. If the replacement project will result in an increase of any air contaminant, the registration time period requirements of paragraph (2) of this section are applicable.

The proposed Boiler 2 modification project is not a replacement of emission control equipment or control technique.

(5) Installation of the control equipment or implementation of the control technique must not result in an increase in the facility's production capacity unless the capacity increase occurs solely as a result of the installation of control equipment or the implementation of control techniques on existing units. This paragraph is not intended to limit the owner or operator's ability to recover lost capacity caused by a derate resulting from the installation of control equipment or the implementation of a control technique.

(A) The owner or operator shall obtain or qualify for any necessary authorization under §116.110 of this title (relating to Applicability) or § 116.116 of this title (relating to Changes to Facilities) prior to utilizing any production capacity increase from a pollution control project required by any governmental standard that:

(i) results in the exceedance of any emission limit in an existing permit, other authorization, or grandfathered baseline; or

(ii) results in an emissions increase which exceeds the emission reduction due to the installation of control equipment or implementation of control techniques.

(B) Any production capacity increase resulting from the voluntary installation of controls or the implementation of control techniques may not be utilized until the owner or operator obtains or qualifies for any necessary authorization under § 116.110 or § 116.116 of this title.

The proposed Boiler 2 modification project will not result in an increase in Alcoa's production capacity.

(6) Any emission increase of an air contaminant must occur solely as a result of the installation of control equipment or implementation of a control technique authorized

by this section. Emissions increases associated with recovering a derate resulting from the installation of control equipment or the implementation of a control technique are not prohibited by this paragraph.

The proposed Boiler 2 modification project will result in a net decrease of actual NO_X emissions and the emissions of SO_2, PM, and VOC will not change. CO levels will be maintained at 150 ppm (or less) to achieve the maximum NOx emission reductions.

(7) Installation of emission control equipment or implementation of a control technique may not include the installation of a new production facility, reconstruction of a production facility as defined in 40 Code of Federal Regulations (CFR) § 60.15(b)(1) and (c), or complete replacement of an existing production facility.

A new production facility will not be included with the proposed Boiler 2 modification project.

(8) If the project, without consideration of any other increases or decreases not related to the project, will result in a significant net increase in emissions of any criteria pollutant, a person claiming this standard permit shall submit, with the registration, information sufficient to demonstrate that the increase will meet the conditions of subparagraph (A) of this paragraph.

(A) The net emissions increase may not:
(i) considering the emission reductions that will result from the project, cause or contribute to a violation of any national ambient air quality standard;
(ii) cause or contribute to a violation of any Prevention of Significant Deterioration (PSD) increment; or
(iii) cause or contribute to a violation of any PSD visibility limitation.

(B) For purposes of this section, "significant net increase" means those emissions increases resulting solely from the installation of control equipment or implementation of control techniques that are equal to or greater than:
(i) the major modification threshold listed in § 116.12 of this title (relating to Nonattainment Review Definitions), Table I, for pollutants for which the area is designated as nonattainment, or for precursors to these pollutants; or
(ii) significant as defined in Title 40 CFR § 52.21(b)(23) (effective July 20, 1993) for pollutants for which the area is designated attainment or unclassifiable, or for precursors to these pollutants.

(C) Netting is not required when determining whether this demonstration must be made for the proposed project. The increases and decreases in emissions resulting from the project must be included in any future netting calculation if they are determined to be otherwise creditable under PSD and nonattainment new source review provisions of the FCAA, Parts C and D and *regulations promulgated thereunder.*

The proposed Boiler 2 modification project will result in a net decrease of actual NO_X emissions and the emissions of SO_2, PM, and VOC will not change. CO levels will be maintained at 150 ppm (or less) to achieve the maximum NOx emission reductions.

(9) For purposes of compliance with the PSD and nonattainment new source review provisions of the FCAA, Parts C and D and regulations promulgated thereunder, any increase that is less than significant, or satisfies the requirements of paragraph (8) of this section does not constitute a physical change or a change in the method of operation. For purposes of compliance with the Standards of Performance for New Stationary Sources regulations promulgated by the EPA at 40 CFR § 60.14 (effective December 16, 1975), an increase that satisfies the requirements of paragraph (8) of this section also satisfies the requirements of 40 CFR § 60.14(e)(5).

The proposed Boiler 2 modification project will result in a net decrease of actual NO_x emissions and the emissions of SO_2, PM, and VOC will not change. CO levels will be maintained at 150 ppm (or less) to achieve the maximum NOx emission reductions.

TNRCC §116.620 – Installation and/or Modification of Oil and Gas Facilities
Not Applicable. Alcoa is not an oil and gas facility.

TNRCC §116.621 – Municipal Solid Waste Landfills
Not Applicable. Alcoa is not a municipal solid waste landfill.

ATTACHMENT A

TNRCC Form PI-1S – Administrative Completeness Checklist
TNRCC Form PI-1S – Application for Standard Permit
TNRCC Table 1(a) – Emission Sources
TNRCC Table 6 – Boilers

PERMIT NO. ______(___ PERMIT TYPE: CONSTRUCTION [X] AMENDMENT ALTERATION [ ] RENEWAL [ ]

ACCOUNT ID NO. MM-0001-T

DATE 10/07/99

TABLE 1(a)
EMISSION SOURCES

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA					EMISSION POINT DISCHARGE PARAMETERS										
EMISSION POINT [1]		COMPONENT OR AIR CONTAMINANT NAME (2)	AIR CONTAMINANT EMISSION RATE		UTM COORDINATES OF EMISSION PT. [5]			SOURCE							
								HEIGHT ABOVE GROUND [ft.]	HEIGHT ABOVE STRUCT. [ft.] [6(A)]	STACK EXIT DATA			FUGITIVES			
NUMBER	NAME		#/HR [3]	TONS/YR [4]	ZONE	EAST [meters]	NORTH [meters]			DIA. [ft.] [6(B)]	VEL. [fps] [6(C)]	TEMP. [°F] [6(D)]	LENGTH [ft.] [7(A)]	WIDTH [ft.] [7(B)]	AXIS DEG. [7(C)]	E/W OF NORTH [7(D)]
EPN 17A*	BOILER 2	NOX CO	1095.0 224.3	4796.1 982.3	14	685606	3382997	265		17	200	325				
FIN P17-2																
EPN																
FIN																
EPN																
FIN																
EPN																
FIN																
PN																
IN																
PN																
IN																
PN																
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PN																
IN																
PN																
IN																

EPN = EMISSION POINT NUMBER
FIN = FACILITY IDENTIFICATION NUMBER

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 480 feet.
TNRCC STANDARD CONDITIONS ARE 68°F AND 14.7 PSIA [GENERAL RULE 101.1].

Boiler 1 (P17-1) and Boiler 2 (P17-2) vent through emission point 17A. The emissions are only shown for Boiler 2.

TABLE 6

BOILERS AND HEATERS

Type of Device: BOILER		Manufacturer: Combustion Engineering		
Number from flow diagram: P17-2		Model Number:		
CHARACTERISTICS OF INPUT				
Type Fuel	Chemical Composition (% by Weight)	Inlet Air Temp °F (after preheat)	Fuel Flow Rate (scfm* or lb/hr)	
LIGNITE		AMBIENT	Average 130,000 lb/hr	Design Maximum 144,230 lb/hr
		Gross Heating Value of Fuel	Total Air Supplied and Excess Air	
		(specify units) 10,400 Btu/lb	Average ____ scfm* ____ % excess (vol)	Design Maximum ____ scfm * ____ % excess (vol)

HEAT TRANSFER MEDIUM						
Type Transfer Medium	Temperature°F		Pressure (psia)		Flow Rate (specify units)	
(Water, oil, etc.)	Input	Output	Input	Output	Average	Design Maxim
Water	440	1005	1800	1537	900,000 lb/hr	

OPERATING CHARACTERISTICS			
Ave. Fire Box Temp. at max. firing rate	Fire Box Volume(ft.^{3}), (from drawing)	Gas Velocity in Fire Box (ft/sec) at max firing rate	Residence Time in Fire Box at max firing rate (sec)
3300 F	56,000		

STACK PARAMETERS					
Stack Diameters	Stack Height	Stack Gas Velocity (ft/sec)		Stack Gas	Exhaust
17 ft	265 ft	(@Ave.Fuel Flow Rate)	(@Max. Fuel Flow Rate)	Temp°F	scfm
				325	330,000 to 350,000

CHARACTERISTICS OF OUTPUT	
Material	Chemical Composition of Exit Gas Released (% by Volume)

Attach an explanation on how temperature, air flow rate, excess air or other operating variables are controlled.

Also supply an assembly drawing, dimensioned and to scale, in plan, elevation, and as many sections as are needed to show clearly the operation of the combustion unit. Show interior dimensions and features of the equipment necessary to calculate in performance.

*Standard Conditions: 70°F, 14.7 psia

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ATTACHMENT B

Area Map
Plot Plan

ATTACHMENT C

Franchise Tax – Certificate of Good Standing

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