Clean Air Engineering

1601 Parkway View Drive ● Pittsburgh, PA 15205
412-787-9130
Fax: 412-787-9138
Internet: www.cleanair.com

May 5, 2000

American Ref-Fuel Company
Ken Armellino
333 Earle Ovington Blvd.
Uniondale, New York 11553

RE: Proposal for Niagara DBA Corrosion Parameter Study

Dear Kenny:

Enclosed is the proposal to perform the Corrosion Parameter Study at the Niagara DBA boilers. Please feel free to contact me at (412) 787-9130 with any questions.

Respectfully submitted,
CLEAN AIR ENGINEERING

James E. Wright
Manager, Eastern Region

JEW/sd
Enc: Proposal

cc: Bill Gleason
Greg Gessell
Bill Walker
Tim Rodak
John Chapman

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Clean Air Engineering
Budgetary Proposal for
Corrosion Parameter Study

Prepared for
American Ref-Fuel Company

Niagara Resource Recovery Facility
DBA Boilers 1 and 2

May 5, 2000

PROJECT SCOPE AND OBJECTIVE

The Niagara DBA boilers are showing extreme corrosion rates in certain areas. Some of the rates would equate to having to replace tube areas every six months. These are areas that would normally be expected to last over seven years. One of the potential culprits behind this phenomenon is that Niagara burns quite a bit of "Special Wastes." These are various non-hazardous industrial waste streams.

As part of the effort in solving this problem, CAE is proposing a program to determine the composition of the flue gas. The main area of corrosion is in the boiler's first pass. Therefore, measurements will be made as close as possible to this area of the boiler. This is a relatively difficult place to measure, due to the high dust loading, high temperature and corrosivity of the gas. Therefore, specialized testing equipment will be required for these measurements.

A cursory literature review indicated that metal corrosion in waste boilers is possibly a result of "molten salt" attack by sodium and potassium chlorides and sulfates. Relationships have been found between this type of corrosion and levels of HCl, SO_2, air and certain metals, particularly copper, lead and zinc. The proposed measurement program is built upon these findings.

Since the potential culprit is waste related, and the waste stream changes constantly, a long term "continuous monitoring" system is desired. In order to help understand the impacts of the special waste streams, the facility is isolating all special wastes to Boiler 3, and burning only MSW in Boiler 4. The measurements will be made on both boilers to provide comparison.

Funding for this project will come in-part from CAE's 2% Reinvestment Fund. This fund currently has a capacity of $60,750 (see attachment).

TEST PARAMETERS

The following test parameters are proposed to be measured at or near the first pass of the boiler:

Gaseous Parameters

HCl	CO
SO_2	H_2O
O_2	Temperature

Particulate (ash) Parameters

Approximate Concentration
Melting Temperature
Elemental Analysis:

Calcium	Iron	Silicon
Carbon	Lead	Sodium
Chlorine	Magnesium	Titanium
Copper	Potassium	Zinc

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METHODOLOGY

Measurement Strategy

The following measurement techniques are proposed:

Table 1:
Proposed Measurement Strategy

Measurement Technique	Sampling Frequency	Parameters	Reference Method
FTIR	Continuous	HCl	EPA 320
		SO_2	EPA 320
		CO	EPA 320
		H_2O	EPA 320
Isokinetic Ash Grab	3 samples per type of waste mixture	Particulate Sample	EPA 5
		H_2O	EPA 4
ICAP	3 samples per type of waste mixture	Metals	EPA 6010
HVT Probe	Continuous	Temperature	ASTM

Special Sampling Considerations

1. Furnace Exit will require water-cooled quartz probe for sample withdrawal.
2. FTIR instrumentation should be located in close proximity to test location (within 50 feet), and must be housed in a thermally stable, dust-free environment, and be reasonably protected from excessive vibration. A temporary shelter constructed within the plant may be suitable for this.

Sampling Duration

Measurements will be made on each of the two DBA boilers sequentially. The testing on each boiler will be conducted long enough to characterize a full range of waste mixtures.

Schedule

The proposed project schedule with work beginning during the first week of June is shown in Table 2. The schedule is based upon ten days of monitoring at Boiler 3 and five days of monitoring at Boiler 4.

Table 2:
Proposed Project Schedule

Date	Activity	Location
June 5-9	Equipment preparation, manufacture and FTIR method development.	CAE Palatine and Pittsburgh facilities
June 12	Equipment arrives on-site	Niagara RRF
June 12	Mobilization of set-up crew	Niagara RRF
June 12-14	Equipment set-up and shake-down	DBA Boiler 3
June 14	Mobilization of Measurement Crew	Niagara RRF
June 15-24	Monitoring on Boiler 3	DBA Boiler 3
June 25	Switch-over	DBA Boiler 3-4
June 26-30	Monitoring on Boiler 4	DBA Boiler 4
June 30	Demobilization of equipment and crew	Niagara RRF
July 14	Gaseous sampling report issued	
July 28	Full report issued	

Personnel Matrix

The following personnel will be required to complete the proposed project:

In-House Support for FTIR Method Development

- One (1) Process Specialist Level P1
- One (1) Mid-Level Technician Level P2

Field Set-Up Crew

- One (1) Process Specialist Level F1
- One (1) Test Leader Level F2
- One (1) Technician Level F4

Monitoring and Measurement Crew

- One (1) Process Specialist Level F1
- One (1) Test Leader Level F2
- One (1) Field Chemist Level F3
- Two (2) Technicians Level F4

Proposed Price Schedule

The budgetary price to conduct the program as shown in Table 2 is detailed below:

Table 3:
Budgetary Price Estimate

ITEM	DESCRIPTION	PRICE
1	Estimated Total Project Price	$130,000
2	CAE Re-Investment Maximum Contribution	$(60,750)
	Net Ref-Fuel Price	$69,250

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ATTACHMENT

CAE 2% REINVESTMENT FUND INFORMATION

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CAE/REF-FUEL REINVESTMENT FUND

The reinvestment fund is based on 2% of CAE's total invoiced amount to American Ref-Fuel.
The program was initiated in the fourth quarter of 1997.
The fund as of the end of first quarter 2000 is as follows.

JOB#	PLANT	JOB DESCRIPTION	REVENUE	PLANT SUBTOTAL	2% of PLANT	
8123	Delaware Valley	Compliance/RATA	129,129			
8239	Delaware Valley	RATA	4,009			
8257	Delaware Valley	Compliance	185,831			
8386	Delaware Valley	Compliance/RATA	143,448			
8478	Delaware Valley	Compliance	125,484			
8589	Delaware Valley	Compliance/RATA	152,242	740,143	14,803	
8124	Essex	Compliance	30,101			
8143	Essex	Compliance	38,625			
8146	Essex	Compliance	217,609			
8188	Essex	Diagnostic	27,268			
8205	Essex	Diagnostic	18,959			
8411	Essex	Compliance	67,897			
8415	Essex	Diagnostic	63,844			
8476	Essex	Diagnostic	21,886			
8631	Essex	Compliance/RATA	-	486,188	9,724	open
8130	Hempstead	Compliance	71,847			
8245	Hempstead	RATA	28,530			
8378	Hempstead	Compliance	71,361			
8456	Hempstead	RATA	29,785			
8577	Hempstead	Compliance/RATA	64,226	265,749	5,315	
8113	Niagara	CEMS Rental	9,517			
8122	Niagara	Diagnostic	65,870			
8142	Niagara	Compliance	144,824			
8183	Niagara	Diagnostic/RATA	90,682			
8204	Niagara	RATA	25,534			
8225	Niagara	Compliance	51,693			
8241	Niagara	RATA	23,883			
8420	Niagara	Compliance/RATA	199,199			
8475	Niagara	Diagnostic	42,834			
8491	Niagara	Diagnostic	28,918			
8647	Niagara	Compliance/RATA	124,051	807,005	16,140	open
7999	SEMASS	Compliance	79,253			
8217	SEMASS	Compliance	64,856			
8226	SEMASS	Diagnostic	64,799			
8364	SEMASS	Comp./Diag./RATA	237,786			
8426	SEMASS	Compliance	84,094			
8511	SEMASS	Diagnostic	13,995			
8513	SEMASS	Compliance	52,263			
8568	SEMASS	Compliance	58,851	655,897	13,118	
8218	Southeastern	RATA	36,545			
8457	Southeastern	RATA	29,494			
8667	Southeastern	RATA	18,198	84,237	1,685	open
		TOTAL		3,039,218	60,785	