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Signed correspondence

SWA
SOLID WASTE AUTHORITY
YOUR PARTNER FOR
SOLID WASTE SOLUTIONS

RECEIVED
NOV 10 2003
BUREAU OF AIR REGULATION

November 6, 2003

Trina L. Vielhauer
Bureau Chief of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Request for Insignificant Emission Unit Activity –Magnesium Hydroxide Injection
North County Resource Recovery Facility
Title V Air Operating Permit 0990234-001-AV

Dear Trina:

Currently, the two boilers at the North County Resource Recovery Facility (NCRRF) in West Palm Beach, FL are experiencing high rates of slag formation and corrosion in the superheater and generating bank tubes. The Plant Operator wishes to evaluate a magnesium hydroxide and surfactant injection system developed by Nalco Fuel-Tech Corporation to reduce the amount of slag and corrosion in the boilers. As you may be aware magnesium hydroxide injection is a common industry practice for maintaining boilers. Reducing the corrosion will also help minimize the number of tube leaks which in turn will lead to an overall reduction in excess emissions attributed to tube leak malfunctions.

This letter is herby requesting an insignificant emission unit activity for the magnesium hydroxide injection system [FDEP 62-213.430(6), F.A.C.]. Enclosed you will find a detailed letter and MSDS sheets of the proposed system from the Plant Operator, Palm Beach County Resource Recovery Corp (PBRRC). The plan is to install the system in Unit 2 subsequent to the November 3, 2003 outage and to evaluate the performance of the system for three (3) months. If the results are favorable, the system will be monitored for an additional three (3) months. At the end of this 6 month period, if there is a significant reduction in slag formation and tube corrosion, the Plant Operator will consider permanently installing the slag control system in both boilers as a method of operation. The Plant Operator does not anticipate any changes in current emissions.

If you have any questions or need additional information on this matter, please contact Mary Beth Morrison at mmorrison@swa.org or (561) 640-4000 ext. 4613.

Sincerely,

John D. Booth, P.E., DEE

Enclosure

cc: Laxmana Tallam, SE District FDEP (w/enclosure)
Mark Hammond
Marc Bruner
Mark McLean
Ray Shauer
Bob Worobel
Bill Arvan
Duff Rawlings

NALCO FUEL TECH

PALM BEACH RESOURCE RECOVERY CORPORATION

RDF BOILER

West Palm Beach, Florida

COMPUTATIONAL FLUID DYNAMICS

PROCESS MODEL RESULTS

NFT Model Report #96-P9-069

July 22, 1996

Technology for a renewed environment.™

NALCO FUELTECH
Technology for a renewed environment™

PALM BEACH RESOURCE RECOVERY CORPORATION
RDF Boiler
WEST PALM BEACH, FLORIDA

COMPUTATIONAL FLUID DYNAMICS

PROCESS MODEL RESULTS

NFT Model Report #96-P9-069

July 22, 1996

Confidentiality Statement

Nalco Fuel Tech provides the attached fuel treatment Process Model Results (the "Model") to Palm Beach Resource Recovery Corporation on the following terms:

Nalco Fuel Tech provides the Model to Palm Beach Resource Recovery and its contractors on a confidential basis. Neither Palm Beach Resource Recovery nor its contractors shall disclose the Model to any third party without the express written consent of Nalco Fuel Tech. The obligations of confidentiality shall not apply to any information in the public domain through no act or fault of Palm Beach Resource Recovery or its contractors or information known to Palm Beach Resource Recovery or its contractors prior to disclosure hereunder.

TABLE OF CONTENTS

1. Executive Summary

The RDF fired boiler at Palm Beach Resource Recovery, West Palm Beach, Florida was modelled to determine the preferred injection locations for introducing corrosion and slag control reagents into the boiler. The superheater tubes are experiencing corrosion requiring tube replacements every year. High levels of corrosion are experienced in the upper half of the superheater.

The analysis was performed using Nalco Fuel Tech's proprietary Computational Fluid Dynamics (CFD) model technology. The CFD model predicted the flow patterns, flue gas temperature within the unit. This information was then used to evaluate different injection strategies.

Several different injection arrangements were examined, with preference given to use of existing penetrations. The model indicates that four front wall injectors at elevation 97 ft, provide good reagent distribution in the upper half of the superheater; targeting the region experiencing severe corrosion. An arrangement using two existing side wall, two existing front wall and two new backwall ports improves the coverage to the entire the superheater. Addition of back wall ports improves reagent distribution on the lower half of the superheater.

2. Introduction

Nalco Fuel Tech will provide a slag control system for the recovery boiler at Palm Beach Resource Recovery, West Palm Beach, Florida. A computational analysis was performed to determine which injector configurations provide the best opportunities for effective slag control.

The analysis was performed using Nalco Fuel Tech's proprietary model technology. The computational fluid dynamics (CFD) model was used to predict the expected temperature and flow patterns in the unit, and to evaluate the expected effectiveness of different injection strategies.

The objectives of the modelling study were:

1. Evaluate the expected flow patterns in the unit.

2. Locate preferred injector locations and spray characteristics as an injection strategy to provide the best opportunities for maximum slag control.

3. Unit Description

This unit was designed by Babcock and Wilcox and commissioned in November of 1989. This MSW incinerator burns refuse derived fuel to produce 320, 000 lbs/hr process steam. Presently, heavy corrosion of the superheater section is being experienced. A treatment program involving the injection of slag control reagents to minimize corrosion of the superheater section is sought.

The furnace measures 30 ft wide and 17 ft 5 in deep, with a furnace height of 78 feet. The rear wall includes a nose between elevations of 92 ft and 99 ft. The superheater is located at the convective inlet approximately 14 ft 5 in from the front wall and above the elevation of 98 ft. The feed system consists of an inclined conveyor with air swept spouts on the front wall. A travelling grate is employed with ash movement from back to front.

This unit processes 83,333 lbs/hr of refuse derived fuel and has a capacity of 1000 tons/day. The fuel analysis for both dry and wet RDF were provided and the average heating value was 5107 btu/lb fuel. This unit is operated 24 hours per day, 7 days a week and has a yearly throughput of 624,000 tons. At start up and shut down natural gas is used as auxiliary fuel and introduced through the burners at elevation 64 ft.

The total heat input is 415 MMBTU/hr. The flue gas flow when burning 83,333 lbs/hr of RDF is 198,774 ACFM at 350 F and 8% oxygen. There are two levels of air - primary and secondary. The secondary air enters through ports at Elevation 59 ft. The grate distribution is 60% under fire air and 40% overfire air.

The existing ports available for injection on the front wall include 4 ports at elevation 97 feet and 4 ports at 100 ft. The existing ports available for injection on the side wall are 2 ports on either side at elevation 96 feet, and 2 ports (one on each side) equidistant from the front and back walls at elevation of 79 feet. The other existing ports in this unit would be unsuitable for injection of slag control reagents.

4. Computational Fluid Dynamics Model Technology

Flow modelling was performed using the PHOENICS CFD program (CHAM), with process-specific correlations provided through subroutines proprietary to Nalco Fuel Tech. The proprietary subroutines perform multi-component droplet dynamics calculations, provide physical property correlations and transport coefficient estimates, and perform supplemental computational or visualization functions.

For a given set of operating conditions, the CFD model provides an estimate of the temperature of the flue gas as a function of residence time. This residence time versus temperature profile is one basis for predicting chemical process performance for a specific unit.

Field test data are used whenever possible to verify the model. Actual performance is often different than the design. Direct temperature measurements reduce uncertainties that can arise from assumptions or estimates of such factors as furnace wall cleanliness, gas emissivity, and fuel characteristics.

Injector simulation was performed by incorporating multi-component droplet dynamics calculations into the CFD model. Sprays are modelled as sources of many individual droplets grouped into several classes. Each droplet class has a different droplet size, velocity, or angle relative to the principle spray direction. The mass, energy, and momentum sources of the injectors are included into the CFD model, and additional iterations were performed until the CFD and injector results converged to a steady-state solution.

The overall process performance was determined by the combination of the chemical reaction processes and the mechanical processes governing reagent dispersion. Excellent chemical performance is negated by poor distribution and *vice versa*. It is only when reagent is well distributed in a regime where the activity is high that effective control can be achieved. Injection arrangements were evaluated to provide conditions having the maximum probability of successful treatment.

5. Model Results

The CFD model results provided estimates of flow patterns within the process unit. Figure 1 show a side sectional temperature profile for the unit at 100% load, and Figure 2 shows the front sectional temperature profile.

There are eight front and six side wall ports available for possible injection of slag treatment at several elevations. No ports are currently available at the rear wall of the furnace. All existing ports between the elevations of 79 ft and 97 ft were evaluated in a various combinations. Table 1 describes the injector locations for the individual cases of injection evaluated.

Table 1: Injector Cases (Figure #) - Location/number of injectors

Case #	Figure #	Front Wall	Side Wall	Rear Wall	Total # of Injectors
1	3	-	4 @ El 96'	-	4
2	4	4 @ El 97'	-	-	4
3	5	2 (inner) @ El 97'	2 @ El 96'	-	4
4	6	2 (outer) @ El 97'	2 @ El 96'	-	4
5	7	4 @ El 97'	2 @ El 96'	-	6
6	8	4 (45° down) @ El 97'	-	-	4
7	9	-	2 @ El 79'	-	2
8	10	2 (inner) @ El 97'	2 @ El 79'	-	4
9	11	-	-	2 @ El 85'	2
10	12	2 (inner) @ El 97'	2 @ El 96'	2 @ El 85'	6
11	13	2 (inner) @ El 97'	2 @ El 79'	2 @ El 85'	6

* Except back wall ports @ El 85', all other ports are existing ports

Case 1 simulated as shown in Figure 3 shows injection through four existing side ports at elevation of 96 ft. The second arrangement (Case 2) shows injection using four existing front wall ports at elevation of 97 ft. Case 3 is a combination of using two front wall (inner) ports at elevation of 97 ft with two side ports, 8 ft 6 in from the front wall. Case 4 is a combination of using two front wall (outer) ports at elevation 97 ft with two side ports, 8 ft 6 in from the front wall at elevation of 96 ft. Case 5 (Figure 7) is a combination of using all four front wall ports at elevation of 97 ft with two side ports. Cases 3 and 5 provide good reagent distribution on the upper and middle sections of the superheater section, but are ineffective in treating the bottom section of the superheater.

The front wall injector configuration of case 6 (Figure 8) is similar to that of case 2 with injection carried out at a 45 degree downward angle. This case shows that injecting at a downward angle results in ineffective distribution of reagent on the superheater section.

Case 7 evaluates injecting at the lower existing side ports at elevation of 79 feet. Case 8 (Figure 10) is a combination of using the lower side ports with the two front wall (inner) ports at elevation of 97 ft. The lower side ports (elevation 79') do not provide as good a distribution as the upper side ports (elevation 96') in terms of reagent distribution on the superheater section.

Upon completion of the above cases with all combinations of existing ports, it became apparent that in order to treat the bottom section of the superheater, back ports would be necessary. Case 9 (Figure 11) shows good reagent distribution at the bottom section of the superheater section with two back wall injectors at elevation 85 ft. Cases 10 and 11 (Figures 12 and 13) are combinations of using two front wall, two side wall and two back wall injectors in order to achieve good overall reagent distribution on the superheater section. Case 10 (Figure 12) gives the best overall distribution and is recommended. Case 11 (Figure 13) employing the two side injectors at elevation of 79 ft could be an alternate choice.

6. Conclusions and Recommendations

The conclusions are:

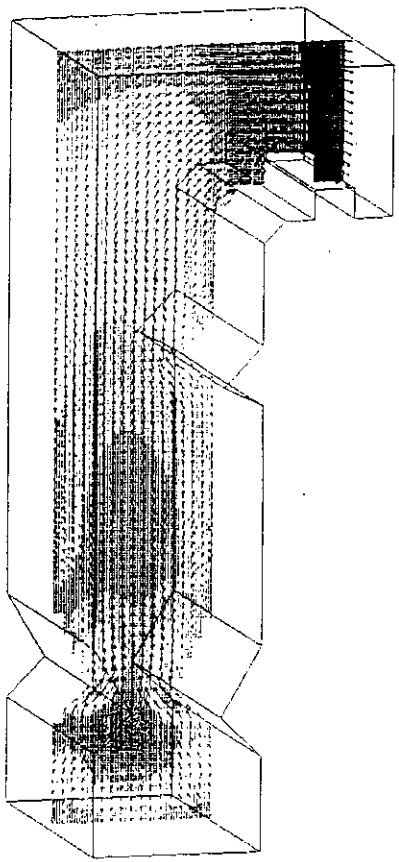
1. The present strategy of injecting corrosion and slag control reagents using the four front wall injectors (elevation 97') should provide good coverage of the upper half (the portion experiencing the higher rate of corrosion) of the superheater.

2. Use of six ports, two front wall (inner) at elevation 97', two back wall at elevation of 85' and two side wall ports at elevation of 96' and 8' 6" from the front wall will provide the maximum opportunity for effective corrosion and slag control throughout the superheater.

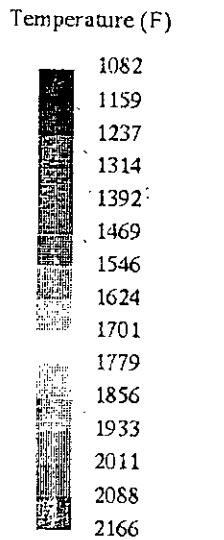
3. Use of the two front wall (inner) ports along with two side wall ports at elevation of 96' and 8' 6" from the front wall will provide good coverage to the upper half and the rear side walls of the superheater.

Figures

Center Sectional Temperature Profile – 100% Load



→ : 61.8 m/s.



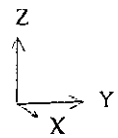


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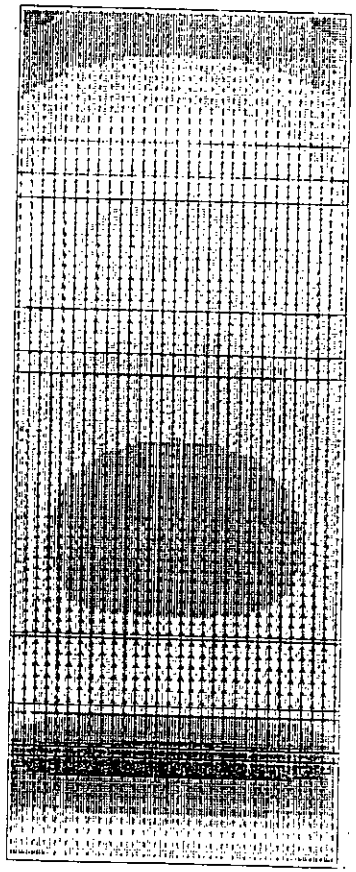
Figure 1

Front Sectional Temperature Profile – 100% Load



Temperature (F)

1082
1159
1237
1314
1392
1469
1546
1624
1701
1779
1856
1933
2011
2088
2166

Z
X

→ : 57.7 m/s.

CONFIDENTIAL

Figure 2

Case 1 – Side Wall Injection (Elevation 96')

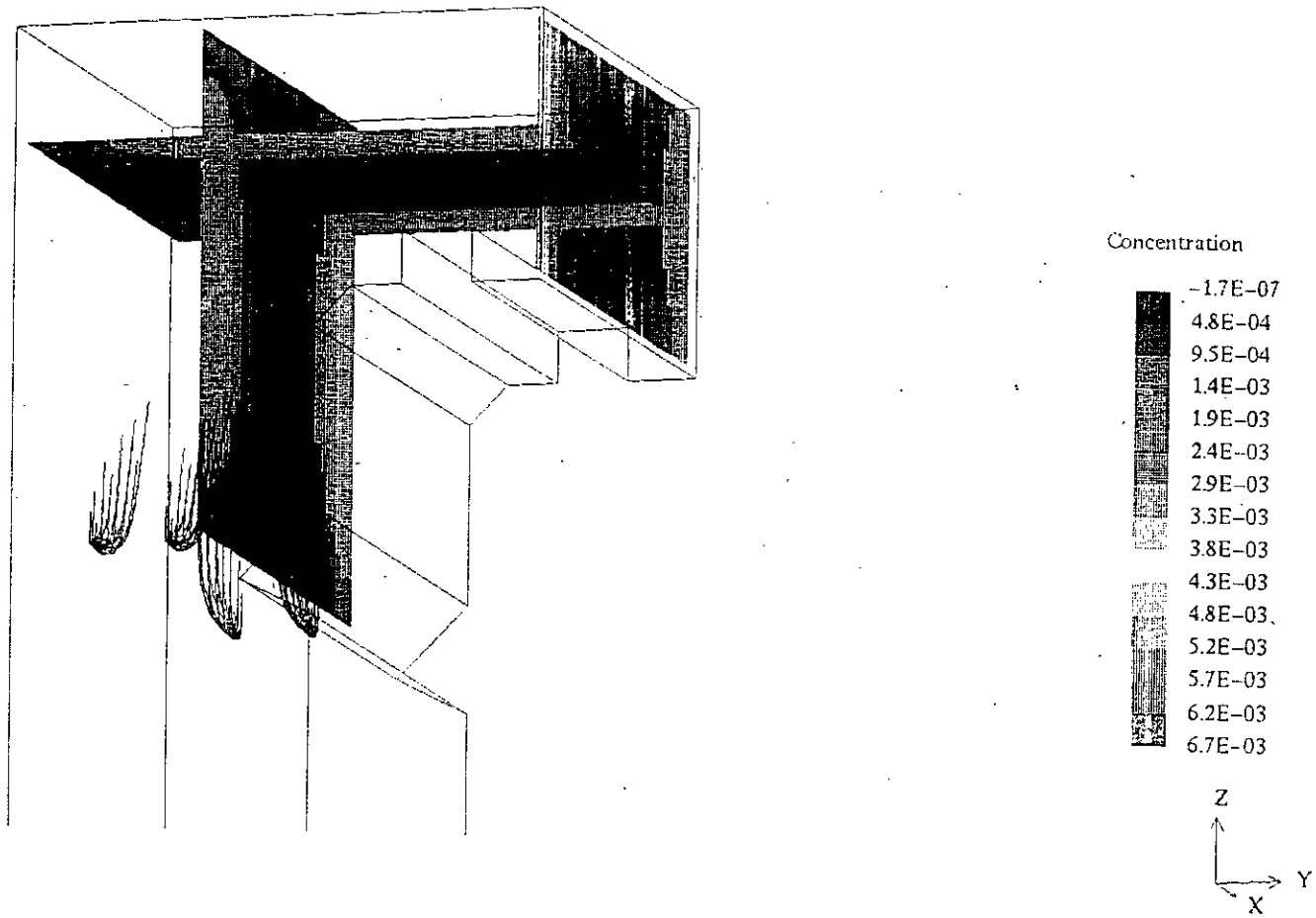
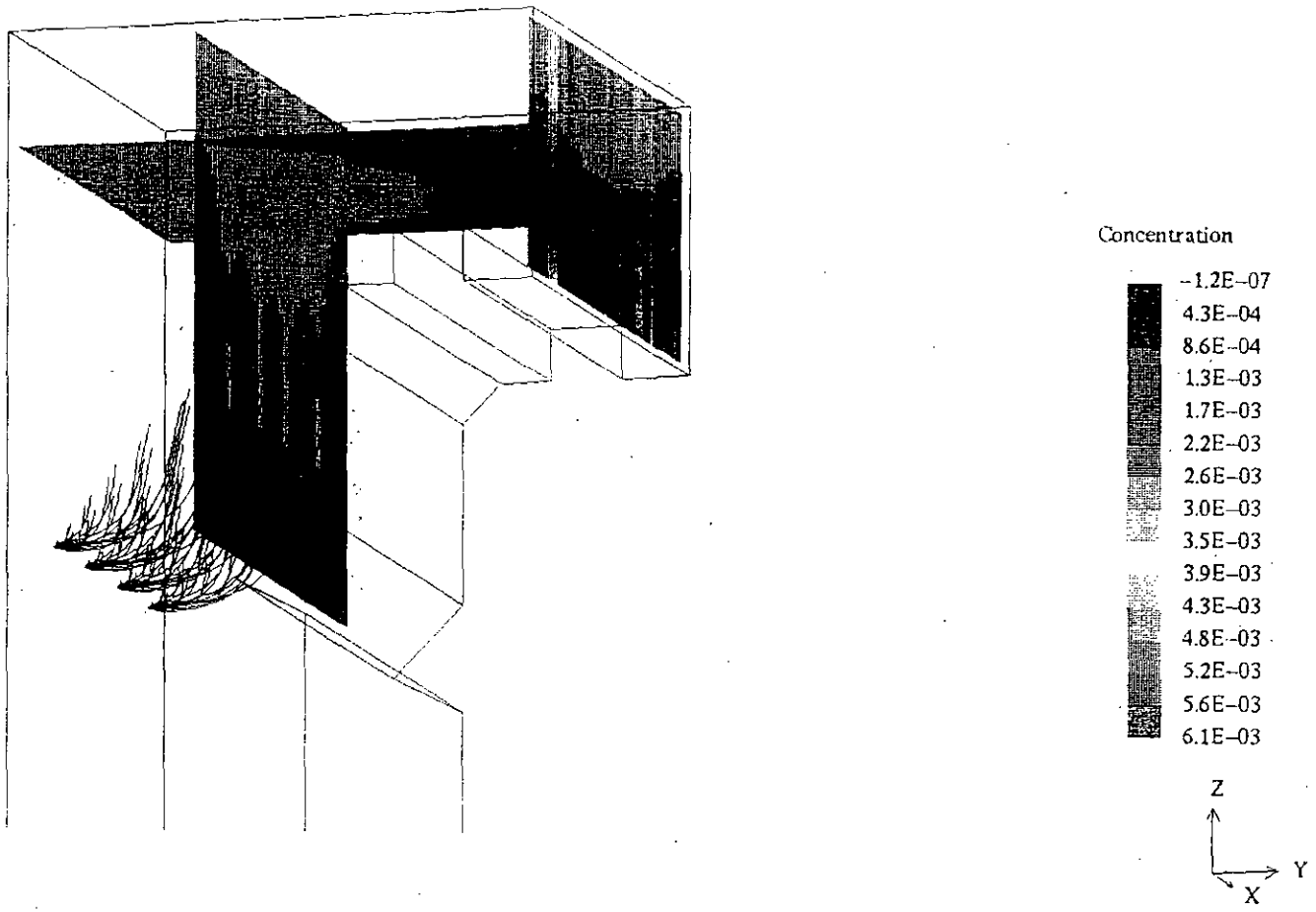


Figure 3

Case 2 – Front Wall Injection (Elevation 97')



Case 3 – Two Side Wall (El 96') & Two Front (inner) wall (El 97')

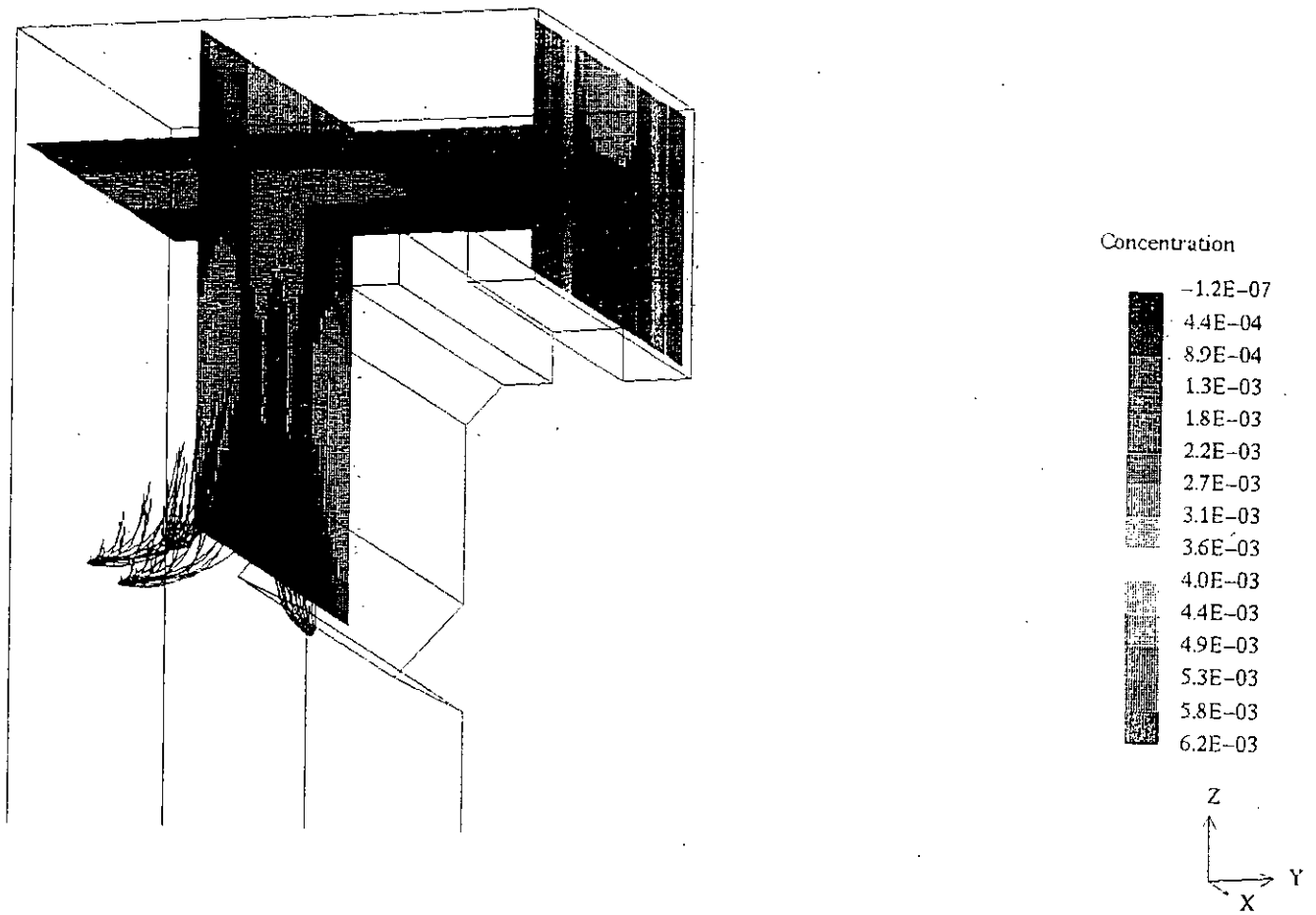


Figure 5

Case 4 – Two Side Wall (El 96') & Two Front (outer) wall (El 97')

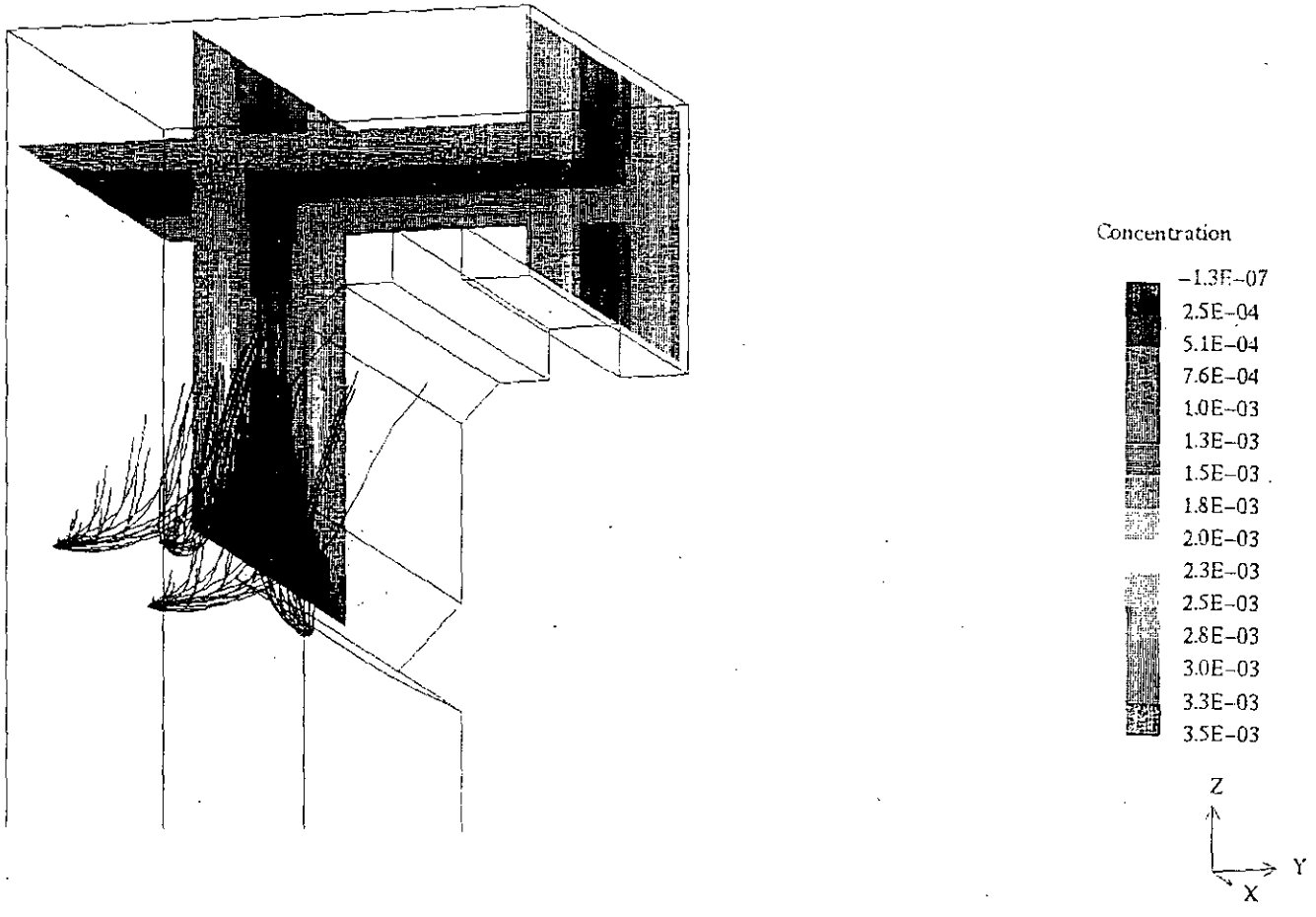


Figure 6

Case 5 – Two Side Wall (El 96') & Four Front Wall (El 97')

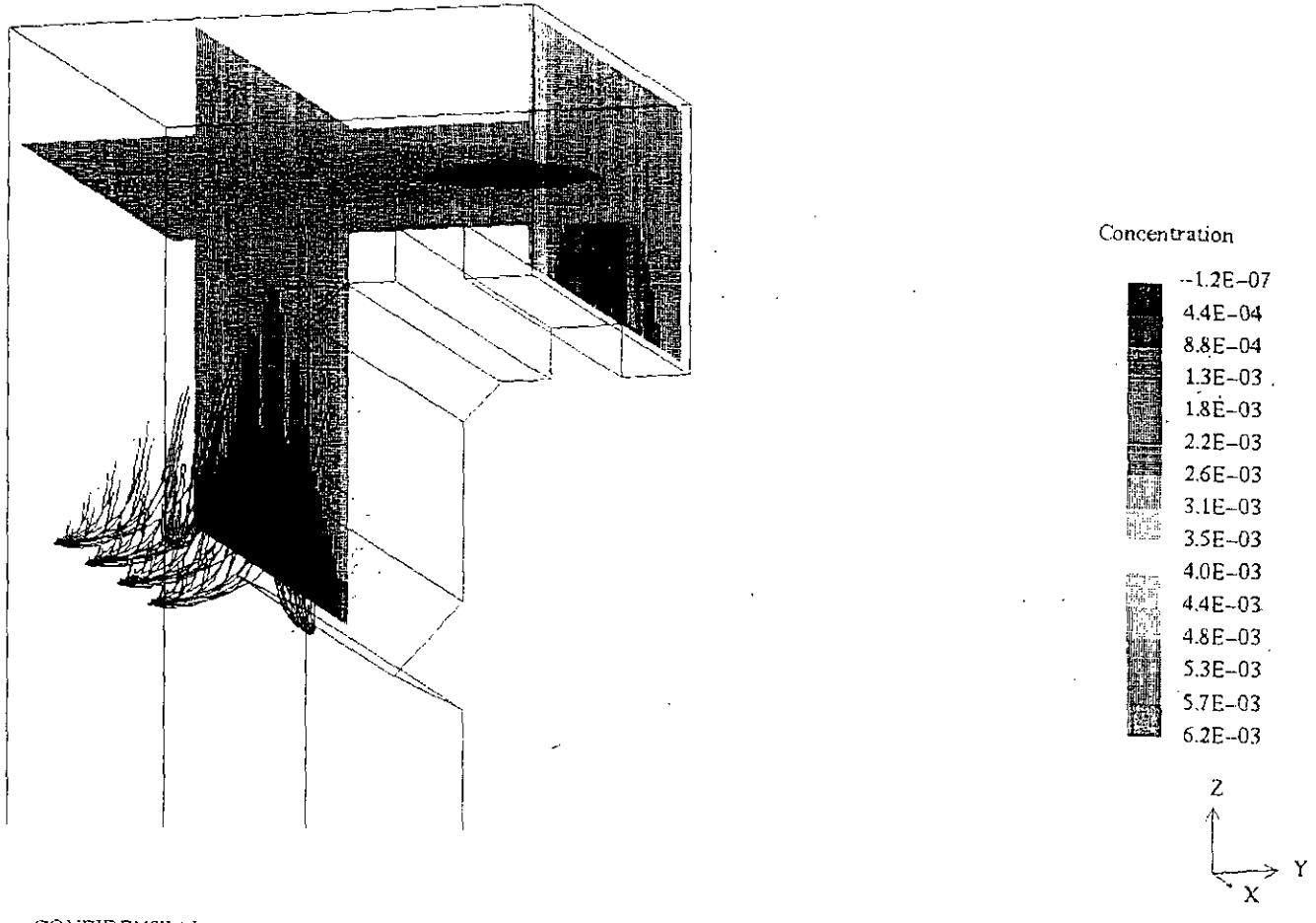


Figure 7

Case 6 – Four Front Wall 45 deg (Elevation 97')

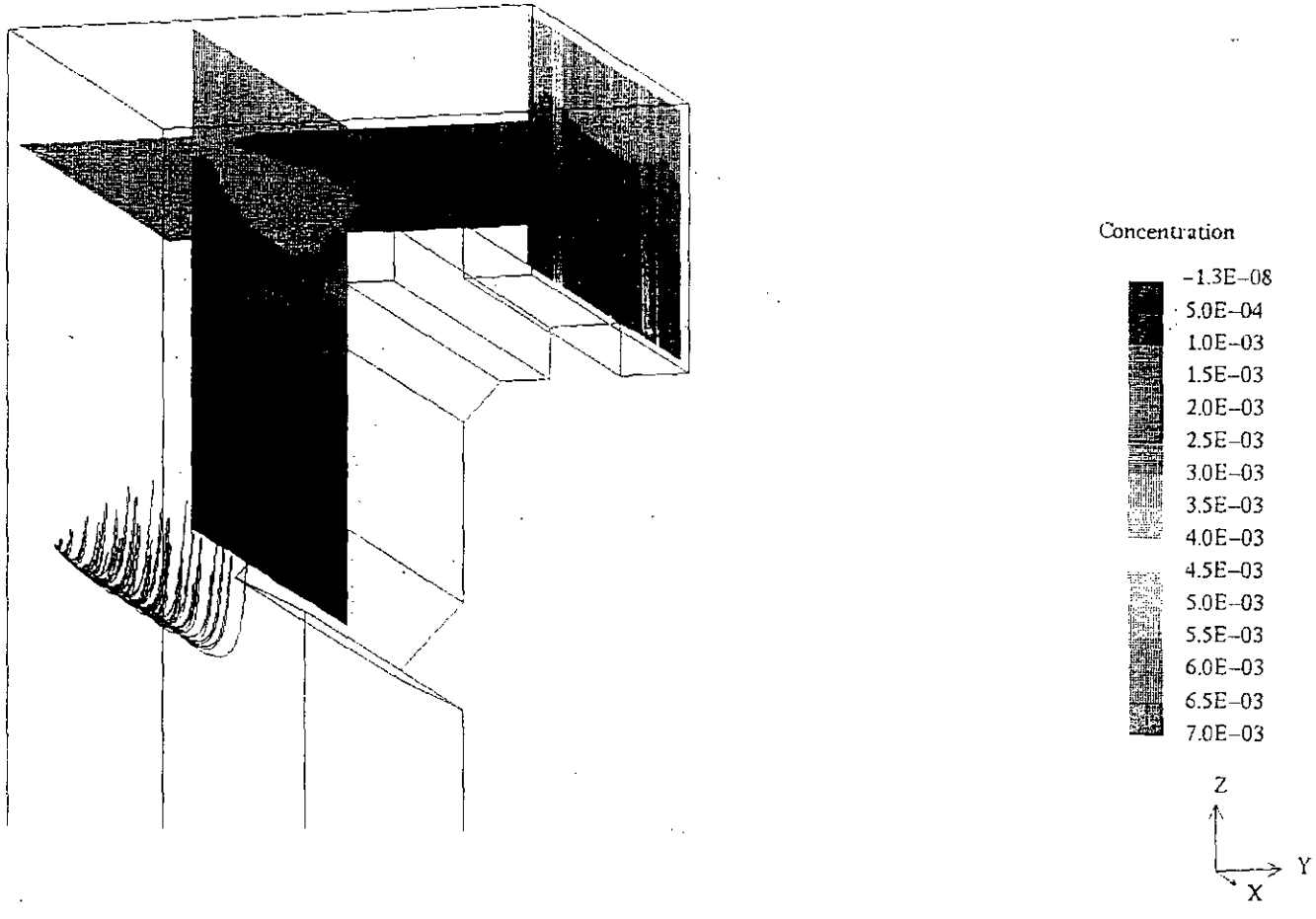
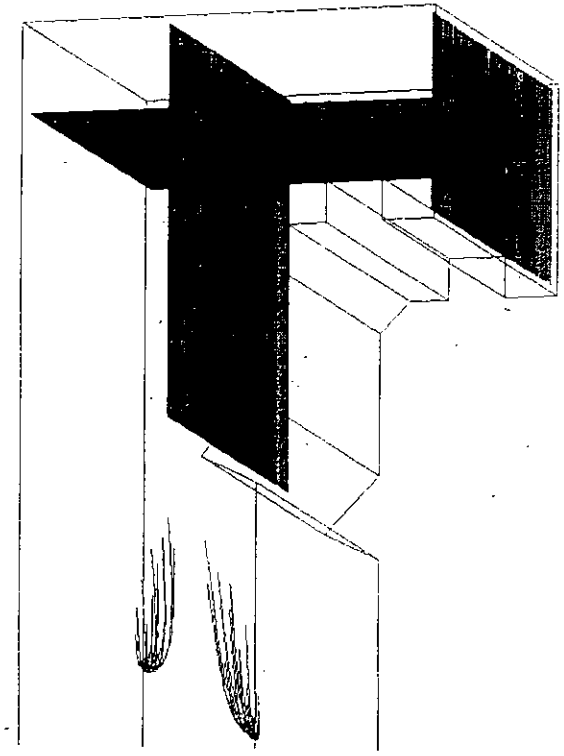


Figure 8

Case 7 – Two Side Wall (Elevation 79')



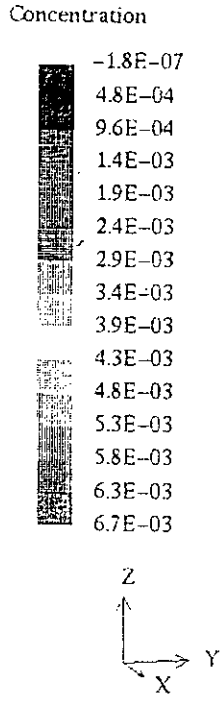
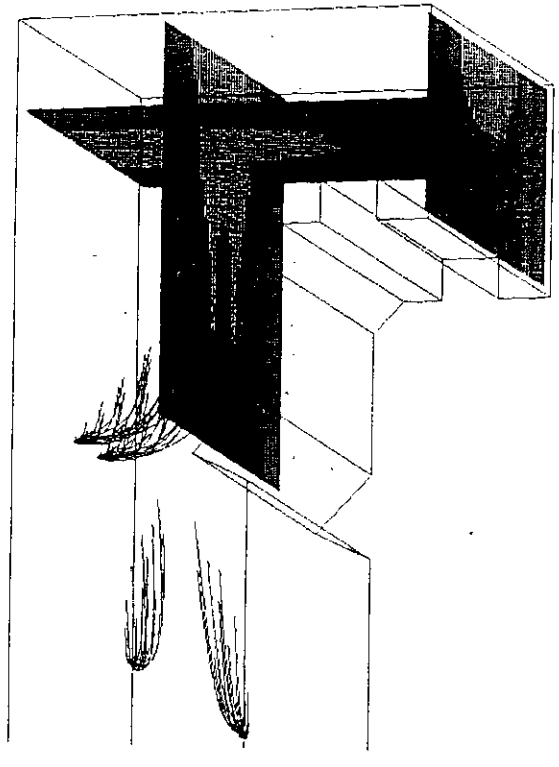


Figure 9

Case 8 – Two Side (El 79') & Two (inner) Front Wall (El 97')



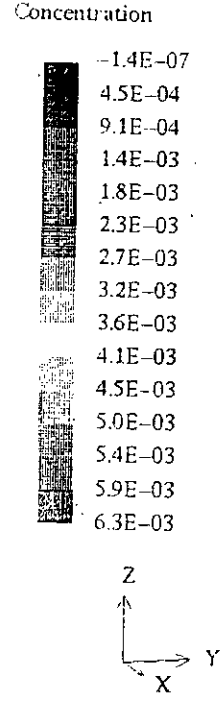
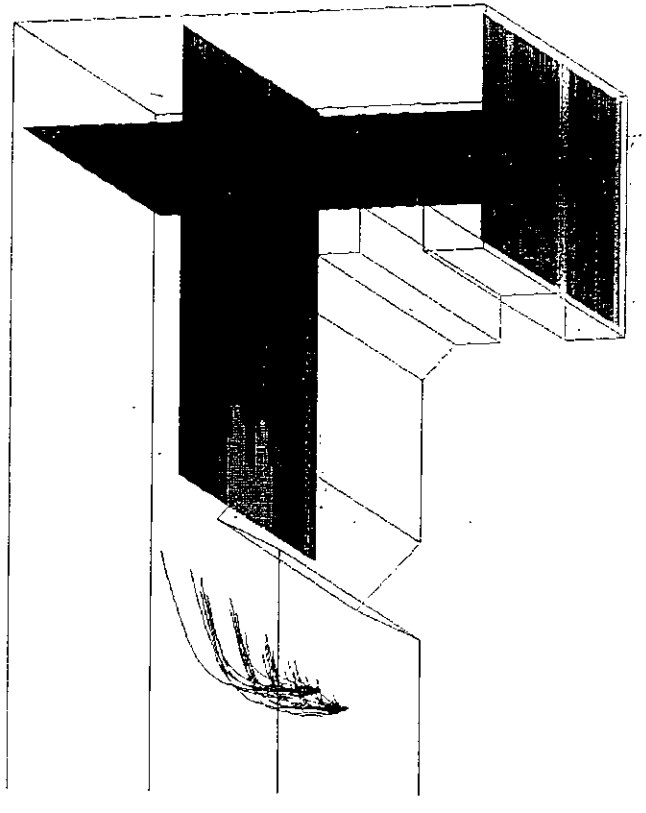


Figure 10

Case 9 – Two Back Wall (Elevation 85')



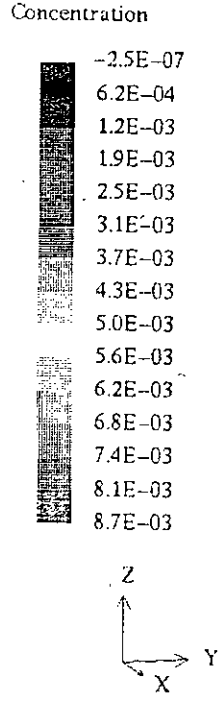
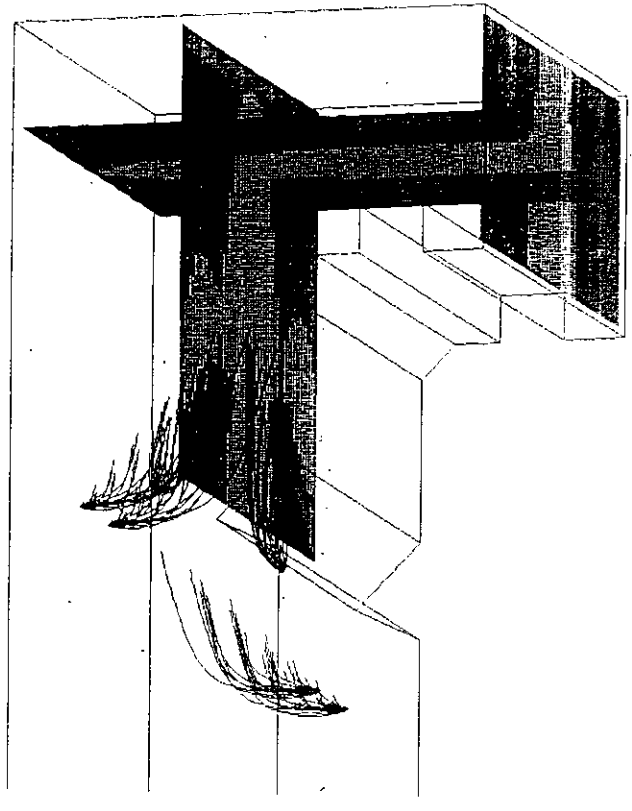


Figure 11

Case 10 – Two Back (El 85'), Two (inner) Front (El 97') & Two Side (El 96')



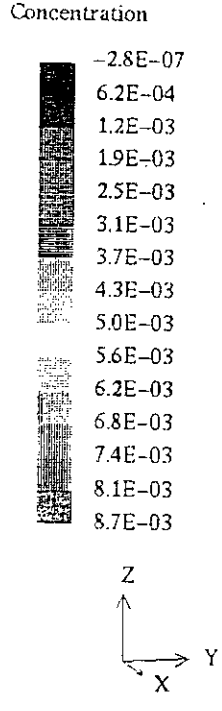
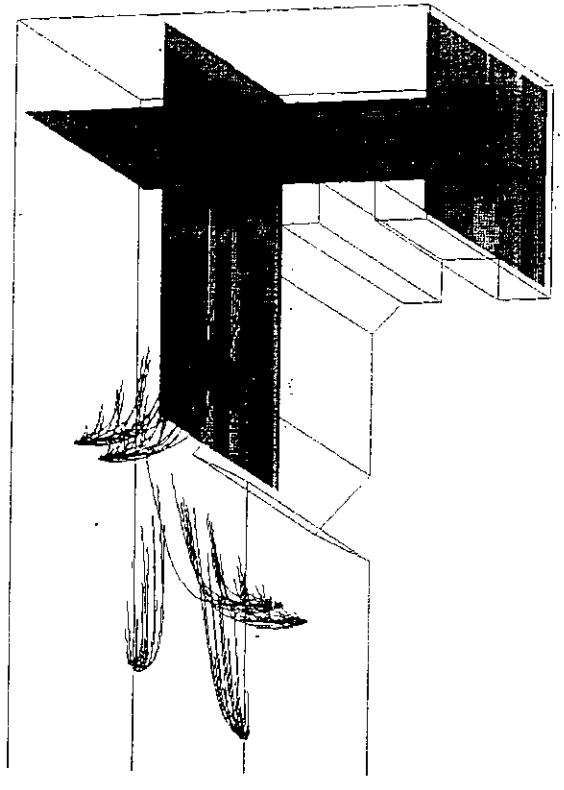


Figure 12

Case 11 – Two Back (El 85'), Two (inner) Front (El 97') & Two Side (El 79')



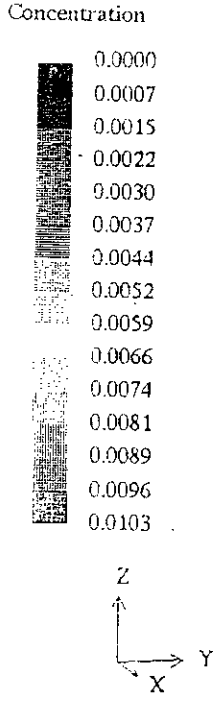


Figure 13

Palm Beach Resource Recovery Corp.

a McDermott company

6501 N. Jog Road
West Palm Beach, FL 33412
(407) 478-3800

October 27, 2003

David Broten
Environmental Specialist
Solid Waste Authority of Palm Beach County
7501 North Jog Road
West Palm Beach, FL 33412

SUBJECT: Slag and Corrosion Control by chemical injection – Boiler Unit 2.

Dear David:

Currently both boilers are experiencing higher than usual degree of obstruction to flue gas flow due to slag formation between the generating bank tubes and also higher rate of corrosion in the super heater and generating bank tubes. Due to this slag formation the boiler ID fan availability reaches the limits, forcing unscheduled outages more frequently, requiring cleaning the gas path by high-pressure water washing.

To minimize slag formation PBRRC will be evaluating a slag and corrosion control system supplied by Nalco Fuel-Tech corporation. This system was tried out by other MSW incinerators and presently is in operation with some incinerators.

The plan is to install the system in unit 2, when the unit comes on line subsequent to the November 03, 2003 scheduled outage. Evaluate the performance (reduction in slag formation and corrosion rate) of the system at the end of three months of operation. If the results are favorable continue for another three months. At the end of six months, if all data available shows reduction in slag formation and, tube corrosion, PBRRC will consider permanently installing the slag control system.

As per the MSDS sheet (copy attached) the description of the material used for slag control and corrosion control is "an aqueous solution of magnesium hydroxide and surfactants". This material will be injected into the combustion zone of the furnace via eight (four on the front wall, two on the back wall below the arch and one each on the sidewalls) existing two inch diameter ports.

The planned injection rate will be 1.5 lbs. per dry ton of RDF burned. Presently 30 to 40 tons per hour is burned in each boiler. On dry basis this will equate to about 25 tons per hour. Hence the chemical use will be approximately 37.5 lbs. (25 x 1.5) per hour.

Should you require additional information on this, please contact me at 616-6198.

Sincerely,

Naren Narendra
Environmental Engineer

cc: W. Arvan
Jim Riley
R. Worobel (SWA)

FUEL TECH®
Technology for a renewed environment™

MATERIAL SAFETY DATA SHEET

PRODUCT
FC200MWC

Emergency Telephone Number
CHEMTREC - 1.800.424.9300 (24 hours)

SECTION 1 - PRODUCT IDENTIFICATION

Trade Name: FC200MWC

Description: An aqueous solution of magnesium hydroxide and surfactants

NFPA 704M/HMIS Rating: 2/2 Health 0/0 Flammability 0/0 Reactivity 0/Other

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 - COMPOSITION / INGREDIENT INFORMATION

Our hazard evaluation has identified the following chemical ingredient(s) as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult Section 15 for the nature of the hazard(s).

Ingredient(s)	CAS #	Approx.%
Magnesium hydroxide	1309-42-8	40-70

SECTION 3 - HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:

Warning! Causes eye irritation. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

Primary Route(s) of Exposure: Eye, Skin

Eye Contact: Can cause moderate irritation.

Skin Contact: May cause irritation with prolonged contact.

SYMPTOMS OF EXPOSURE:

A review of available data does not identify any symptoms from exposure not previously mentioned.

Aggravation of Existing Conditions: A review of available data does not identify any worsening of existing conditions.

SECTION 4 - FIRST AID INFORMATION

Eyes: Immediately flush for at least 15 minutes while holding eyelids open. Call a physician at once.

Skin: Flush with water for 15 minutes.

Ingestion: Do not induce vomiting. Give water. Call a physician.

Inhalation: Remove to fresh air. Treat symptoms. Call a physician.

Note To Physician: Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.

Caution: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

SECTION 5 - FIRE FIGHTING

Flash Point: Greater than 200 Degrees F (PMCC) ASTM D-93

Extinguishing Media: Not applicable

FUEL TECH, INC. ♦ 512 KINGSLAND DR. ♦ BATAVIA, ILLINOIS 60510-2299
630.845.4500 or 800.666.9688

SECTION 6 - ACCIDENTAL RELEASE MEASURES

In case of transportation accidents, call the following 24-hour telephone number: 1.800.424.9300 (CHEMTREC).

SPILL CONTROL AND RECOVERY:

Small Liquid Spills: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 15.

Large Liquid Spills: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 15.

SECTION 7 - HANDLING AND STORAGE

Storage: Keep container closed when not in use.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory Protection: Respiratory protection is not normally needed since the volatility and toxicity are low. If significant mists are generated, use either a chemical cartridge respirator with a dust/mist prefilter or supplied air.

Ventilation: General ventilation is recommended.

Protective Equipment: Use impermeable gloves and chemical splash goggles when attaching feeding equipment, doing maintenance or handling product. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, viton and butyl (compatibility studies have not been performed).

The availability of an eye wash fountain and safety shower is recommended.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

Human Exposure Characterization: Based on Fuel Tech's recommended product application and our recommended personal protective equipment, the potential human exposure is: LOW.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Color:	Turbid, opaque white	
Form:	Liquid	
Density:	11.4-12.3 lbs/gal.	
Solubility In Water:	Dispersible	
Specific Gravity:	1.34-1.48 @ 77 Degrees F	ASTM D-1298
Ph (NEAT) =	10	ASTM E-70
Freeze Point:	29 Degrees F	ASTM D-1177
Viscosity:	1,500-3,500 cps @ 77 Degrees F	ASTM D-2983
Flash Point:	Greater than 200 Degress F (PMCC)	ASTM D-93
Volatile Organic Compound (Voc) per EPA Method 24:	0.277 lbs/gal.	

Note: These physical properties are typical values for this product.

FUEL TECH, INC. ♦ 512 KINGSLAND DR. ♦ BATAVIA, ILLINOIS 60510-2299
630.845.4500 or 800.666.9688

SECTION 10 - STABILITY AND REACTIVITY

Incompatibility: Avoid contact with strong acids (eg. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) which can generate heat, splattering or boiling and the release of toxic fumes.

Storage: Protect from freezing. Do not store at temperatures below 32 Degrees F.

Thermal Decomposition Products: None

SECTION 11 - TOXICOLOGICAL INFORMATION

Toxicity Studies: No toxicity studies have been conducted on this product.

Human Hazard Characterization: Based on our hazard characterization, the potential human hazard is: MODERATE.

SECTION 12 - ECOLOGICAL INFORMATION

If released into the environment, see CERCLA in Section 15.

Environmental Hazard And Exposure Characterization: Based on our Hazard Characterization, the potential environmental hazard is: MODERATE. Based on Fuel Tech's recommended product application and the product's characteristics, the potential environmental exposure is: HIGH.

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

SECTION 14 - TRANSPORTATION INFORMATION

Proper shipping name/hazard class may vary by packaging, properties, and mode of transportation. Typical proper shipping names for this product are:

All Transportation Modes:	Environmentally hazardous substance, liquid, N.O.S. (unless specified below)
Marine Transportation:	Product Is Not Regulated During Transportation (IMDG/IMO)
Un/Id No:	UN 3082
Hazard Class - Primary:	9 - CLASS 9
Packing Group:	III
Imdg Page No:	N/A
Iata Packing Instruction:	Cargo: 914
Iata Cargo Aircraft Limit:	No Limit (Max Net Quantity Per Package)
Flash Point:	None
Technical Name(s):	None
Rq Lbs (Per Package):	35,400
Rq Component(s):	Diethanolamine

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SECTION 15 - REGULATORY INFORMATION

The following regulations apply to this product.

FEDERAL REGULATIONS:

OSHA Hazard Communication Rule, 29 CFR 1910.1200:

Based on our hazard evaluation, the following ingredient in this product is hazardous and the reason is shown below.

Magnesium hydroxide -	Eye irritant
Magnesium hydroxide:	10 mg/m3 TLV
Manufacturer's recommendations	

CERCLA/Superfund, 40 CFR 117, 302:

This product contains diethanolamine, a Reportable Quantity (RQ) substance and if 35,400 pounds of product are released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D. C. (1-800-424-8802).

SARA/Superfund Amendments and Reauthorization Act of 1986 (Title III) - Sections 302, 311, 312 and 313:

Section 302 - Extremely Hazardous Substances (40 CFR 355):

This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

Sections 311 and 312 - Material Safety Data Sheet Requirements (40 CFR 370):

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

- XX Immediate (acute) health hazard
- -- Delayed (chronic) health hazard
- -- Fire hazard
- -- Sudden release of pressure hazard
- -- Reactive hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

Section 313 - List of Toxic Chemicals (40 CFR 372):

This product does not contain ingredients on the List of Toxic Chemicals.

Toxic Substances Control Act (TSCA):

The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

Resource Conservation and Recovery Act (RCRA), 40 CFR 261 Subpart C & D:

Consult Section 13 for RCRA classification.

Federal Water Pollution Control Act, Clean Water Act, 40 CFR 401.15 (Formerly Sec. 307), 40 CFR 116 (Formerly Sec. 311):

None of the ingredients are specifically listed.

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Clean Air Act, Sec. 111 (40 CFR 60), Sec. 112 (40 CFR 61, 1990 Amendments),Sec. 611 (40 CFR 82, Class I and II Ozone Depleting Substances):

This product contains the following ingredients covered by the Clean Air Act:

Diethanolamine - Section 112

STATE REGULATIONS:

California Proposition 65:

This product does not contain any chemicals which require warning under California Proposition 65.

Michigan Critical Materials:

This product does not contain ingredients listed on the Michigan Critical Materials Register.

State Right To Know Laws:

This product does not contain ingredients listed by State Right To Know Laws.

INTERNATIONAL REGULATIONS:

All components in this product are either on the Domestic Substance List, have been notified under Section 26 of CEPA, or are exempt.

This is a WHMIS controlled product under The House of Commons of Canada Bill C-70 (Class D2B). The product contains the following substance(s), from the Ingredient Disclosure List or has been evaluated based on its toxicological properties, to contain the following hazardous ingredient(s):

Chemical Name	CAS #	% Concentration Range
Magnesium hydroxide	1309-42-8	40-70

SECTION 16 - RISK CHARACTERIZATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: LOW.
* The environmental risk is: MODERATE.

Any use inconsistent with Fuel Tech's recommendations may affect our risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

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SECTION 17 - REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (CD-ROM version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (CD-ROM version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, Ohio (CD-ROM version), Micromedex, Inc., Englewood, CO.

Shepard's Catalog of Teratogenic Agents (CD-ROM version), Micromedex, Inc., Englewood, CO.

Suspect Chemicals Sourcebook (a guide to industrial chemicals covered under major regulatory and advisory programs), Roytech Publications (a Division of Ariel Corporation), Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, Washington (CD-ROM version), Micromedex, Inc., Englewood, CO.

REVISED: 06.21.02