

여과집진막 채용에 의한
소각플랜트의 유해물질 제거 사례

(선경건설)

조 재 수

여과집진막 채용에 의한 소각플랜트의 유해물질 제거 사례

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조성기 / SKEC

TYPICAL SOLID WASTE STREAM

COMPOSITION	%
PAPER AND PAPERBOARD	41.0
GLASS	8.2
METALS	8.7
PLASTICS	6.5
RUBBER, LEATHER, TEXTILES, AND WOOD	8.1
FOOD WASTES	7.9
YARD WASTES	17.9
MISCELLANEOUS INORGANIC WASTES	1.6

**PRINCIPAL MUNICIPAL-WASTE-COMBUSTION EMISSIONS
AND SOURCES**

POLLUTANT	PRINCIPAL SOURCE
PARTICULATE MATTER	ASH IN WASTE STREAM
ACID GASES	
HCl	CHLORINATED PLASTIC IN WASTE STREAM
SO ₂	SULFUR COMPOUNDS IN WASTE STREAM
SO ₃	OXIDATION OF SO ₂ IN FLUE GAS
HF	FLUOROCARBONS IN WASTE STREAM
NO _x	AIR AND FUEL NITROGEN CONVERSION
CO	INCOMPLETE COMBUSTION
HEAVY METALS (ARSENIC, CADMIUM, LEAD, MERCURY)	METAL COMPOUNDS IN WASTE STREAM
ORGANIC COMPOUNDS (DIOXINS, FURANS)	PRODUCTS OF INCOMPLETE COMBUSTION OR CONTAINED IN WASTE STREAM

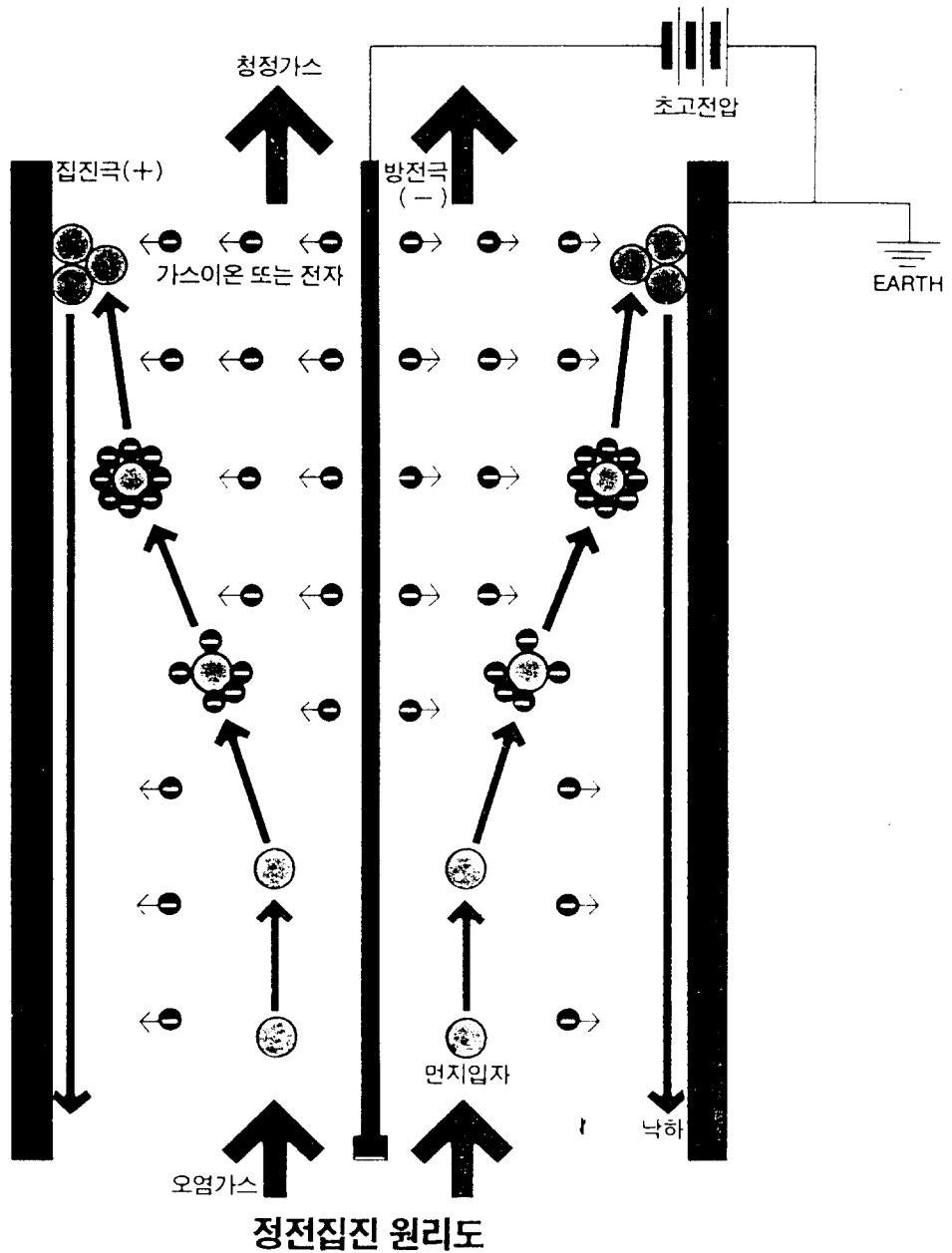
DUST/PARTICULATE CONTROL

ESP - COLD SIDE
- HOT SIDE

- ◎ ADVANTAGES
 - LOW PRESSURE DROP
 - LOW MAINTENANCE

- ◎ DISADVANTAGES
 - VARIABLE EFFICIENCY
 - TEMPERATURE SENSITIVE
 - DIOXIN GENERATION
 - POOR CAPTURE OF METALS
 - ONLINE MAINTENANCE LIMITED

ELECTROSTATIC PRECIPITATION



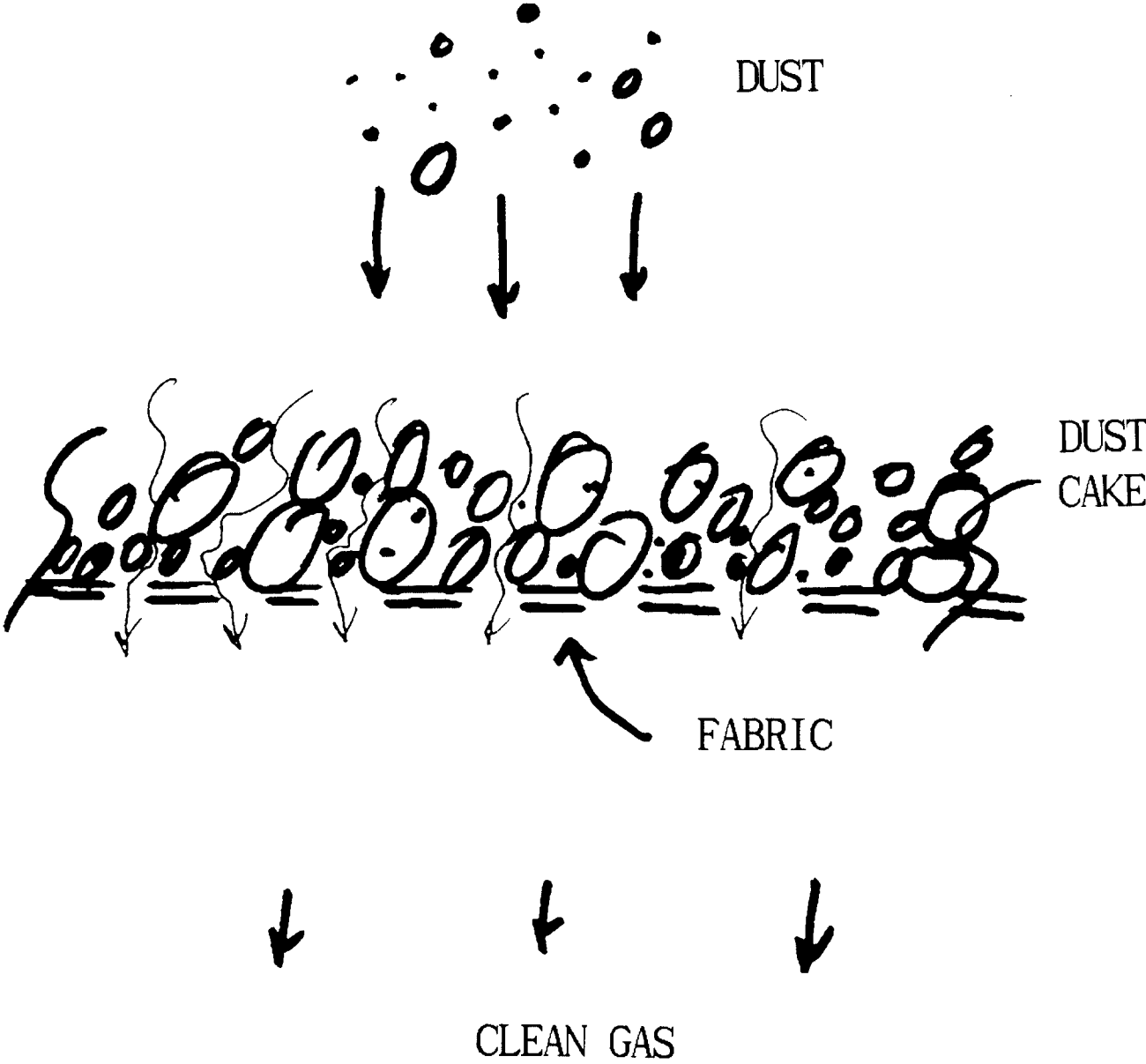
DUST/PARTICULATE CONTROL

FABRIC FILTERS

- ⊙ ADVANTAGES
 - POSITIVE FILTRATION
 - REACTION BED
 - SMALL PARTICLE EFFICIENCY
 - EASY TO MAINTAIN ON LINE

- ⊙ DISADVANTAGES
 - HIGHER PRESSURE DROP
 - FABRIC REPLACEMENT

BED FILTRATION

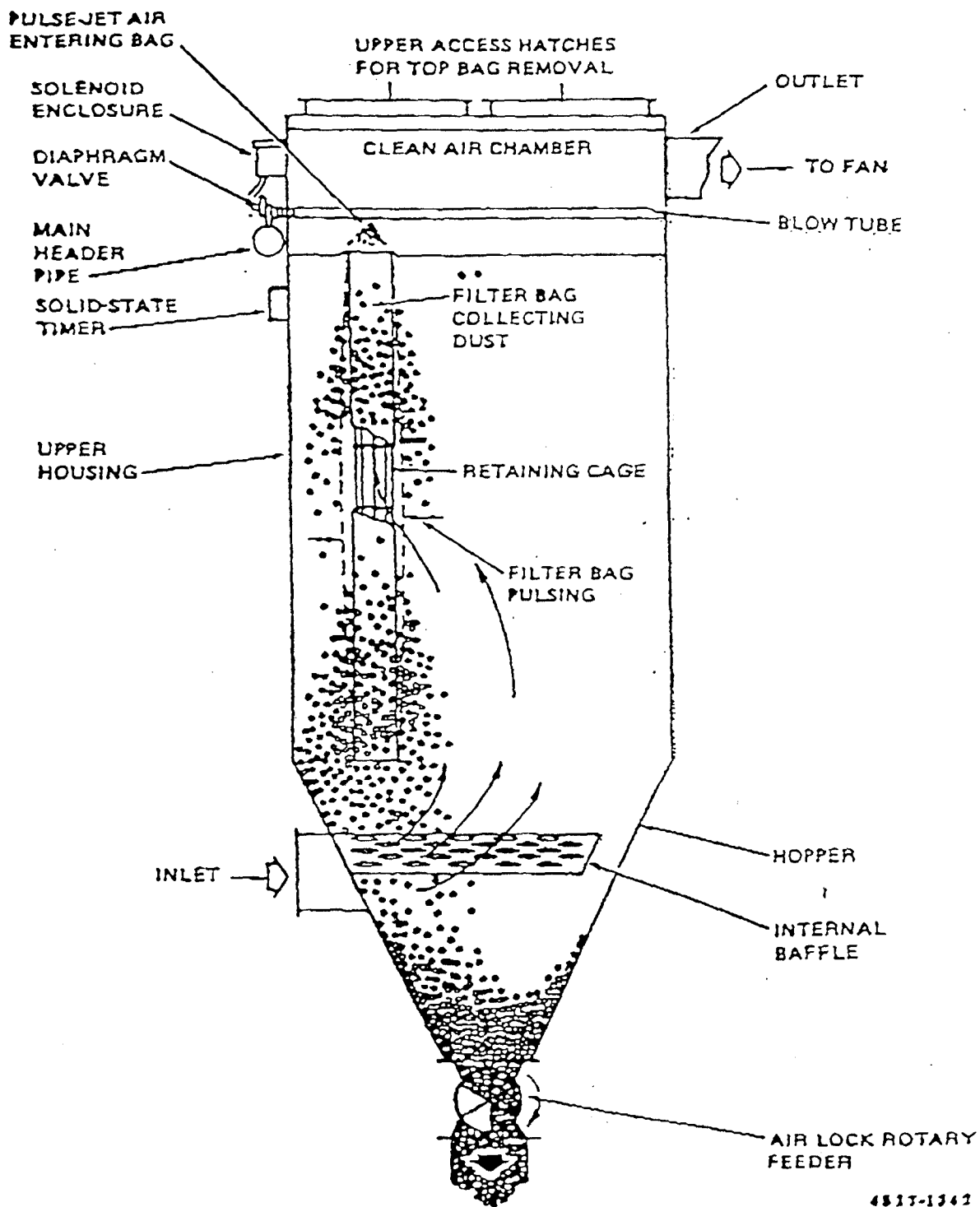


FABRIC PROPERTIES

FABRIC	OPER. MAX. TEMP. (F)	ACID RESISTANCE	ALKALI RESISTANCE	FLEX/ABRASI ON RESISTANCE	REL. COSTS LOW TO HIGH
POLYESTER	275	FAIR	FAIR	EXCELLENT	1
ACRYLIC	285	GOOD	FAIR	GOOD	2
RYTON	375	EXCELLENT	EXCELLENT	GOOD	5
NOMEX	400	POOR	GOOD	GOOD	4
TEFLON	450	EXCELLENT	EXCELLENT	FAIR	6
GORTEX	450	EXCELLENT	EXCELLENT	FAIR	6
FIBERGLASS	500	GOOD	FAIR	POOR	3
*P-84	500	EXCELLENT	EXCELLENT	POOR	5
*PBI	500	EXCELLENT	EXCELLENT	GOOD	6
*METAL	750	VERY GOOD	VERY GOOD	FAIR	7
*CERAMIC	2000	VERY GOOD	GOOD	FAIR	7

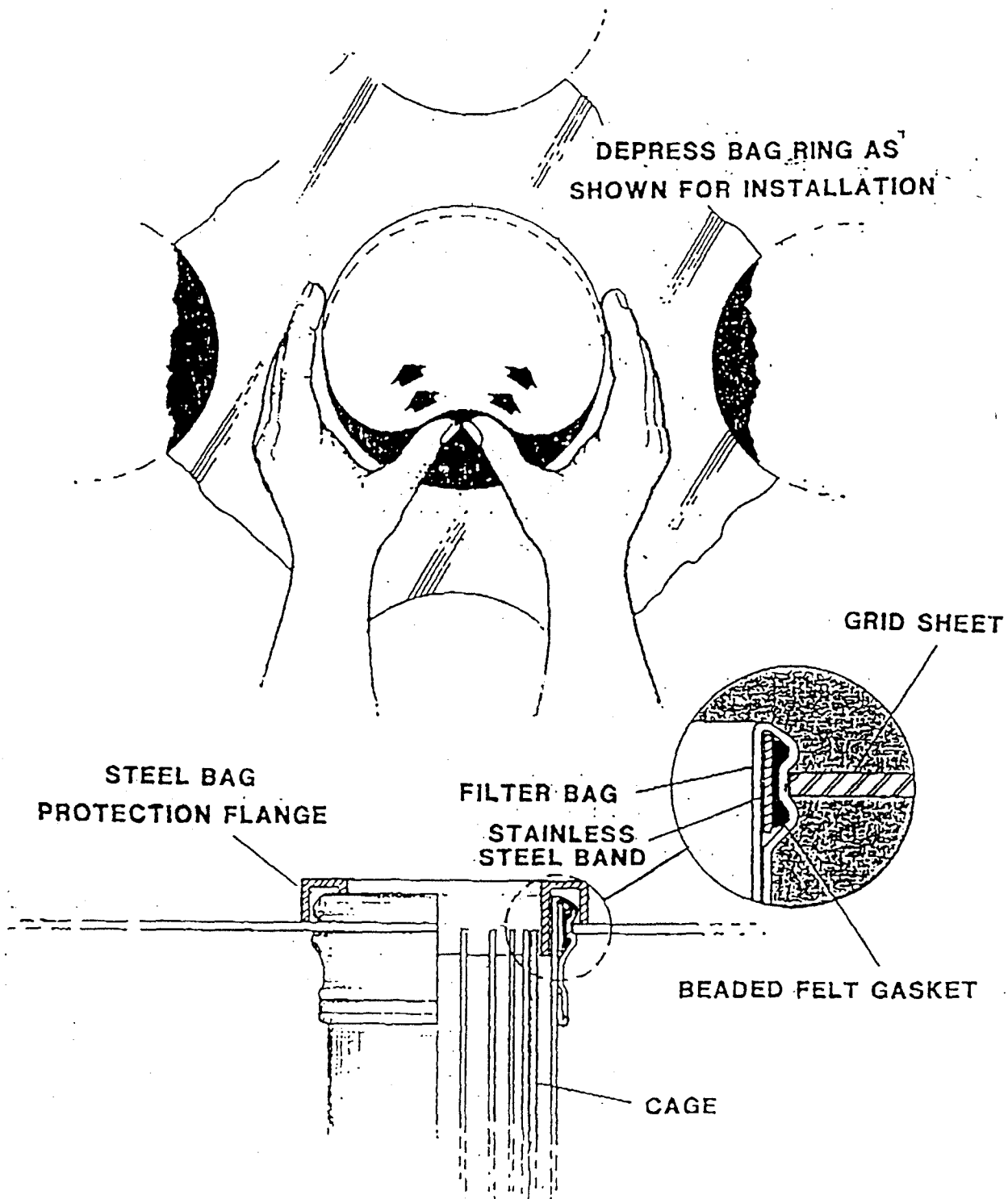
* MINIMAL EXPERIENCE BASE

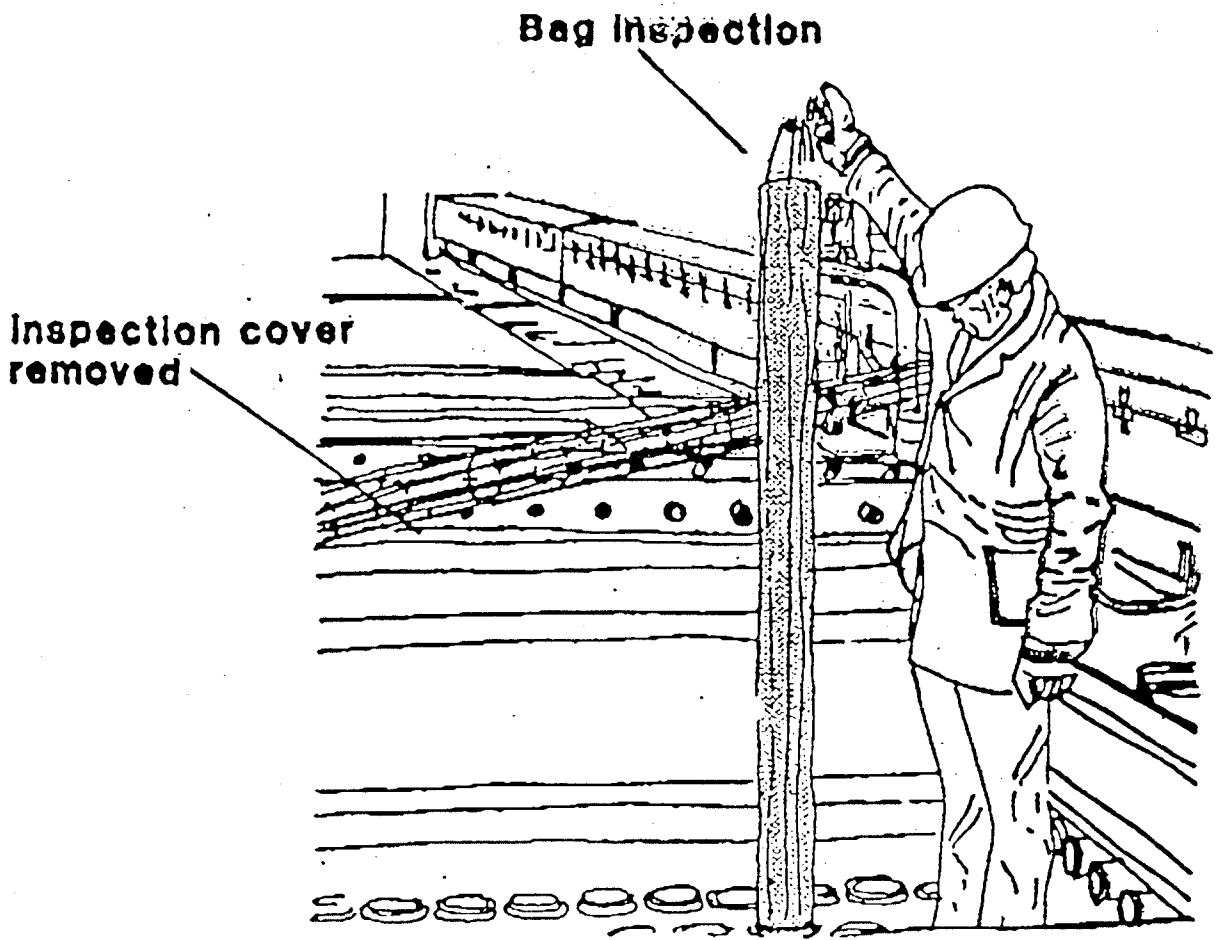
TYPICAL HIGH PRESSURE HRF



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BAG INSTALLATION

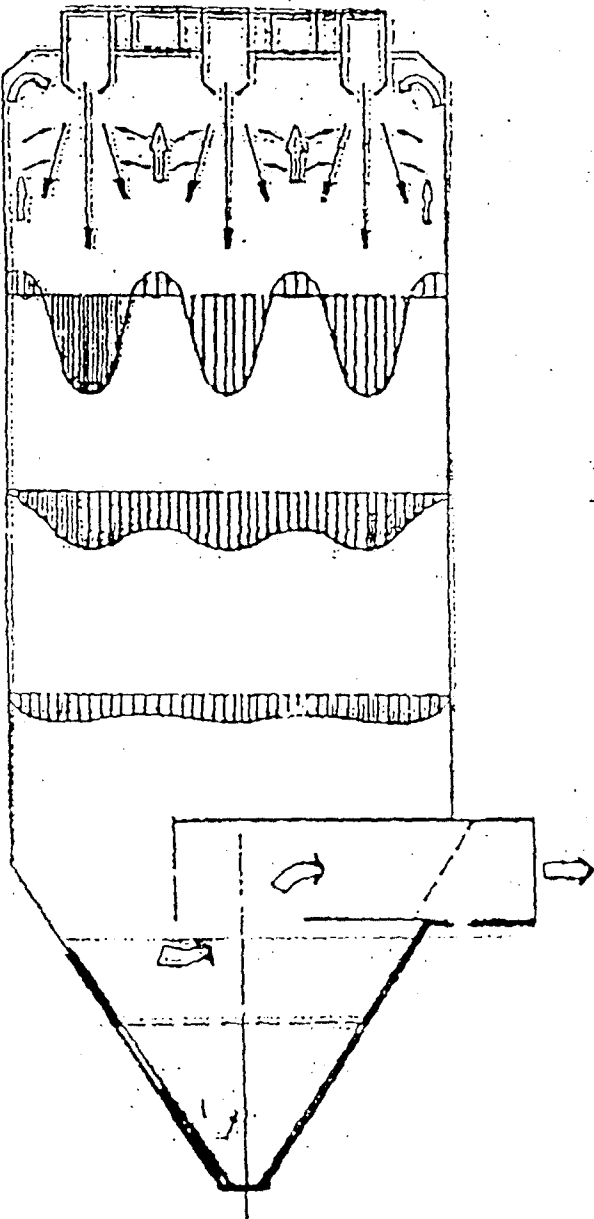




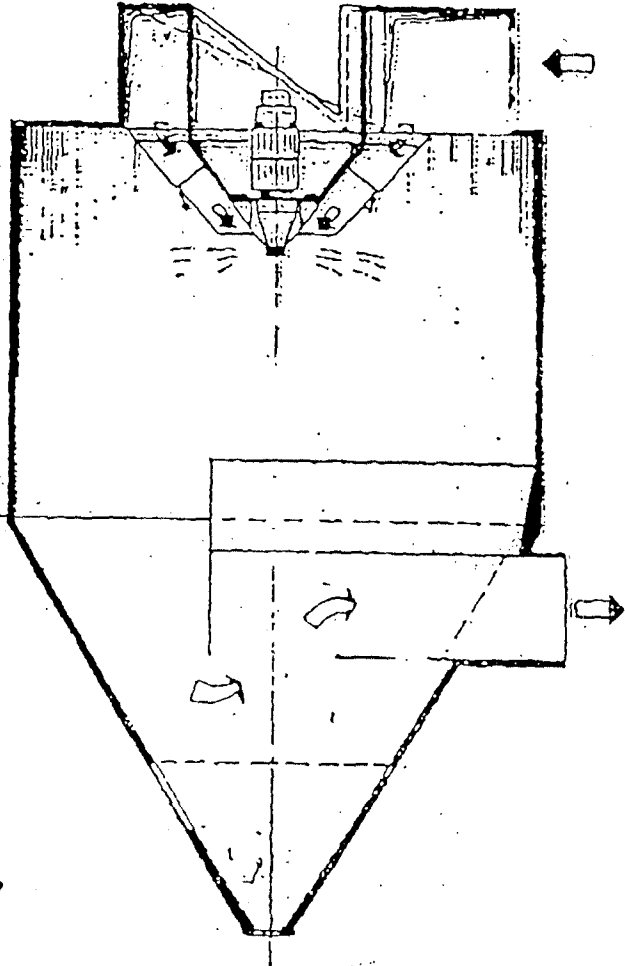
On line maintenance

WET/DRY SCRUBBING

DUAL FLUID NOZZLE



ROTARY ATOMIZER



ACID GAS CONTROL

WET SCRUBBERS

- ◎ ADVANTAGES
 - EFFICIENT USE OF REAGENTS
 - EFFICIENT SO₂/HCl CAPTURE

- ◎ DISADVANTAGES
 - WET WASTE PRODUCT
 - STACK VAPOR PLUME
 - POOR PARTICLE CAPTURE
 - POOR DIOXIN EFFICIENCY
 - POOR METALS EFFICIENCY
 - EXPENSIVE MATERIALS

ACID GAS CONTROL

SEMI-DRY SCRUBBERS

- ◎ ADVANTAGES
 - DRY WASTE PRODUCT
 - ALKALINE WASTE PREVENTS
LEACHING OF METALS
 - ENHANCES SMALL PARTICLE
CAPTURE
 - QUENCH STOPS DIOXIN
FORMATION
 - CARBON STEEL CONSTRUCTION
 - EXCELLENT METALS CAPTURE

- ◎ DISADVANTAGES - MORE EXPENSIVE REAGENT

Wet FGD System

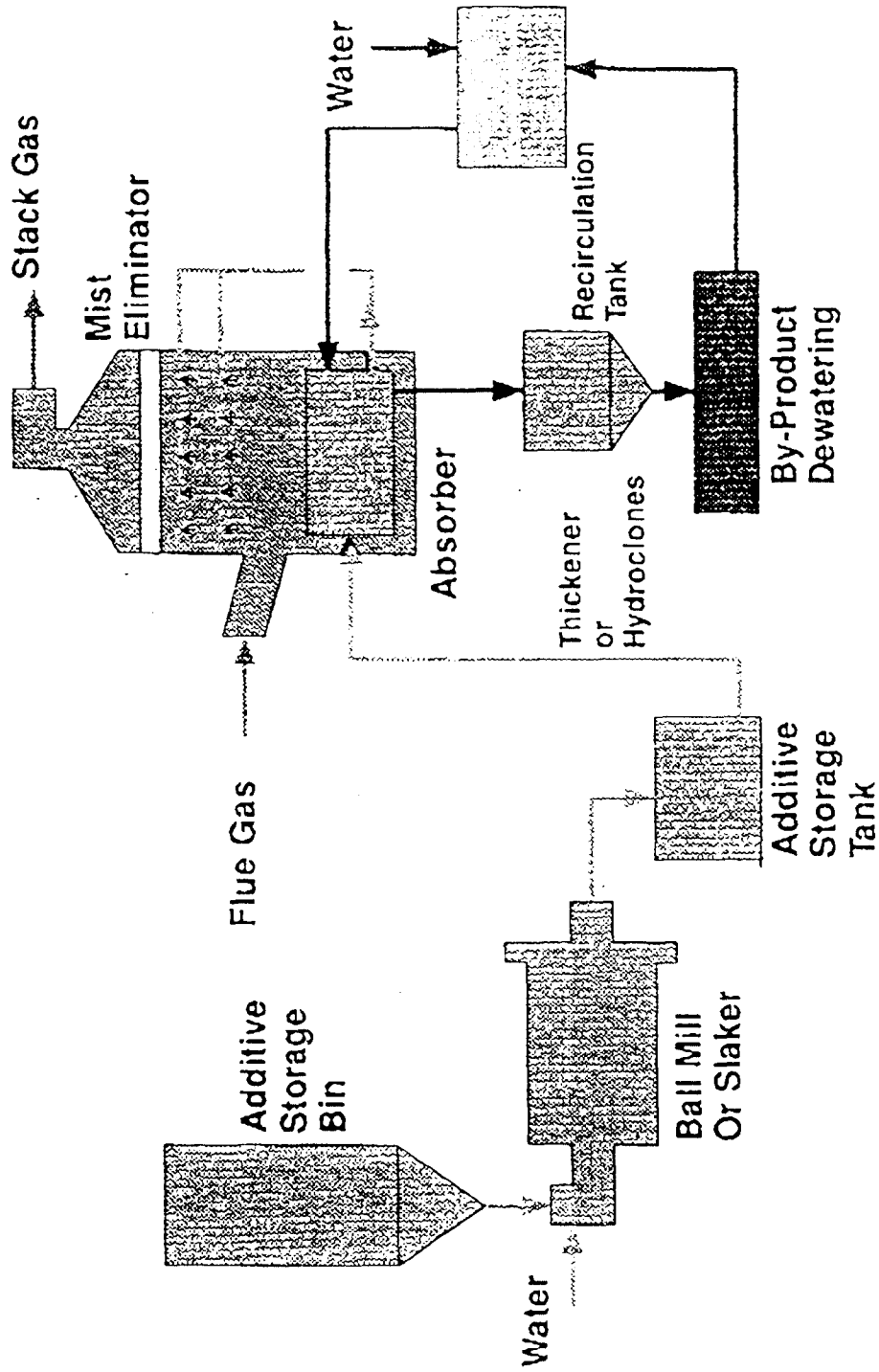


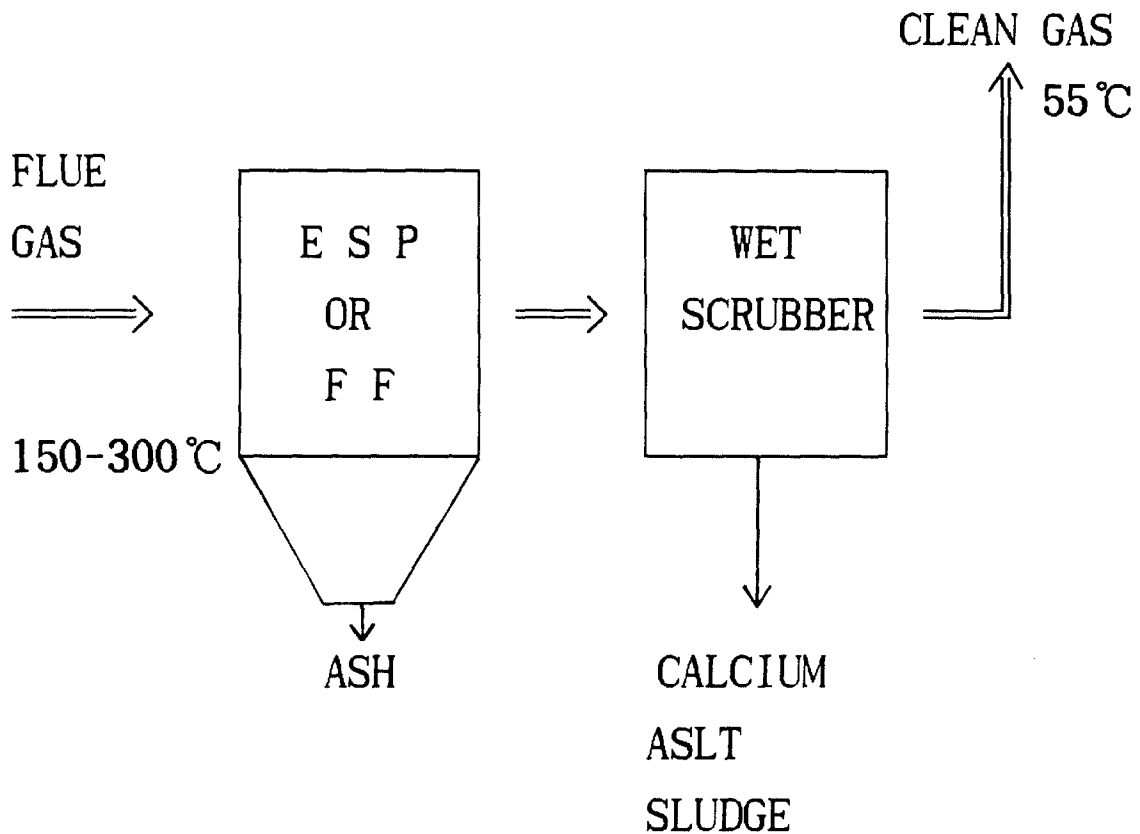
ABB Environmental Systems



I . PARTICULATE/ACID GAS CONTROL

● FILTRATIONS - ESP/FF

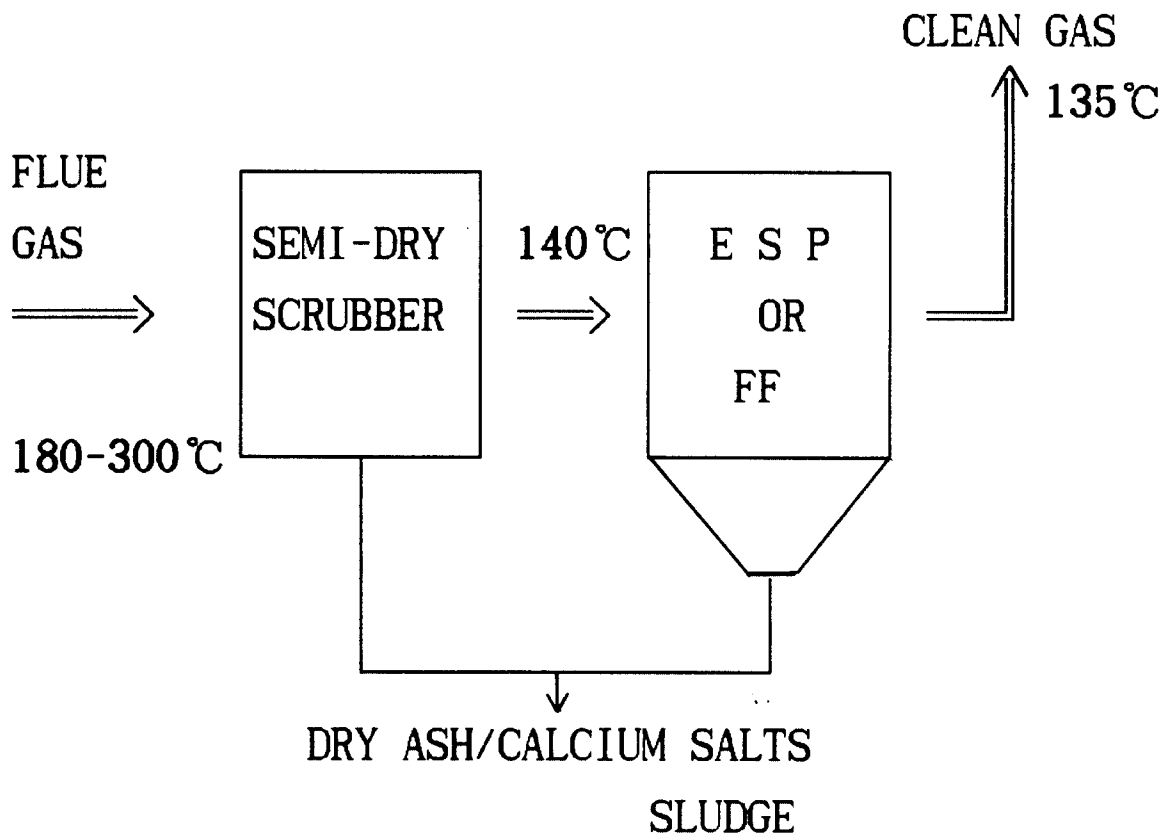
● COOLING/HUMIDIFIRATION - SCRUBBER



II. PARTICULATE/ACID GAS CONTROL

● COOLING/HUMIDIFICATION - SCRUBBER

● FILTRATION - ESP/FF



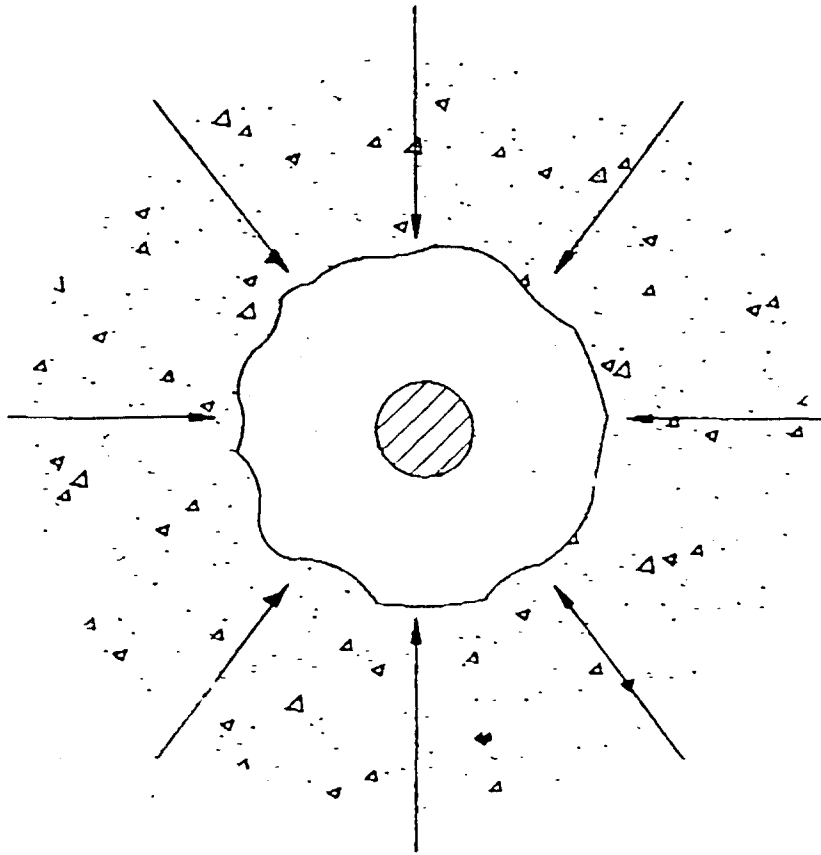
TRACE METALS/DIOXIN CONTROL

- SOURCE SEPARATION

- COMBUSTION CONTROL

- FLUE GAS TREATMENT

METAL/DIOXIN CONDENSATION WITH COOLING OF GAS



TRACE METALS / DIOXIN CONTROL

◎ REMOVAL MECHANISMS

- CONDENSATION
 - SMALL PARTICLES
 - SURFACE ENRICHMENT
 - STOP FORMATION

- ADSORPTION
 - SPECIFIC SURFACE

- CATALYTIC REACTIONS
 - $\text{Hg}_2 \text{Cl}_2(\text{S})$
 - $\text{HgCl}_2 (\text{SOL})$

- FILTRATION
 - IMPACTION
 - INTERCEPTION
 - DIFFUSION

SEMI - DRY SCRUBBER/FABRIC FILTER

PERFORMANCE FEATURES

- DRY WASTE PRODUCT
- ALKALINE CONDITIONS PREVENT METALS LEACHING
- EXCELLENT FINE PARTICLE CAPTURE
- EXCELLENT MERCURY CAPTURE WITH POWDERED ACTIVATED CARBON
- EXCELLENT DIOXIN CONTROL
- 80 - 98% SO₂ REMOVAL
- 95 - 99% HCl REMOVAL
- 95 - 99% HF REMOVAL

OGDEN MARTIN SYSTEMS

LEE COUNTY, FLORIDA - W.T.E. PLANT

MAJOR EQUIPMENT SUPPLIED

SPARY DRYERS 2@ 11m ϕ x 8.5m SSH

ROTARY ATOMIZERS 3@ 150HP

BAGHOUSE 2@ 8 HP-320-14.5
(4.4m BAGS)

LIME SLAKING/STORAGE 2 SLAKERS @ 1500KG/HR
200TONS STORAGE

I.D. FANS 2 x 600HP

POWDEREN ACTIVATED CARBON SYSTEM

OGDEN MARTIN SYSTEMS

LEE COUNTY, FLORIDA - W.T.E. PLANT

	EMISSION GUARANTEES	ACTUAL PERFORMANCE
PARTICULATE	0.010 gr/dscf 26mg/Nm ³	0.001 gr/dscf 2.6mg/Nm ³
PM ₁₀	0.010gr/dscf	0.00045gr/dscf
SO ₂	85% REMOVAL or 30ppmd	89.5%, 9.5ppmd
HC1	95% REMOVAL or 25ppmd	97.3%, 21.2ppmd
HF	95% REMOVAL or 1ppmd	<0.049 ppmd
Hg	140mg/dscm	21.4mg/dscm
DIOXINS/FURANS,	30ng/dscm	5.48ng/dscm
TOTAL		

GREATER DETROIT RESOURCE RECOVERY FACILITY

UNIT NO. 12 EMISSIONS DATA - MARCH 1993

AVERAGE OF THREE(3) TESTS

<u>EMISSION</u>	<u>SPARY DRYER INLET</u>	<u>STACK</u>	<u>REMOVAL EFFICLENCY</u>
PARTICULATE (gr/DSCF @ 7% O ₂)	NOT MEASURED	0.000505	-
SO ₂ (ppmdv @7% O ₂)	172	5.69	96.64
HCl(ppmdv @7% O ₂)	572	5.64	99.03
HF(ppmdv @7% O ₂)	1.94	N.D(0.193)	>89.18
 <u>METALS</u>			
Hg(μg/DSCM @ 7% O ₂)	NOT MEASURED	4.46	
Cd(μg/DSCM @ 7% O ₂)	NOT MEASURED	N. D. (3.23)	
Pb(μg/DSCM @ 7% O ₂)	NOT MEASURED	N. D. (6.45)	
Cr(μg/DSCM @ 7% O ₂)	NOT MEASURED	N. D. (6.45)	