CENTRAL PHOSPHATES, INC., Subsidiary of

P.O. Drawer L.
Plant City, Florida 33566
Telephone: 813/782-1591

CF Industries, Inc.
Plant City Phosphate Complex

May 22, 1989

RECEIVED
MAY 30 1989
DER-BAQM

Mr. Clair Fancy
Division of Air Resources Management
Florida Department of
Environmental Regulation
2600 Blair Stone Road, Room 338
Tallahassee, Florida 32399-2400

RE: Central Phosphates, Inc.
"Y" Train DAP/MAP/GTSP Product Cooler

Dear Mr. Fancy:

Enclosed is a construction permit application and check for the addition of a product cooler and associated air pollution control equipment to the existing "Y" train. As previously discussed with your staff, there will be no production rate increase or no increase in emissions as indicated by 40 CFR 60 Appendix C. There will be increased operating and maintenance procedures to maintain the scrubbers at high operating efficiencies. The project will cool the product in route to storage.

As discussed in our meeting with your staff, changes in shipping patterns to CF's member owners has resulted in a need to decrease product temperatures. With increased direct shipments to our customers, product quality has been adversely affected, resulting in numerous customer complaints relating to excessive moisture and set-up in rail cars. Additionally, we have been limited in pursuing product exports due to the potential for product quality problems caused by product moisture and product set-up. For a plant moving approximately 2,000,000 tons per year of product, this is a problem of major proportions. The expedient installation of this product cooler is of vital interest to CPI.

We appreciate your understanding of our dilemma and request expeditious handling of this application. Should anything additional be required, please call Paul Roberts or Jim Martin at (813) 782-1591 or (813) 752-0489.

Sincerely,

J. E. Parsons
General Manager

JEP/tjj
Enclosures

5-25-89
Patty,
CF Chemicals is to
hand deliver copies
of the application to
SW Dist. + NCEPC

Linda

#200pd. 5-30-89
Rcpt.#117619

Y-TRAIN COOLER ADDITION

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHWEST DISTRICT
7601 HIGHWAY 301 NORTH
TAMPA, FLORIDA 33610
AC 29-165420

RECEIVED
MAY 30 1989
DER-BAQM

BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY
WILLIAM K. HENNESSEY
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Y-Train Granulation Plant [ ] New[1] [xx] Existing[1]

APPLICATION TYPE: [xx] Construction [ ] Operation [ ] Modification

COMPANY NAME: Central Phosphates, Inc. COUNTY: Hillsborough

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Y-Train Scrubbers

SOURCE LOCATION: Street 10609 Highway 39 North City Plant City

UTM: East 17-358.9 North 3092.8

Latitude 28 ° 09 ' 55 "N Longitude 82 ° 08 ' 37 "W

APPLICANT NAME AND TITLE: J.E. Parsons, General Manager

APPLICANT ADDRESS: P.O. Drawer L, Plant City, Florida 33566

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Central Phosphates, Inc.

I certify that the statements made in this application for a Construction Permit permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization
Letter of Authorization on File in DER Offices

Signed: J. E. Parsons

J.E. Parsons, General Manager
Name and Title (Please Type)

Date: 5/19/89 Telephone No. 813/782-1592

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed _____

John J. Mulqueen

Name (Please Type)

Company Name (Please Type)

2306 S. Valrico Road

Valrico, Florida 33594

Mailing Address (Please Type)

Florida Registration No. 18919 Date: 5-20-89 Telephone No. 813/689-9644

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

The project consists of adding a cooler and associated scrubbing equipment to the Y-Train Granulation Unit. After construction, the unit will be a duplicate of the Z-Train and will be in compliance with all applicable environmental regulations. This unit is capable of manufacturing DAP, MAP and GTSP

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction June 19, 1989 Completion of Construction November 7, 1989

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Fan	$ 89,130	Seal Tanks	$ 3,000
Scrubber	106,670	Misc. & Labor	546,270
Cyclone	159,800		
Ducts	91,160	Total Cost Estimate	$ 1,009,730
Piping	9,100		
Concrete	4,600		

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Present Operating Permit No. A029-88151, Issued 8/31/84 - Expires 8/14/89

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr_____; if seasonal, describe:_____

F. If this is a new source or major modification, answer the following questions. (Yes or No)

N/A

1. Is this source in a non-attainment area for a particular pollutant? _____

   a. If yes, has "offset" been applied? _____

   b. If yes, has "Lowest Achievable Emission Rate" been applied? _____

   c. If yes, list non-attainment pollutants. _____

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. _____

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. _____

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? _____

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? _____

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   a. If yes, for what pollutants?_____

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

This plant is in the area of influence of the Tampa Non-Attainment Area for Particulates but was exempted by modeling.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Input Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
39.8% Phosphoric Acid	F	2.0	183,400	A
Ammonia	None		34,700	B
Phosphate Rock	F	3.8	40,000	C (on GTSP)
Sulfuric Acid	None		1,800	C

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 219,900

2. Product Weight (lbs/hr): 150,000 as DAP; 100,000 as GTSP

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

	Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
		Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
(1)	Fluoride	1.24	0.98	0.15 lbs/ton	3.8	600 T/Year		E
(1)	Particulate	6.8	7.42	[3]34.9 #/hr.	34.9	4,650 T/Year		E
(2)	Fluoride	1.00	0.67	0.06 lbs/ton	2.2	420 T/Year		E
(2)	Particulate	15.3	7.17	[3]34.9 #/hr.	34.9	4,500 T/Year		E

(1) When manufacturing GTSP
(2) When manufacturing DAP

[3] Permit condition for exemption from RACT

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard.

[4] Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Ducon Cooler Cyclone	Particulate	89+%	0-10	by design
Ducon Cooler Scrubber	Particulate F	70+% 70+%	-	by design
Ducon F Abatement Scrubber	Particulate F	89+% 89+%	-	by design
Overall efficiency for	both F and Particulate = 99.8%	+ by design		
See attached equipment	specifications			

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Natural Gas	0.005	0.044	45

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr

Fuel Analysis:

Percent Sulfur: 0 Percent Ash: 0

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: 1,031 BTU/~~lb~~ cu.ft. _____ BTU/gal

Other Fuel Contaminants (which may cause air pollution): None

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average None Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

No liquid or solid wastes are generated. Process pond water is used in the scrubbers and is recycled to the cooling pond. Waste product recycles to the system.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 125 ft. Stack Diameter: 9.2 ft.

Gas Flow Rate: 175,000 ACFM 168,000 DSCFM Gas Exit Temperature: 140 °F.

Water Vapor Content: 18.0 % Velocity: 44 FPS

SECTION IV: INCINERATOR INFORMATION

N/A

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

_____

_____

_____

_____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

_____

_____

_____

_____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

N/A

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [xx] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data N/A

1. _____ no. sites _____ TSP _____ ( ) SO^{2}* _____ Wind spd/dir

Period of Monitoring ____/____/____ to ____/____/____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from _____/_____/_____ to _____/_____/_____
month day year month day year

2. Surface data obtained from (location)_____

3. Upper air (mixing height) data obtained from (location)_____

4. Stability wind rose (STAR) data obtained from (location)_____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	_____	grams/sec
SO^2	_____	grams/sec

E. Emission Data Used in Modeling

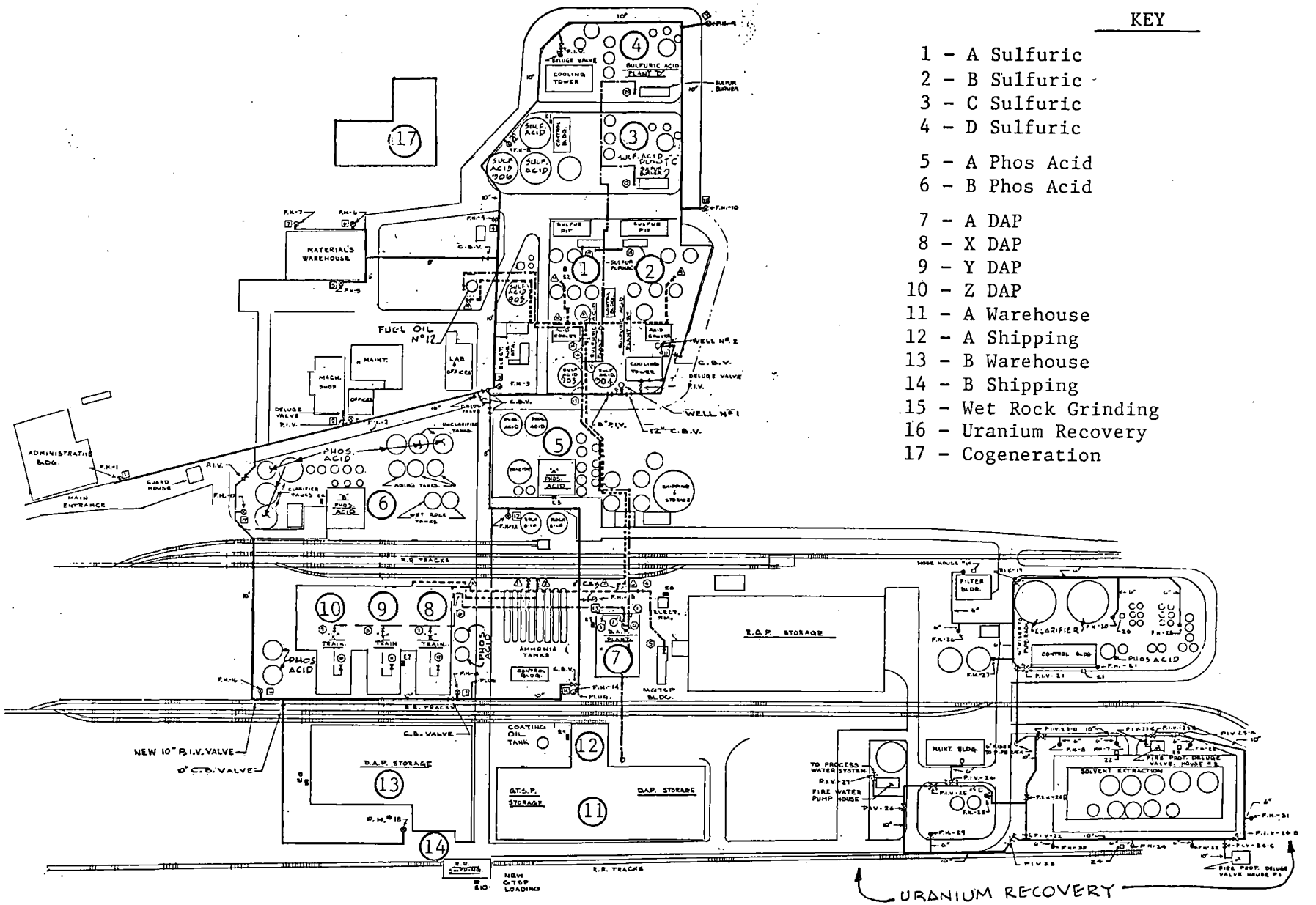
Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

I. FACILITY DIAGRAM



DRAWING HISTORY				DEPARTMENT	APPROVED BY	DATE
DATE	BY	ISSUE	DES.	OPERATIONS		
				MAINTENANCE		
				PROCESS ENG.		
				SAFETY		

JOB NO. 81-000-047
AFE NO.

MARK	REVISION	BY	DATE	APPROVED BY	DATE
1	REVISED P.I.P.W.S., ADDED VALVES, REVISED P.H. NOS., DESTROY ALL OLD ISSUES.		10-9-81		
2	REVISED PER AFE 80-41, DWG 90-P-180	MVB	5-22-82		

SCALE 1" = 100'
DRAWN BY R.T.N. 4-27-81
CHECKED BY
CHECKED BY

CENTRAL PHOSPHATES, INC., A subsidiary of
CF Industries, Inc.
Plant City Phosphate Complex
P.O. DRAWER L, PLANT CITY, FLORIDA 33566

TITLE
PLANT
FIRE PROTECTION SYSTEMS
AMMONIA & NATURAL GAS

DWG. NO.
0.1-P-37
1

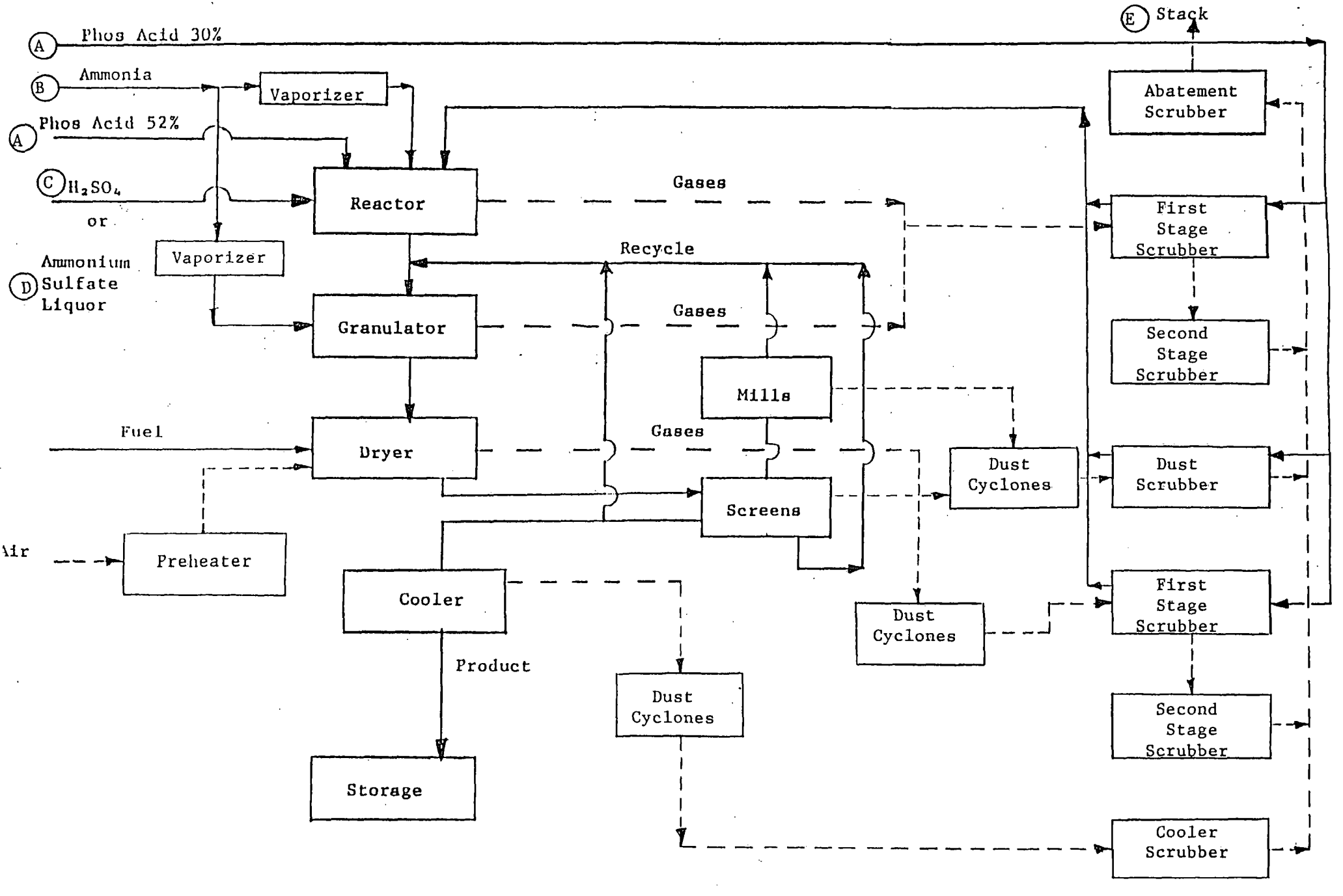


FIGURE VI - DAP PROCESS FLOW DIAGRAM

NOTE: Second Stage Scrubbers and Cooler Scrubbers use Pond Water as the scrubbing medium

REV. 5/89

GRANULAR TRIPLESUPERPHOSPHATE PLANTS SPECIFICATION

GRANULAR TRIPLESUPERPHOSPHATE WILL BE PRODUCED IN TWO TRAINS USING THE DIRECT REACTION OF PHOSPHATE ROCK AND PHOSPHORIC ACID IN A SLURRY MEDIUM FOLLOWED BY GRANULATION, DRYING AND SCREENING. AIR POLLUTION CONTROL SYSTEMS WILL BE PROVIDED SO THAT NO FUGITIVE DUST OR VISIBLE EMISSIONS WILL OCCUR AT ANY LOCATION WITHIN THE BATTERY LIMITS OF THE TRIPLESUPERPHOSPHATE PLANT FROM ANY SOURCE. GASEOUS FLUORIDE EMISSIONS WILL BE LIMITED TO 35 LB./DAY AS F OR 70 LB./DAY AS F TOTAL FOR THE GRANULATION TRAINS, TRIPLE STORAGE, AND TRIPLE SHIPPING.

I. PLANT SIZE

A. SECONDARY PHOSPHATE ROCK UNLOADING & STORAGE

1.00	NUMBER OF UNLOADING STATIONS:	ONE
2.00	UNLOADING RATE:	100 TPH
3.00	OPERATING TIME:	THE UNLOADING STATION SHALL BE CAPABLE OF OPERATION 330 DAYS PER YEAR, 24 HRS. PER DAY AT FULL CAPACITY OF 100 TONS PER HOUR.
4.00	STORAGE:	TWO SILOS OF GROUND PHOSPHATE ROCK: 1,310 TONS LIVE STORAGE EACH; A TOTAL OF 2,620 TONS OF LIVE STORAGE.

B. PHOSPHORIC ACID SHIFT TANKS

1.00	NUMBER OF TANKS:	EIGHT; FOUR PER TRAIN.
2.00	SIZE OF TANKS:	200 TONS OF P_2O_5 AS 40% P_2O_5 ACID EACH, A TOTAL CAPACITY OF 1,600 TONS P_2O_5 (4,000 TONS "AS-IS" ACID)
3.00	RECEIPT OF PHOSPHORIC ACID:	200 GPM

CF Industries, Inc.

INTRA-COMPANY CORRESPONDENCE

Date May 18, 1989

From F.L. Gay

Plant City Phosphate Complex

To C.J. Martin

cc P.R. Roberts, T.A. Edwards, N.F. Curran

Subject COST ESTIMATE FOR ENVIRONMENTAL PORTION OF Y-DAP COOLER PROJECT

The portion of the Y-DAP Cooler Project necessary for environmental control is estimated at $1,009,730. This estimate includes all equipment downstream of the product cooler exhaust; i.e., ducting, cyclones, scrubber, fan and related equipment. Cost estimates are based on the Jacobs Engineering Company report dated April 5, 1989.

A breakdown of the cost estimate is attached.

F L Gay

F.L. Gay

FLG/lh
Attachment

ACCT. NO.	DESCRIPTION	NO PCS. EQUIP	TOTAL MAN HRS.	$/HR	MATERIAL	LABOR	SUB CONT.	TOTAL COST
	FANS & BLOWERS	1	200		89130	0	0	89130
09	TANKS	1	30		3000	0	0	3000
10	SCRUBBERS	1	150		106670	0	0	106670
11	HEAT EXCHANGER	2	1100		374800	0	0	374800
23	CYCLONES	1	500		159800	0	0	159800
29	BELT CONVEYORS/FEEDERS	1	100		22200	0	0	22200
35	CHUTEWORK		300		25000	0	0	25000
	TOTAL EQUIPMENT	7	2880		780600	0	0	780600
51	DEMOLITION		1720		18070	0	0	18070
54	PILING		0		0	0	0	0
55	BUILDINGS		130		1850	0	14270	16120
56	CONCRETE		1390		18090	0	0	18090
58	STRUCTURAL STEEL		1640		75720	0	0	75720
61	DUCT WORK		1338		100760	0	0	100760
62	PIPING		1254		30000	0	0	30000
63	INSULATION		0		0	0	31243	31243
64	INSTRUMENTATION		0		0	0	15000	15000
65	ELECTRICAL		0		0	0	239940	239940
66	PAINTING,PROTECTIVE COATINGS		0		0	0	7810	7810
	TOTAL BULKS		7522		244490	0	308263	552753
	COMPLEXITY FACTOR		2090					
	TOTAL DIRECTS		12482		1025090	137230	308263	1520583
	FIELD INDIRECTS:							249676
	TOTAL DIRECTS/INDIRECTS							1770259
	J.E.G. PROFESSIONAL SERVICES							212405
	SUB TOTAL							1982664
	CONTINGENCY @ 15%							297400
	TOTAL							2280064

ACCT. NO.	DESCRIPTION	QTY.	UNIT	MAT'L $/UNIT	MAN HRS PER UNIT	TOTAL MAN HRS.	$/HR	MATERIAL	LABOR	SUB CONTRACT	TOTAL COST	CODE
								0			0	
05.00	FAN-COOLER VENT RLCS.50000 CFM.-15"W.G W/ MOTOR GUARD & CPLG.	1	EA.	80130 9000	200	200		80130 9000			80130 9000	B E
		1				200		89130			89130	B
09.00	TANK-SEAL RLCS.55"0X60".OPEN TOP	1	EA.	3000	30	30		3000			3000	E
		1	0			30		3000			3000	
10.00	SCRUBBER CYCLONIC.RL	1	EA.	106670	150	150		106670			106670	B
		1	0			150		106670			106670	
11.00	COOLER-ROTARY 10'0X55' LONG C/W DRIVE & AUTO LUBE SYSTEM	1	EA.	325000	800	800		325000			325000	B
	CHILLER 50.000 CFM @ 85 DEG. TO 45 DEG.10'X10'X14' RELOCATE AMMONIA VAPOR. RELOCATE TWO (2)UNITS	1	EA.	49800	100	100 200		49800			49800	B
		2				1100		374800			374800	
23.00	DUST CYCLONE W\TRICKLE VALVE	1	EA.	159800	500	500		159800			159800	B
		1	0			500		159800			159800	
29.00	CONVEYOR-COOLER DISCHARGE 24" BELT.35DEG. IDLERS 100 TPD.5HP.37'C/C	1	EA.	22200	100	100		22200			22200	B
		1				100		22200			22200	
10						0		0			0	B

ACCT. NO.	DESCRIPTION	QTY.	UNIT	MAT'L $/UNIT	MAN HRS PER UNIT	TOTAL MAN HRS.	$/HR	MATERIAL	LABOR	SUB CONTRACT	TOTAL COST	CODE
35.000	PLATEWORK											
	COOLER FEED HOOD	4000	LBS	2	0.06	240		8000			8000	
	COOLER DISC. HOOD	6000	LBS	2	0.06	360		12000			12000	
	CHUTEWORK	2000	LBS	2.5	0.1	200		5000			5000	
						800		25000			25000	E

ACCT. NO.	DESCRIPTION	QTY.	UNIT	MAT'L $/UNIT	MAN HRS PER UNIT	TOTAL MAN HRS.	$/HR	MATERIAL	LABOR	SUB CONTRACT	TOTAL COST
	DEMOLITION										
	COOLER SLAB	11	CY	20	20	220		220			220
	CYCLONE SLAB	0	CY	20	20	0		0			0
	SCRUBBER SLAB	10	CY	20	20	200		200			200
	FAN SLAB	5	CY	20	20	100		100			100
	TRENCH SLAB	0	CY	20	20	0		0			0
	REMOVE AND REINSTALL										
	SIDING	112	SF		0.5	60		0			0
	STEEL	0.5	TON		50	30		0			0
	STAIRS	1	TON		30	30		0			0
	BUCKET ELEV BOOT & CASING	1	LOT		150	150		0			0
	CONV SUPPORT STEEL	2	TON	1800	40	80		3600			3600
	REINSTALL	1	LOT	1000	150	150		1000			1000
	RELOCATE EXIST.24" CONV.65'C/C	1	LOT		336	340		0			0
	STEEL:0-20#	1	TON	1800	35	40		1800			1800
	STEEL:40# & UP	6	TON	1400	25	150		8400			8400
	HANDRAIL/TOE PL.	50	LF	10	0.5	30		500			500
	GRATING	125	SF	10	0.34	40		1250			1250
	CHUTEWORK-12"SCD 40 CS PIPE	50	LF	20	2	100		1000			1000
						1720		18070			18070
54	PILING-----NOT REQUIRED					0		0			0
						0		0			0
55	BUILDING-MCC 20'X20'X10'H	1	LOT	1850	130	130		1850		14270	16120
						130		1850		14270	16120
56	CONCRETE										
	COOLER PILE CAP	46	C.Y.	101	5	230		4650			4650
	COOLER PED.	64	C.Y.	76	3	190		4860			4860
	SCRUBBER FOOTING	13	C.Y.	100	7	90		1300			1300
	FAN FDN.	28	C.Y.	100	7	200		2800			2800
	SLAB @ GR.	26	C.Y.	70	5	130		1820			1820
	MISC.CONC	5	C.Y.	132	15	80		660			660
	GROUT	2	C.Y.	1000	100	200		2000			2000
	EXCAVATION	200	C.Y.		0.9	180		0			0
	BACKFILL	100	C.Y.		0.9	90		0			0
		184	C.Y.			1390		18090			18090
58	STRUCTURAL STEEL										
	0-20 # PER LF	10	TON	1800	42	420		18000			18000
	20-40 # PER LF	6	TON	1600	31	190		9600			9600
	40 # PER LF & UP	3	TON	1400	21	60		4200			4200
	MISC. STEEL	15	TON	1800	40	600		27000			27000
	GRATING-1.25X3/16	1275	SF	6	0.15	190		7650			7650
	HAND RAIL w/ TOE PLATE	550	LF	16	0.3	170		8800			8800

ACCT. NO.	DESCRIPTION	QTY.	UNIT	MAT'L $/UNIT	MAN HRS PER UNIT	TOTAL MAN HRS.	$/HR	MATERIAL	LABOR	SUB CONTRACT	TOTAL COST
	TREADS	18	EA	16	0.5	10		299			299
	ANCHOR BOLTS	60	EA	3		0		180			180
		34				1640		75720			75720
61	DUCT WORK										
	CARBON STEEL-3/16" THK	45336	LBS.	1.5	0.025	1133		68004			68004
	12 GA. GALV.	7000	LBS.	1.5	0.025	175		10500			10500
	TRIFLEX LINING	1266	SF	16		0		20256			20256
	DAMPERS	2	EA	1000	40	80		2000			2000
											0
						1388		100760			100760
62	PIPING										
	PIPE C.S.	630	LF	15	1.7	1071		9500			9500
	VALVES	1	LOT	9500		0		9500			9500
	PIPE R.L.C.S.	20	LF	175	2.75	55		3500			3500
	PIPE F.R.P	80	LF	45	1.6	128		3600			3600
	MISC.	1	LOT	3900		0		3900			3900
						1254		30000			30000
63	INSULATION										
	1 1/2" THK.PRE FORMED FIBERGLASS										
	W/ ALUM JACKET										
	4" PIPE	421	SF	15						6315	6315
	8" PIPE	482	SF	20						9640	9640
	3" PIPE	18	SF	16						288	288
	PROCESS EQUIPMENT	1000	SF	15						15000	15000
						0		0		31243	31243
64	INSTRUMENTATION	1	LOT	15000		0				15000	15000
						0				15000	15000
65	ELECTRICAL	1	LOT	239940						239940	239940
						0		0		239940	239940
66	PAINTING/PROTECTIVE COATINGS										
	PAINTING	1	LOT			0				7810	7810
						0				7810	7810

CF Industries, Inc.

ESTIMATING GUIDE

DETAIL ESTIMATE — SUMMARY

PROJECT

LOCATION: 4 DAP

AREA (UNIT): PROD. COOLER - ENV. COMPONENT

DATE: 5/18/89

ESTIMATOR: FG

PAGE 1 OF 7

REVISION NO.: DATE: BY:

ITEM NO.	DESCRIPTION	MATERIALS	LABOR MH	EQUIPMENT	SUBCONTRACTS	TOTAL
03	FAN	89130	200			
09	SEAL TANK	3000	30			
10	SCRUBBER	106670	150			
23	CYCLONE	159800	500			
51	DEMOLITION					
	SCRUBBER SLAB	200	200			
	FAN SLAB	100	100			
	MISC (PRO-RATA TO DAP)	100	100			
56	CONCRETE					
	SCRUBBER FTG	1300	90			
	FAN FDN.	2800	200			
	GROUT (PRO-RATA)	500	50			
	EXC. + BACKFILL (ALLOW)		100			
58	STRUCTURAL STL					
	SCRUBBER STRUCTURE	9800	199			
	DUCT SUPPORTS	8000	156			
	GRATING, H/R, TREADS	6085	131			
61	DUCT WORK					
	CARBON STL 3/16" THK	68004	1133			
	TRI-FLEX LINING	20256	—			
	DAMPERS (2)	2900	80			
62	PIPING					
	RLCS	3500	55			
	FRP	3600	128			
	MISC (ALLOWANCE)	2000	100			

CF Industries, Inc.

ESTIMATING GUIDE

DETAIL ESTIMATE — SUMMARY

PROJECT | LOCATION: -1 DAP

AREA (UNIT): PRODUCT COOLER - ENVIRONMENTAL

DATE: 5/18/89 | ESTIMATOR: FG | PAGE 2 OF 2

REVISION: NO. | DATE | BY

ITEM NO.	DESCRIPTION	MATERIALS	LABOR	EQUIPMENT	SUBCONTRACTS	TOTAL
64	INSTRUMENTATION (ALLOWANCE)				10000	
65	ELECTRICAL (")				40000	
66	COATINGS (")				5000	
	SUBTOTAL	$485545	4512 MH		$55000	
	COMPLEXITY FACTOR (20%)		902 MH			
	TOTAL DIRECTS (LABOR @ $18/MH)	$485545	$81210		$55000	$621755
	FIELD INDIRECTS (16%)					99481
	TOTAL DIRECTS/INDIRECTS					$721236
	PRO-SERVICES					86548
	SUBTOTAL					$807784
	CONTINGENCY @ 25%					201946
	GRAND TOTAL					$1009730

SECTION V
SUPPLEMENTAL REQUIREMENTS

1. Derivation of Input and Product Rates

Known:

Phosphoric Acid	=	39.8% P2O5
Ammonia	=	99.5% NH3 = 81.9% N
DAP Product	=	18% N
		46.2% P2O5
Recovery	=	95%

75 T/Hr DAP Product = 150,000 lbs

P_2O_5 $\frac{150{,}000 \text{ lbs}}{.95}$ = 158,000 lbs DAP x 46.2% P_2O_5 = 73,000 lbs P_2O_5 input

$$\frac{73{,}000 \text{ lbs } P_2O_5}{.398 \text{ Phos Acid Concentration}} = 183{,}400 \text{ lbs 39.8\% Phos Acid Input}$$

NH3 Required at 95% Recovery

158,000 lbs DAP x 18.0% N = 28,440 lbs N

28,440 lbs N x 17/14 = 34,534 lbs NH3

$\frac{34{,}534}{.995}$ = 34,707 lbs of 99.5% NH3 input

2. Basis of Emission Estimate

All emission estimates are based on past compliance tests on both DAP and GTSP. There will not be an increase in emissions as measured by the Student T Test contained in 40 CFR 60, Appendix C.

Compliance tests shall be performed using EPA or DER procedures, such as:

Particulates	EPA Method 5
Fluorides	EPA 13A or 13B or DER 13
Visible Emissions	EPA Method 9

Other tests shall be by EPA Methods 1, 2, 4, 5, 9, 13B and 17

3. Potential Discharge

Potential emissions are based on present stack emissions and efficiencies as stated in the original Construction Application, dated May 30, 1974. Page 5C, Section III states "The overall efficiency will exceed 99.8%". Therefore, potential emissions are calculated as follows:

Actual emissions are taken from annual emissions reports.

$$\text{Potential Emissions} = \frac{\frac{\text{Actual (T/Yr)}}{\text{Hours operated}} \times 8{,}760 \text{ hrs/yr} \times \text{operating factor}}{(1 - \text{scrubber efficiency})}$$

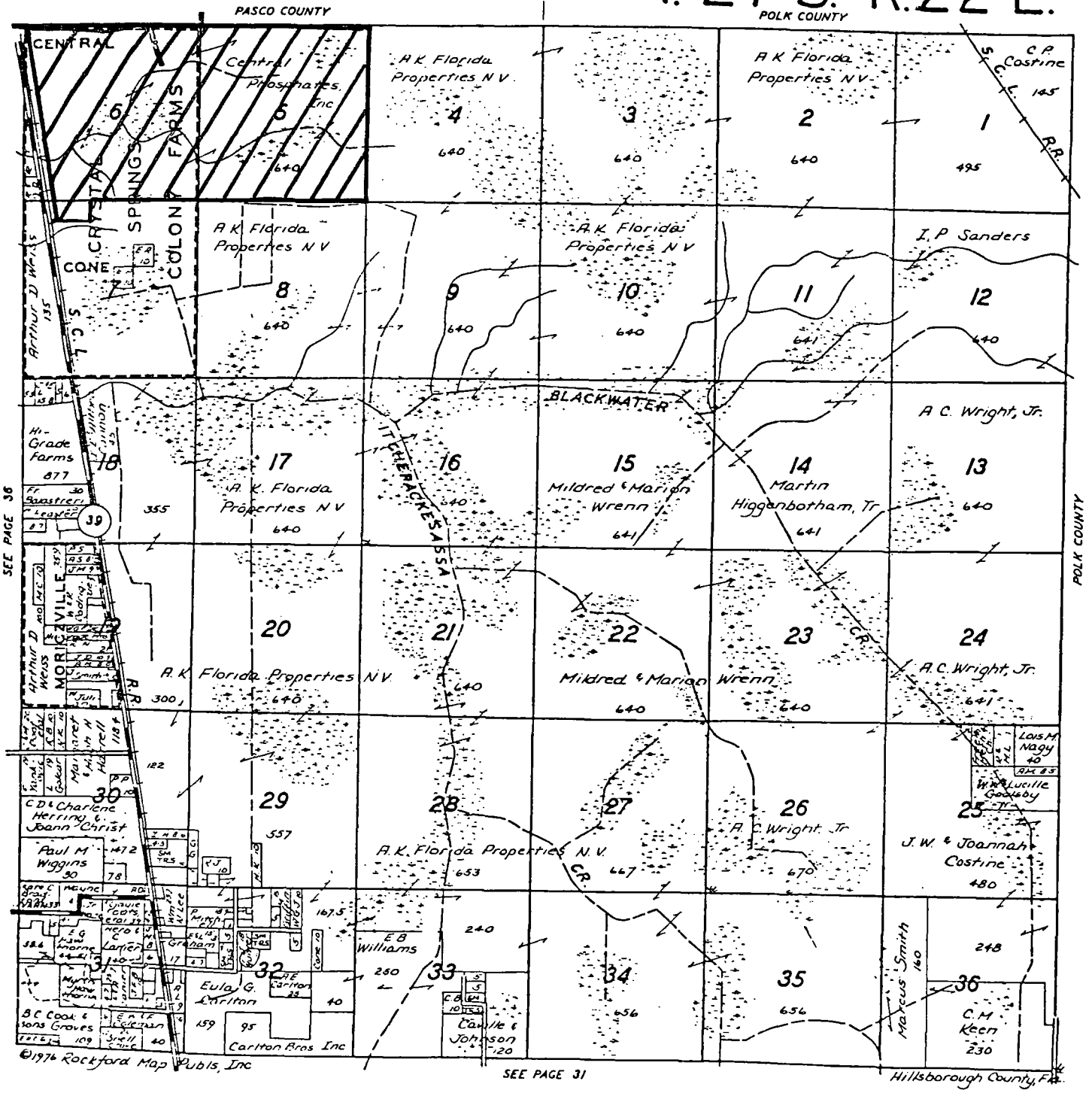
SECTION V
SUPPLEMENTAL REQUIREMENTS

4. Derivation of Control Device Efficiency

As stated in (3) above, the overall efficiency by design exceeds 99.8%. Further substantiation is found on Page 1 of the Design Specification titled "Granular Triplesuperphosphate Plants Specification", which shows a maximum of 70 lbs/day F from all three production plants and storage and shipping.

For Fluorides:

$$\text{Efficiency} = \frac{\text{F in} - \text{F out}}{\text{F in}} \times 100$$



CENTRAL PHOSPHATES, INC.
SITE LOCATION MAP

Y-TRAIN - GRANULAR TSP AND GRANULAR DAP PLANT

EQUIPMENT LIST

PRIMARY AIR POLLUTION SOURCES

ITEM NO.	NAME	MOTORS HP	DESCRIPTION
A. DRYING SYSTEM			
1D-161 Y	Dryer	200**	C: Triple Superphosphate: Feed = 461 TPH Discharge = 450 TPH; Evap. = 11 TPH (Max) S: Rotary, co-current dryer diameter = 12', L = 80 M: Steel V: Standard Steel
B. PRODUCT COOLING SYSTEM			
1D-261 Y	Product Cooler*** (To be Added)	100	C: Diammonium Phosphate: To cool 85 TPH from 185°F to 120°F or Triple Superphosphate: Cooler not used S: Rotary, countercurrent cooler, diameter = 10', L = 55' M: Steel V: Standard Steel
C. REACTOR SYSTEM			
1A-561 Y	Granulator	300	S: 12' dia. x 24'L M: Steel, flexible rubber lining, reversible drive. Type 316/316L SS slurry distributor (2 per granulator) Type 316/316L SS ammonia distributor Shell extended by 2' long grizzly V: Standard Steel
1C-172 Y	Aging Conveyor	20	C: 11,800 CFPH, 450 TPH of GTSP S: 72" wide x 102'-6" c-c Inclined @ 14°, 35° troughed with rubber-disc carrying idlers, totally enclosed. Varispeed drive belt speed = 50-150 FPM M: Steel, rubber belt V: Continental

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* Two (2) 75 HP motors per pulverizer

** Two (2) 200 HP motors per dryer

*** Inlet ambient air to be cooled to 45°F by means of an ammonia air chiller

KEY

C = Capacity
S = Size or Service
M = Materials of Construction
V = Vendor
TDH = Total Dynamic Head

Y-TRAIN - GRANULAR TSP
AND GRANULAR DAP PLANT

EQUIPMENT LIST

PRIMARY AIR POLLUTION SOURCES

ITEM NO.	NAME	MOTORS HP	DESCRIPTION
C. REACTOR SYSTEM (Continued)			
1S-262 Y	TSP Reactor	-	C: 4,700 gallons S: 10' dia. x 10'H M: Pyroflex and acid-brick lined steel, with Type 316L SS cover V: -
1S-361 Y	Preneutralizer	-	C: 14,000 gallons (normal) 22,000 gallons (maximum) S: 14' dia. x 24'H M: Pyroflex and acid-brick lined steel, with Type 316L SS cover V: -
D. DUST SYSTEM			
1C-562 Y	Primary Elevator	150	C: 11,800 CFPH, 450 TPH (TSP) S: Supercapacity, continuous, double chain, bucket elevator. Casing = 68" x 60", Lift = 126' M: Steel V: Jeffrey
1J-361 YAB	Oversize Pulverizers	75*	C: 65 TPH of -1" TSP S: 42" wide, double rotor chain mill M: Steel, hardened chains; Special rubber lining for casing V: Longhorn
1M-161 YAB	Process Scalping Screens	-	C: Feed = 225 TPH of GTSP/screen, separation at 6 mesh S: 4' wise x 20' long, single surface Electromagnetically-vibrated "Hum-mer" Type M: Steel V: Tyler

Y-TRAIN - GRANULAR TSP
AND GRANULAR DAP PLANT

EQUIPMENT LIST

PRIMARY AIR POLLUTION SOURCES

ITEM NO.	NAME	MOTORS HP	DESCRIPTION	
D. DUST SYSTEM (continued)				
1M-162 YAB	Process Product Screens	-	C:	Feed = 100 TPH of GTSP/screen, separation @ 12 mesh
			S:	4'W x 20'L, Single surface Electromagnetically-vibrated "Hum-mer" type
			M:	Steel
			V:	Tyler
1S-462 YAB	Scalping Screen Hoppers	-	C:	
			S:	4'W x 16'L x 14'H
			M:	Steel
			V:	
1S-463 YAB	Product Screen Hoppers	-	C:	
			S:	4'W x 16'L x 14'H
			M:	Steel
			V:	

DESIGN DATA FOR TSP PRODUCTION

Y TRAIN

1. SCRUBBER ARRANGEMENT

A. Dryer Fume Scrubbers (1G-661 Y)
The scrubbing system consists of a first stage venturi-cyclonic scrubber and a second stage cyclonic scrubber.

B. Reactor Fume Scrubber (1G-662 Y)
The scrubbing system consists of a first stage venturi-cyclonic scrubber and a second stage cyclonic scrubber.

C. Dust Scrubbers (1G-663 Y)
The scrubbing system consists of a venturi-cyclonic scrubber without second stage.

D. Cooler Scrubber (1G-666 Y)
The scrubbing system shall consist of a cyclonic scrubber.

E. Fluorine Abatement Scrubber (Granulation Plant) (1G-664 Y)
The exit gases from A, B, C and D above are treated in an abatement scrubber (spray tower) before being vented to the stack. The abatement scrubber design allows for future installation of a cooler scrubber.

2. DESIGN DATA

Triple Superphosphate Production

	DRYER	REACTOR FUME	DUST	COOLER*
ACFM	53,000	45,000	25,000	50,000
Pressure. PSIA***	14.4	14.5	14.4	14.4
Temperature, °F	200	116	120	146
Dust Loading Grains/ACF	2	1	2	1/2
Humidity lb H2O/lb. D.A.	0.19	0.072	0.017	0.017
Fluoride as F: Mg/ACF	140	30 (Normal) 100 (Maximum)	2	1-5
SO2: mg/ACF	20**	-	-	-

---

* Initially installed on Z Train only
** Maximum firing with No. 6 fuel oil containing 2.5% sulfur
*** Pressure referenced to Normal Barometer of 29.92" Hg.

DESIGN DATA FOR TSP PRODUCTION

Y TRAIN

3. SCRUBBING LIQUOR

A. TSP Production

Scrubbing solution for the Dryer, Reactor, Dust and Cooler scrubbing systems is pond water on a once-through basis.

Scrubbing solution for the Fluorine Abatement Scrubber (1G-664 Y) is a recirculated, dilute, solution maintained at a suitable concentration of solids and pH by the addition of fresh water.

Operating Parameters

	STAGE I VENTURI	STAGE I CYCLONIC	STAGE II CYCLONIC
Dryer (1G-661 Y)			
Scrubber Size	455	555	555
Liquid Rate, GPM	425(425)	525 (250)	320
Liquid Source	P (A)	P (A)	P
Liquid Pressure, PSIG	3 (4)	100 (50)	100
Pressure Drop, " WG	15.0	4.5	3.5
Reactor Fume (1G-662 Y)			
Scrubber Size	455	550	550
Liquid Rate, GPM	360(360)	450 (225)	270
Liquid Source	P (A)	P (A)	P
Liquid Pressure, PSIG	3 (4)	100 (50)	100
Pressure Drop, " WG	15	4.5	3.5
Dust Fume (1G-663 Y)			
Scrubber Size	425	535	--
Liquid Rate, GPM	200(240)	250 (150)	--
Liquid Source	P (A)	P (A)	--
Liquid Pressure, PSIG	3 (4)	100 (50)	--
Pressure Drop, " WG	15	4.5	--
Cooler (1G-666 Y)			
Size	--	550	--
Liquid Rate, GPM	--	500	--
Liquid Source	--	P	--
Liquid Pressure, PSIG	--	100	--
Pressure Drop, " WG	--	4.5	--

Dryer, Reactor, Dust and Cooler Systems all discharge to Fluorine Abatement Scrubber

Fluorine Abatement (1G-664 Y)	
Size	15-35
Liquid Rate, GPM	2,800
Liquid Source	C
Liquid Pressure, PSIG	20
Pressure Drop, " WG	2.0

DESIGN DATA FOR TSP PRODUCTION

Y TRAIN

3. SCRUBBING LIQUOR (Continued)

Notes:

P denotes pond water 8,000 PPM Maximum F.
A denotes ammonium phosphate solution when on DAP
C denotes recycled solution with makeup water

The figures in parenthesis pertain when ammonium phosphate solution scrubbing on DAP operation.

On TSP, pond water will be the scrubbing medium for all of the above units with the exception of the final Fluorine Abatement Scrubber. The product cooler and its scrubbing system is not used.

Y-TRAIN - GRANULAR TSP AND GRANULAR DAP PLANT

EQUIPMENT LIST

AIR POLLUTION CONTROL

ITEM NO.	NAME	MOTORS HP	DESCRIPTION
FANS			
1B-261 Y	Dryer Fan	500	C: Centrifugal Fan 55,100 ACFM @ 133°F SP = 36" WG; Radial Blades M: Type 316L SS wheel, casing and shaft V: Zurn-Clarage
1B-262 Y	Fume Fan	400	C: Centrifugal Fan 50,000 ACFM @ 112-158°F SP = 32" WG; Radial Blades M: Type 316L SS wheel, casing and shaft V: Zurn-Clarage
1B-263 Y	Dust Fan	250	C: Centrifugal Fan 32,000 ACFM @ 140°F SP = 32.5" WG; Radial Blades M: Type 316L SS wheel, casing and shaft V: Zurn-Clarage
1B-269 Y	Cooler Fan (To Be Added)	250	C: Centrifugal Fan 49,500 ACFM @ 96°F SP = 18" WG; Radial Blades M: Type 316L SS wheel, casing and shaft V: Zurn-Clarage
GAS SEPARATING EQUIPMENT			
1G-161 Y	Dryer Cyclones		C: 53,000 ACFM @ 220°F (185°F for DAP), Dust Loading = 20 gr/CF, Pressure Drop = 4.3" WG maximum S: High efficiency type*, 4 cone multiple cyclone with common hopper and cleaning chains M: Steel V: Ducon

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* 73% Minimum Efficiency (+5 Micron Particles)

KEY

C = Capacity
S = Size or Service
M = Materials of Construction
V = Vendor
TDH = Total Dynamic Head

Y-TRAIN - GRANULAR TSP
AND GRANULAR DAP PLANT

EQUIPMENT LIST

AIR POLLUTION CONTROL

ITEM NO.	NAME	DESCRIPTION
GAS SEPARATING EQUIPMENT (Continued)		
1G-162 Y	Dust Cyclones	C: 25,000 ACFM @ 120°F Dust Loading = 15 gr/CF Pressure Drop = 4.3" WG S: High efficiency type*, 4 cone multiple cyclone with common hopper and cleaning chains M: Steel V: Ducon
1G-163 Y	Cooler Cyclone (To Be Added)	C: 50,000 ACFM @ 146°F Dust Loading = 5 gr/CF Pressure Drop = 4.3" WG S: High efficiency type*, 4 cone multiple cyclone with common hopper and cleaning chains M: Steel V: Ducon
1G-661 Y	Dryer Fume Scrubbers	C: 53,000 ACFM @ 185-200°F, Delta P = 23" WG S: 10'2" dia. x 38' - 4½" H overall Venturi - 1st stage cyclonic 10'-2" dia. x 36'-10½"H overall 2nd stage cyclonic M: R/L Steel V: Ducon
1G-662 Y	Reactor Fume Scrubbers	C: 45,000 ACFM @ 116-182°F; Delta P = 23" WG S: 9'9" dia. x 36'-10½" H Overall Venturi 1st stage cyclonic 9'9" dia. x 35'-4½" overall 2nd stage cyclonic M: R/L Steel V: Ducon
1G-663 Y	Dust Scrubbers	C: 25,000 ACFM @ 120°F; Delta P = 19.5" WG S: 8'8" dia. x 34'-3" H overall Venturi - single stage cyclonic M: R/L Steel V: Ducon
1G-666 Y	Cooler Scrubber (To Be Added)	C: 50,000 ACFM @ 146°F; Delta P = 4½" WG S: 9'9" dia. x 35'-4½" H overall Single-stage cyclonic M: R/L Steel V: Ducon

Y-TRAIN - GRANULAR TSP
AND GRANULAR DAP PLANT

EQUIPMENT LIST

AIR POLLUTION CONTROL

ITEM NO.	NAME		DESCRIPTION
GAS SEPARATING EQUIPMENT (Continued)			
1G-664 Y	Fluorine Abatement Scrubber	C:	173,000 ACFM @ 130°F; Delta P = 2" WG
		S:	Rectangular Spray Chamber with packed entrainment section L = 33'-6"; W = 17' H = 27'-7" overall
		M:	R/L Steel
		V:	Ducon
1S-261 Y	Exhaust Stack (Granulation Plant)	C:	174,000 ACFM maximum
		S:	110" dia. x 180' H
		M:	R/L Steel
		V:	
1S-562 Y	Scrubber Effluent Tank	C:	9,000 gallons
		S:	13' diameter, 10' H
		M:	R/L Steel with Type 316L SS radial baffles
		V:	

	NAME	MOTORS HP	DESCRIPTION	
PUMPS				
1P-164 Y	Low Pressure Scrubber Liquor Pump (Not Original)	75	C:	1,050 GPM @ 1.35-1.50 SG, TDH = 94'
			S:	8" x 6" with 15" diameter impeller
			M:	
			V:	Durco
1P-168 Y	Granulation Plant Fluorine Abatement Circulating Pump	100	C:	2,800 GPM, SG = 1.01; TDH = 90'
			S:	Vertical submerged - 10" VS
			M:	Type 316/316L SS
			V:	Hazleton
1P-173 Y	High Pressure Scrubber Liquor Pump (Not Original)	250	C:	1,850 GPM @ SG = 1.35-1.50; TDH = 210'
			S:	8" x 6" with 15" diameter impeller
			M:	
			V:	Durco

ZURN AIR SYSTEMS

FAN PERFORMANCE CURVE

DATE 6/21/74

REF:

FAN SIZE 7200
SERIES 3500 RB

ARRG'T 3D2
D.I.(81.16%)D.W.

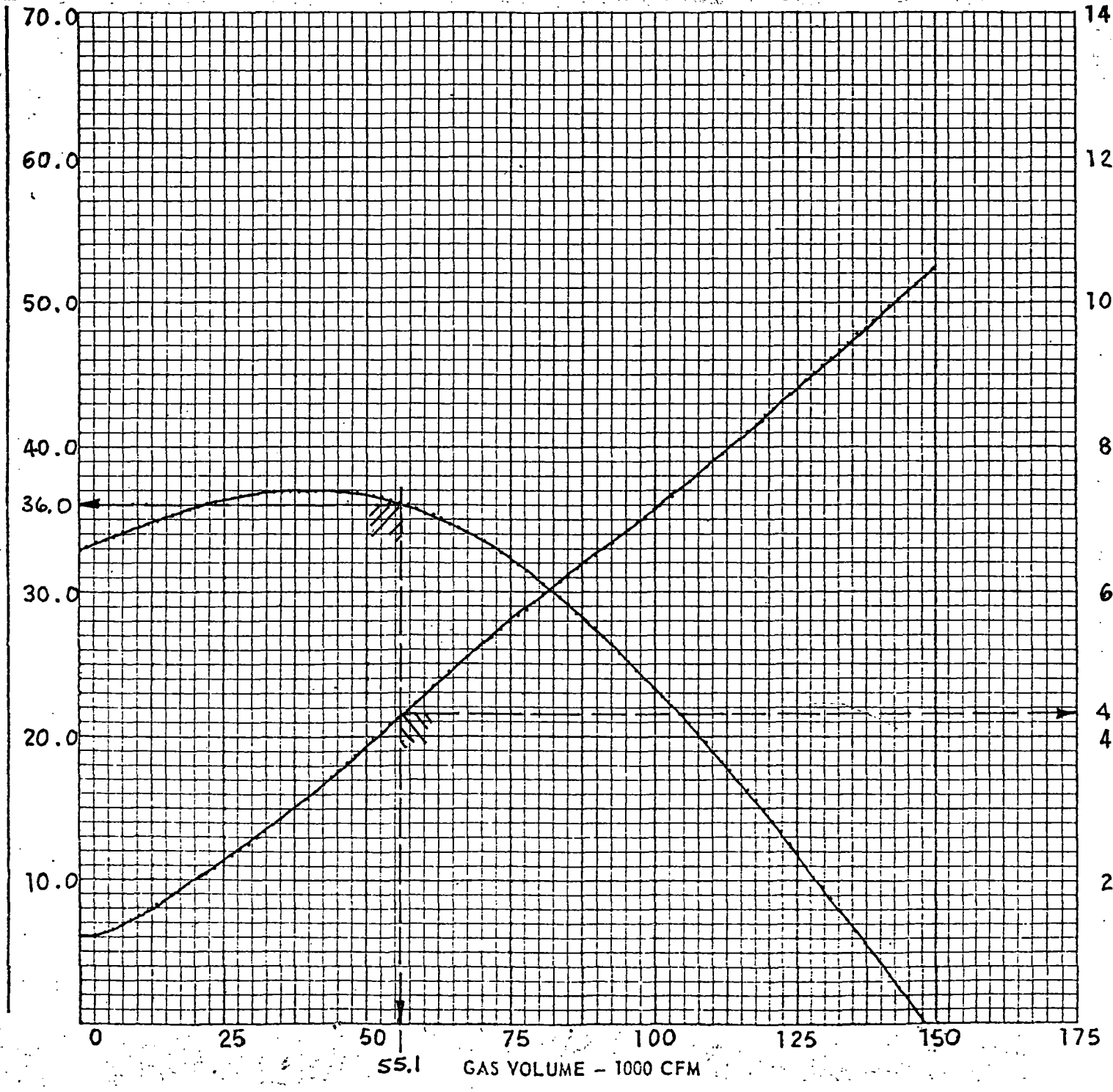
standardoutlet

Dryer Fan 1B-261 Y
Dorr-Oliver J-3047-117
Zurn #FE 689

JUL 25 1974

BASE DENSITY (#/ft³)
BAROMETRIC PRESS. (Ins. Hg.)

	TEST BLOCK	CONDITION 1	CONDITION 2
FAN SPEED (R.P.M.)	1180		
TEMPERATURE (°F)			
INLET PRESS. (Ins. Water)			
INLET DENSITY (#/ft³)	.05900		



ZURN

AIR SYSTEMS

COMBINING THE RESOURCES OF CLARAGE AND ZURN

FAN PERFORMANCE CURVE

PAGE 3 OF 10 BY
DATE 6/21/74
REF:

FAN SIZE 7200
SERIES 3530 RB

ARRG'T 3D2
D.I.(69.74%)D.W.

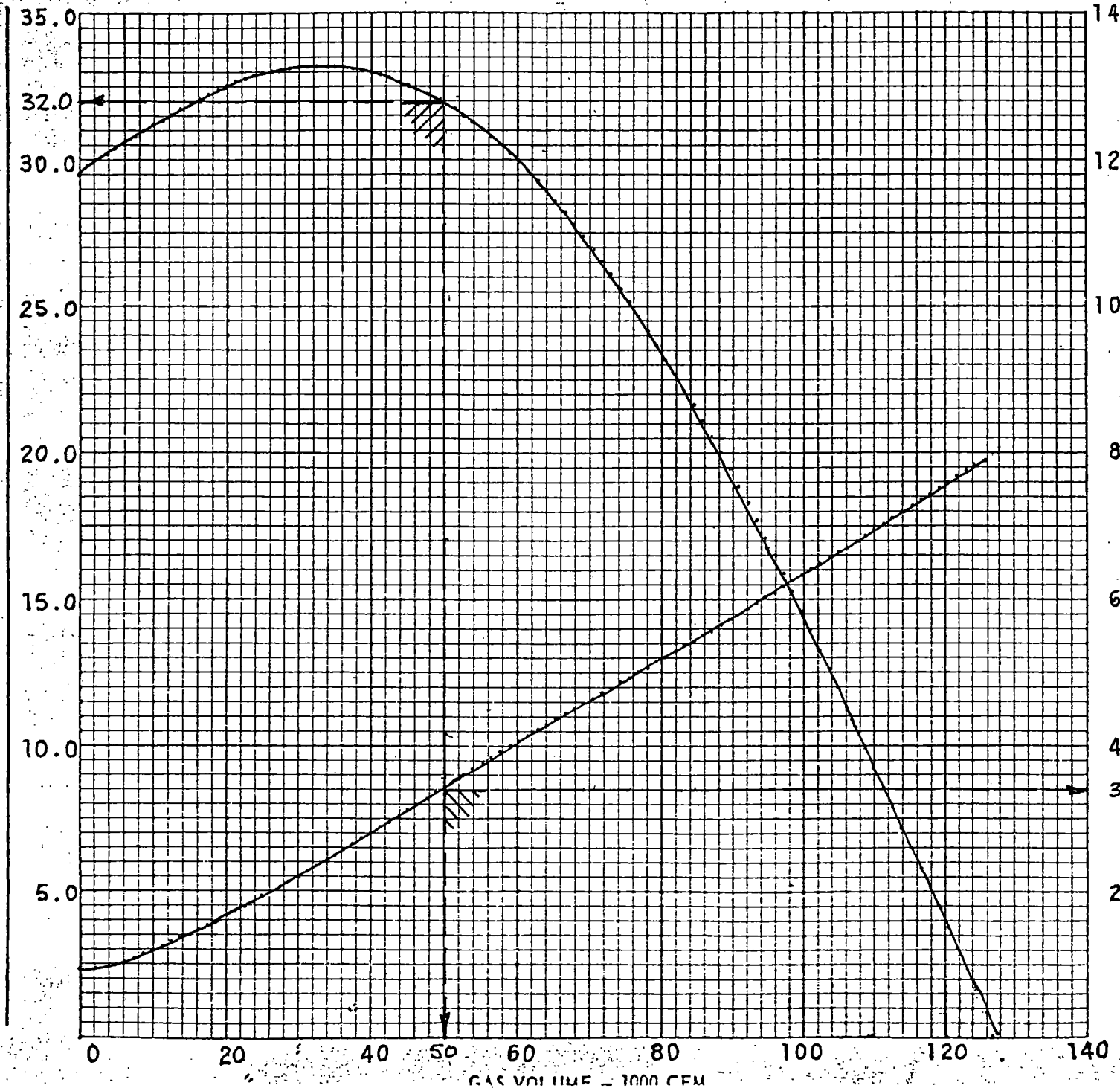
standard outlet

Fume Fan 1B-262 Y
Dorr-Oliver J-3047-117
Zurn #FE 689

JUL 25 1974

BASE DENSITY (#/ft³)
BAROMETRIC PRESS. (Ins. Hg.)

	TEST BLOCK	CONDITION 1	CONDITION 2
FAN SPEED (R.P.M.)	1130		
TEMPERATURE (°F)			
INLET PRESS. (Ins. Water)			
INLET DENSITY (#/ft³)	.05300		



ZURN

AIR SYSTEMS

COMBINING THE RESOURCES OF CLARAGE AND ACE AERATORS

FAN PERFORMANCE CURVE

DATE 6/21/74

REF:

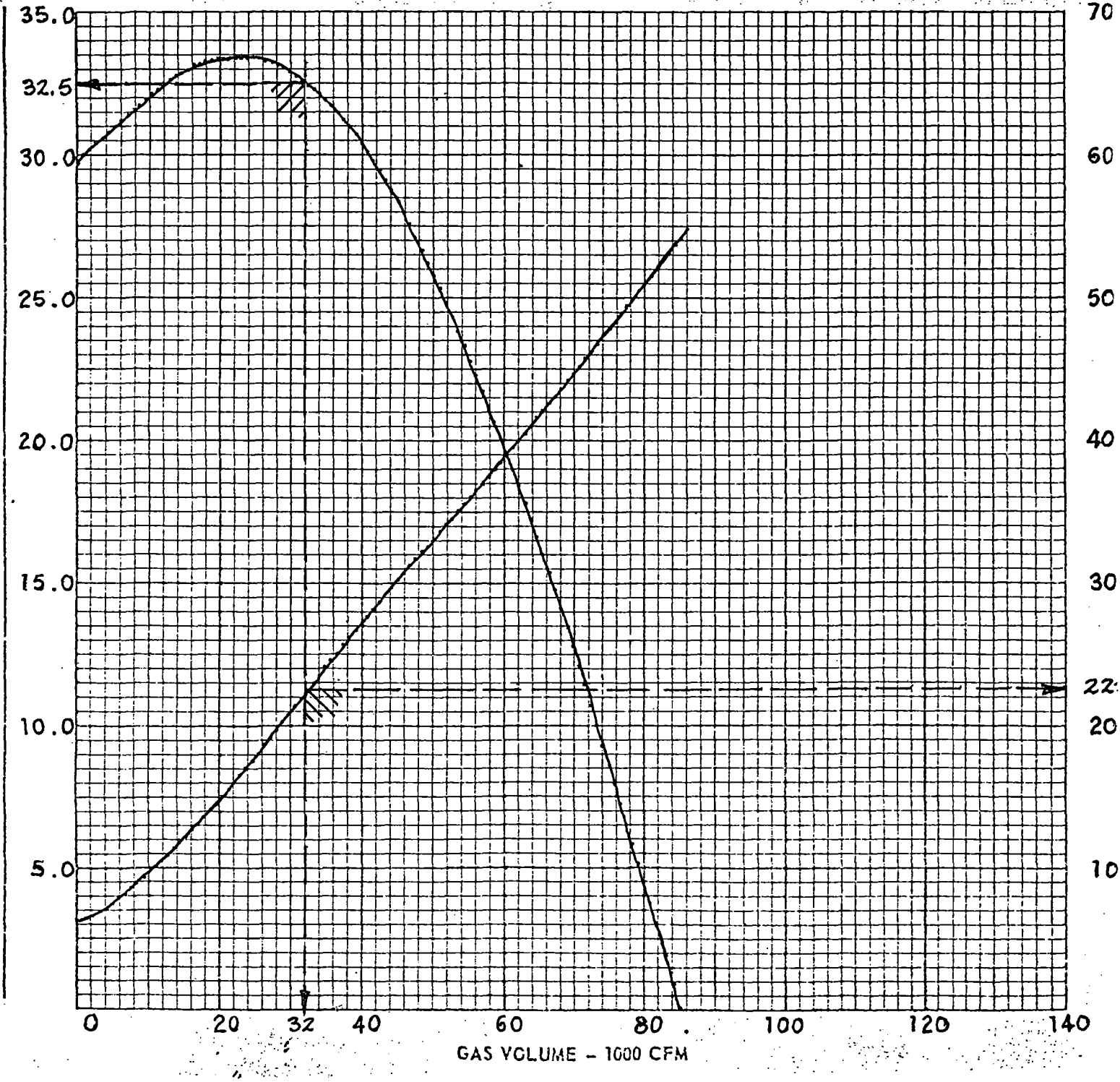
FAN SIZE 6900 ARRG'T 3D2 standardoutlet
SERIES 3530 RB D.I.(53.53%)D.M.

Dust Fan 1B-263 Y
Dorr-Oliver J-3047-117
Zurn #FE 689

JUL 25 1974

BASE DENSITY (#/ft³)
BAROMETRIC PRESS. (Ins. Hg.)

	TEST BLOCK	CONDITION 1	CONDITION 2
FAN SPEED (R.P.M.)	1180		
TEMPERATURE (°F)			
INLET PRESS. (Ins. Water)			
INLET DENSITY (#/ft³)	.05800		



AIR SYSTEMS

COMBINING THE RESOURCES OF CLARAGE AIR AIR SYSTEMS

FAN PERFORMANCE CURVE

DATE 8/24/74

REF

FAN SIZE 5700 ARRG'T 302 standard outlet
SERIES 3530 RB D.I.(84.52%)B.M.

Cooler Fan 1B-269 Y
Dorr-Oliver J-30470117
Zurn #FE 689

JUL 25 1974

BASE DENSITY (#/ft³)
BAROMETRIC PRESS. (Ins. Hg.)

	TEST BLOCK	CONDITION 1	CONDITION 2
FAN SPEED (R.P.M.)	7180		
TEMPERATURE (°F)			
INLET PRESS. (Ins. Water)			
INLET DENSITY (#/ft³)	.06700		

STATIC EFF. %
S. P. IN. H20
HORSEPOWER

35.0 30.0 25.0 20.0 18.0 15.0 10.0 5.0

700 600 500 400 300 200 100

90 80 70 60 50 40 30 20 10

0 20 40 49.5 60 80 100 120 140

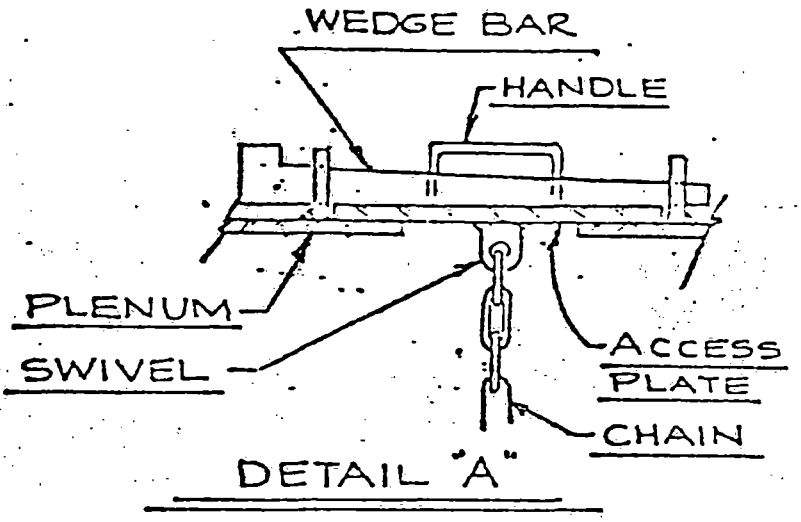
GAS VOLUME – 1000 CFM

TLE

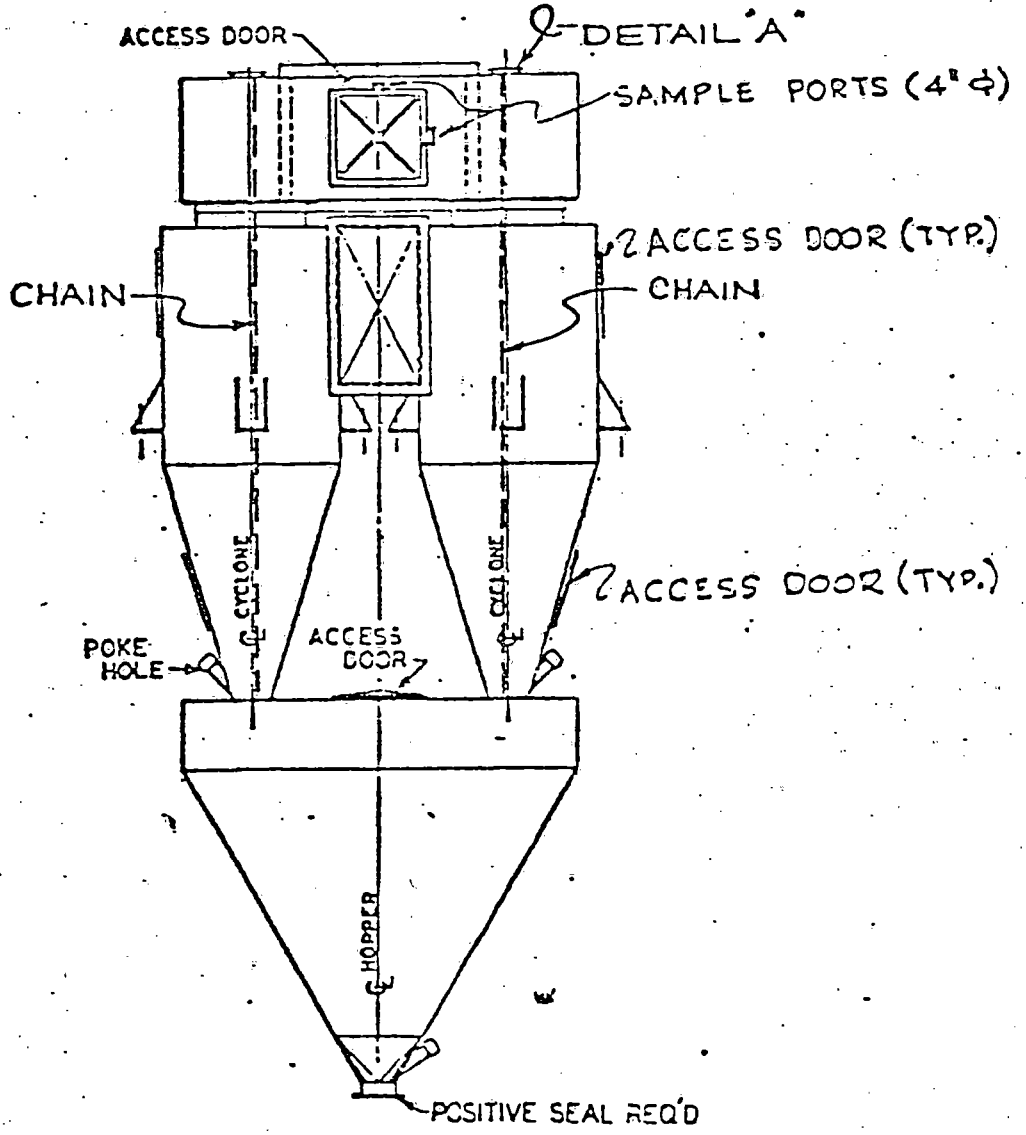
CENTRAL FARMERS INDUSTRIES, INCORPORATED
PLANT CITY, FLORIDA

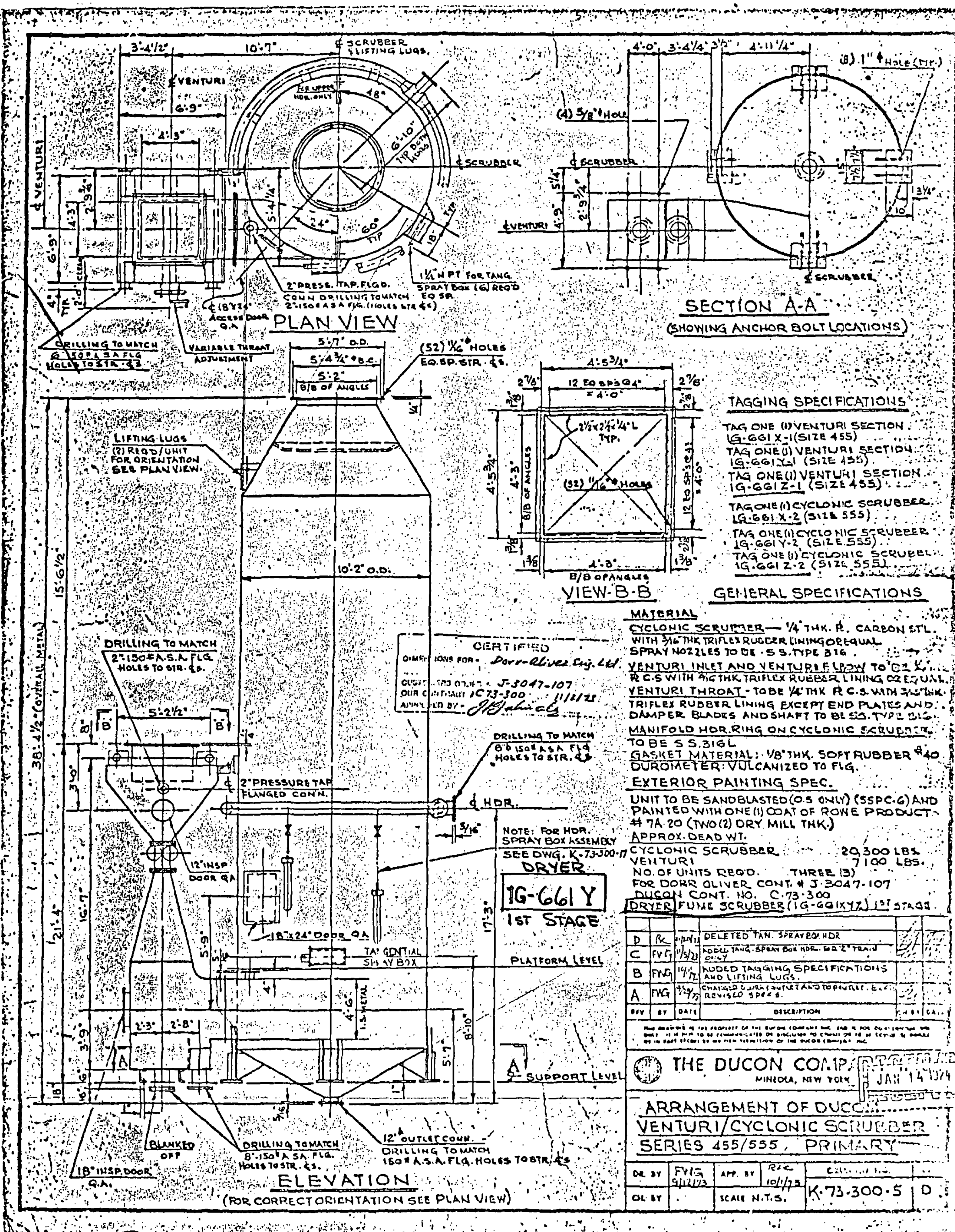
PAGE OF	SPEC. NO.
DRYER CYCLONES	IG-161Y
DUST CYCLONES	IG-162Y
COOLER CYCLONES	IG-163Y

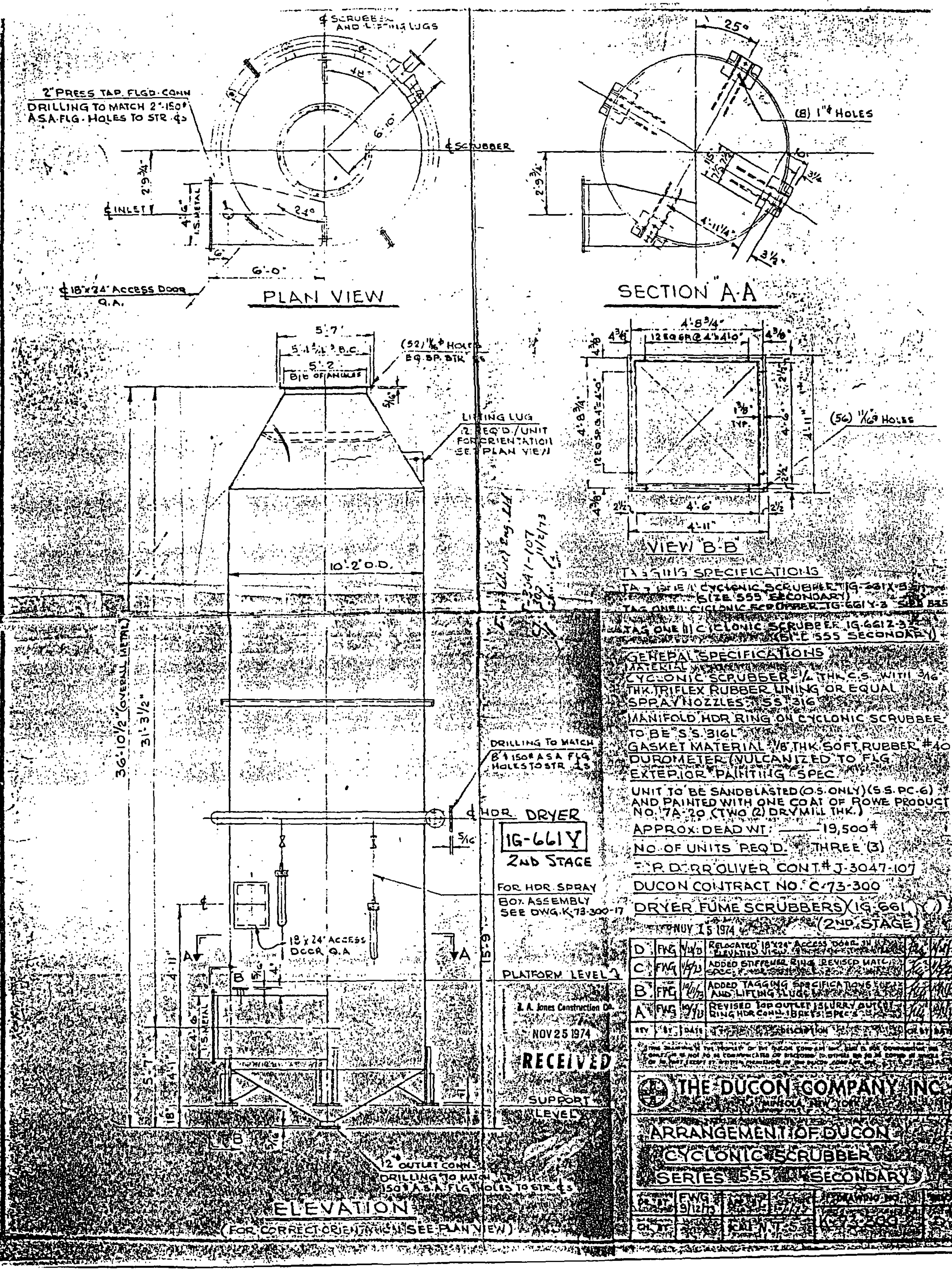
ISSUE



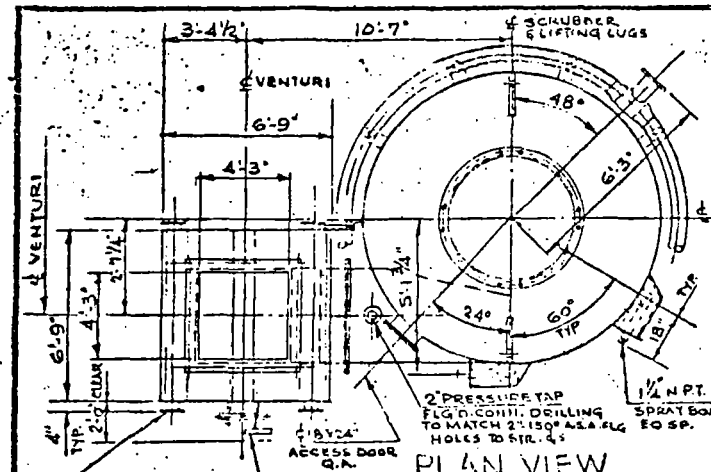
DETAIL "A"



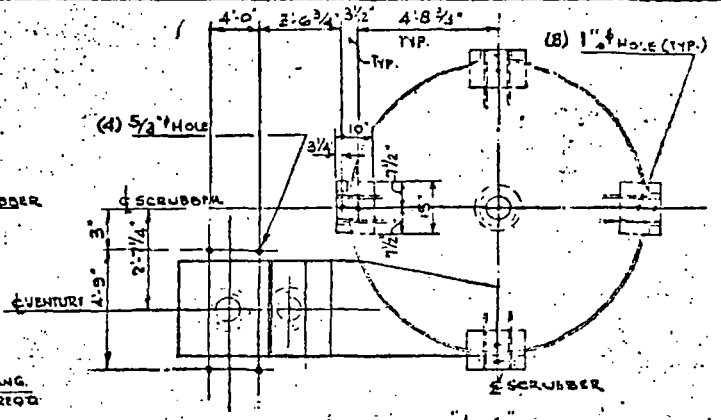

PLAN VIEW
SECTION A-A
(SHOWING ANCHOR BOLT LOCATIONS)
VIEW-B-B
ELEVATION
(FOR CORRECT ORIENTATION SEE PLAN VIEW)
TAGGING SPECIFICATIONS
TAG ONE (1) VENTURI SECTION 1G-661 X-1 (SIZE 455)
TAG ONE (1) VENTURI SECTION 1G-661 Y-1 (SIZE 455)
TAG ONE (1) VENTURI SECTION 1G-661 Z-1 (SIZE 455)
TAG ONE (1) CYCLONIC SCRUBBER 1G-661 X-2 (SIZE 555)
TAG ONE (1) CYCLONIC SCRUBBER 1G-661 Y-2 (SIZE 555)
TAG ONE (1) CYCLONIC SCRUBBER 1G-661 Z-2 (SIZE 555)
GENERAL SPECIFICATIONS
MATERIAL
CYCLONIC SCRUBBER — 1/4" THK. PL. CARBON STL. WITH 3/16" THK TRIFLEX RUBBER LINING OR EQUAL.
SPRAY NOZZLES TO BE S.S. TYPE 316.
VENTURI INLET AND VENTURI ELBOW TO BE 1/4" PL. C.S. WITH 3/16" THK. TRIFLEX RUBBER LINING OR EQUAL.
VENTURI THROAT - TO BE 1/4" THK PL. C.S. WITH 3/16" THK. TRIFLEX RUBBER LINING EXCEPT END PLATES AND DAMPER BLADES AND SHAFT TO BE S.S. TYPE 316.
MANIFOLD HDR. RING ON CYCLONIC SCRUBBER TO BE S.S. 316L
GASKET MATERIAL: 1/8" THK. SOFT RUBBER #40 DUROMETER: VULCANIZED TO FLG.
EXTERIOR PAINTING SPEC.
UNIT TO BE SANDBLASTED (O.S. ONLY) (SSPC-6) AND PAINTED WITH ONE (1) COAT OF ROWE PRODUCT #7A-20 (TWO (2) DRY MILL THK.)
APPROX. DEAD WT.
CYCLONIC SCRUBBER 20,300 LBS.
VENTURI 7100 LBS.
NO. OF UNITS REQ'D. THREE (3)
FOR DORR OLIVER CONT. # J-3047-107
DUCON CONT. NO. C-73-300
DRYER FUME SCRUBBER (1G-661XYZ) 1ST STAGE
CERTIFIED
DIMENSIONS FOR - Dorr-Oliver Eng. Ltd.
CUSTOMER ORDER J-3047-107
OUR CONTRACT C73-300 11/2/73
DRYER
1G-661 Y
1ST STAGE
D — DELETED TAN. SPRAY BOX HDR
C — FVG 11/5/73 ADDED TANG. SPRAY BOX HDR. FOR 2" TRAIN ONLY
B — FVG ADDED TAGGING SPECIFICATIONS AND LIFTING LUGS.
A — FVG REVISED SPECS.
REV BY DATE DESCRIPTION
THE DUCON COMPANY
MINEOLA, NEW YORK
JAN 14 1974
ARRANGEMENT OF DUCON VENTURI/CYCLONIC SCRUBBER
SERIES 455/555, PRIMARY
DR. BY FVG 9/12/73
APP. BY 10/1/73
SCALE N.T.S.
K-73-300-5 D
SUPPORT LEVEL
PLATFORM LEVEL
TANGENTIAL SPRAY BOX
12" OUTLET CONN.
18" INSP. DOOR
12" INSP. DOOR
18"x24" DOOR
2" PRESSURE TAP FLANGED CONN.
LIFTING LUGS (2) REQ'D/UNIT FOR ORIENTATION SEE PLAN VIEW.
NOTE: FOR HDR. SPRAY BOX ASSEMBLY SEE DWG. K-73-300-17
VARIABLE THROAT ADJUSTMENT



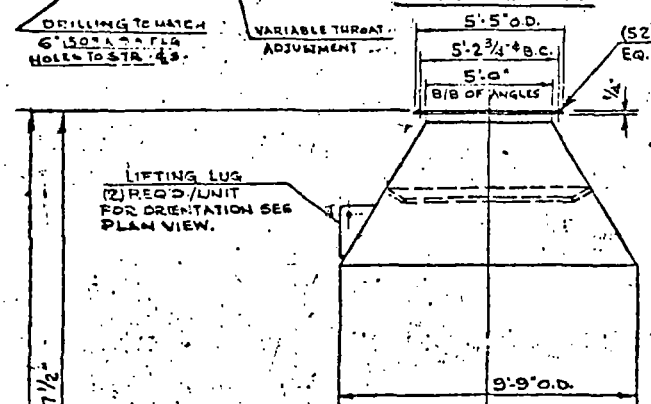
PLAN VIEW
SECTION "A-A"
VIEW "B-B"
ELEVATION
(FOR CORRECT ORIENTATION SEE PLAN VIEW)
2" PRESS TAP. FLGD. CONN
DRILLING TO MATCH 2"-150# A.S.A. FLG. HOLES TO STR. ℄S
℄ SCRUBBER AND LIFTING LUGS
℄ SCRUBBER
℄ INLET
℄ 18"x24" ACCESS DOOR O.A.
(8) 1"ϕ HOLES
(52) 11/16"ϕ HOLES EQ. SP. STK.
LIFTING LUG (2) REQ'D./UNIT FOR ORIENTATION SEE PLAN VIEW
(56) 11/16"ϕ HOLES
10'-2" O.D.
36'-10 1/2" (OVERALL METAL)
31'-3 1/2"
DRILLING TO MATCH 8"-150# A.S.A. FLG. HOLES TO STR. ℄S
℄ HDR.
DRYER
IG-661Y
2ND STAGE
FOR HDR. SPRAY BOX ASSEMBLY SEE DWG. K-73-300-17
18"x24" ACCESS DOOR O.A.
PLATFORM LEVEL
SUPPORT LEVEL
12" OUTLET CONN. DRILLING TO MATCH 12"-150# A.S.A. FLG. HOLES TO STR. ℄S
TAGGING SPECIFICATIONS
GENERAL SPECIFICATIONS
MATERIAL
CYCLONIC SCRUBBER - 1/4" THK. C.S. WITH 3/16" THK. TRIFLEX RUBBER LINING OR EQUAL
SPRAY NOZZLES: S.S. 316
MANIFOLD HDR RING ON CYCLONIC SCRUBBER TO BE S.S. 316L
GASKET MATERIAL 1/8" THK. SOFT RUBBER #40 DUROMETER (VULCANIZED TO FLG.
EXTERIOR PAINTING SPEC.
UNIT TO BE SANDBLASTED (O.S. ONLY) (S.S. PC-6) AND PAINTED WITH ONE COAT OF ROWE PRODUCT NO. 7A-20 (TWO (2) DRY MILL THK.)
APPROX. DEAD WT: 19,500#
NO. OF UNITS REQ'D. THREE (3)
DUCON CONTRACT NO. C-73-300
DRYER FUME SCRUBBERS (IG-661) (2ND STAGE)
NOV 15 1974
H. A. Jones Construction CO.
NOV 25 1974
RECEIVED
THE DUCON COMPANY INC.
MINEOLA, NEW YORK
ARRANGEMENT OF DUCON CYCLONIC SCRUBBER SERIES 555 SECONDARY

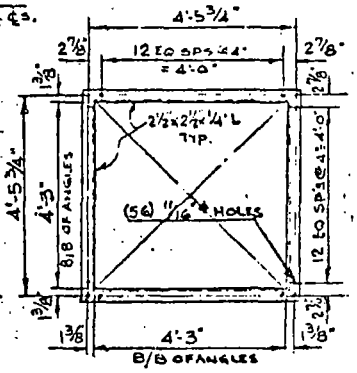


PLAN VIEW



SECTION "A-A"
(SHOWING ANCHOR BOLT LOCATIONS)





VIEW "B-B"

TAGGING SPECIFICATIONS

TAG ONE (1) VENTURI SECTION
1G-662X-1 (SIZE 455X)
TAG ONE (1) VENTURI SECTION
1G-662Y-1 (SIZE 455X)
TAG ONE (1) VENTURI SECTION
1G-662Z-1 (SIZE 455X)

TAG ONE (1) CYCLONIC SCRUBBER
1G-662X-2 (SIZE 550)
TAG ONE (1) CYCLONIC SCRUBBER
1G-662Y-2 (SIZE-550)
TAG ONE CYCLONIC SCRUBBER
1G-662Z-2 (SIZE-550)

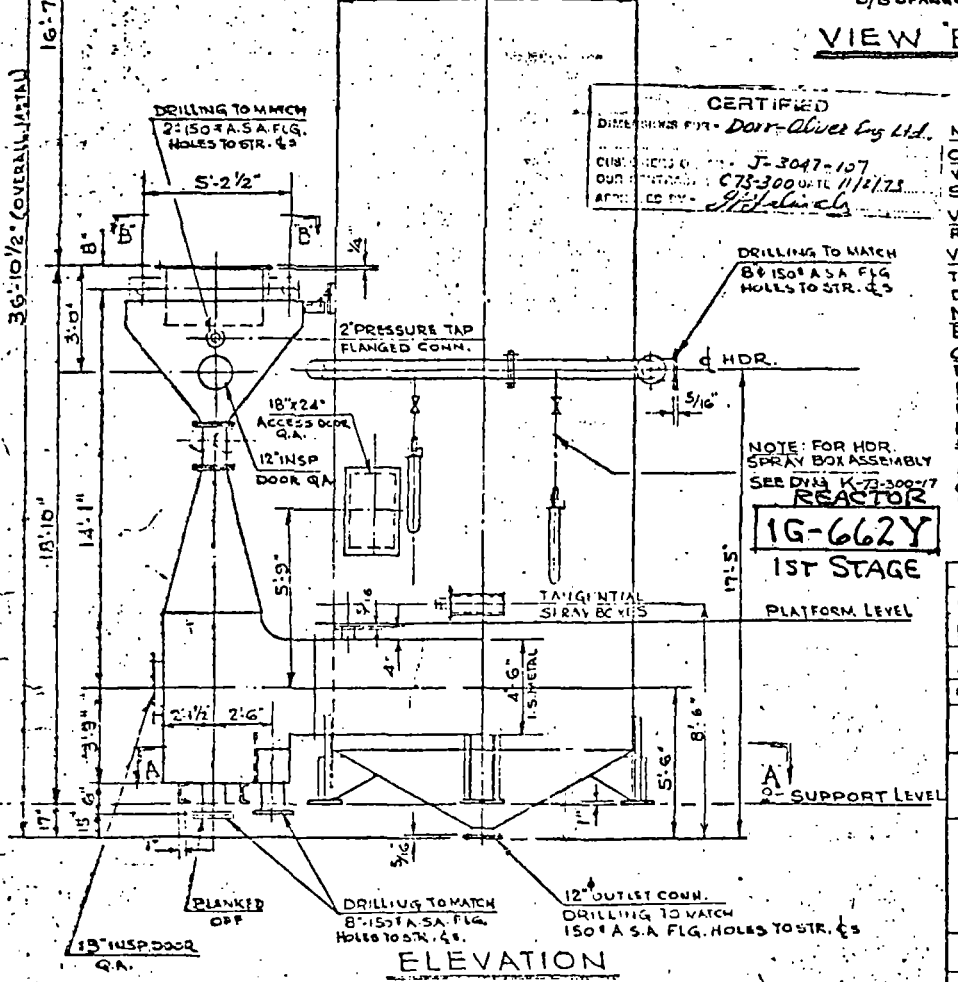
GENERAL SPECIFICATIONS

NO. OF UNITS REQ'D. THREE (3)
REACTOR FINE SCRUBBERS (1G-662 X,Y,Z 1ST STAGE
DORR OLIVER CONT. NO. J-3047-107
DUCON CONT. NO. C-73-300

MATERIAL
CYCLONIC SCRUBBER — ¼" THK. C.S. WITH ⅜" THK. TRIFLEX RUBBER LINING OR EQUAL.
SPRAY NOZZLES TO BE - S.S. TYPE 316
VENTURI INLET AND VENTURI ELBOW TO BE ¼" THK R.C.S WITH ⅜" THK. TRIFLEX RUBBER LINING OR EQUAL.
VENTURI THROAT - TO BE ¼" THK R.C.S. WITH ⅜" THK TRIFLEX RUBBER LINING EXCEPT END PLATES AND DAMPER BLADES AND SHAFT TO BE S.S. TYPE 316
MANIFOLD HDR. RING ON CYCLONIC SCRUBBER TO BE S.S. 316L
GASKET MATERIAL - ⅛" THK. SOFT RUBBER #40 DUROMETER (VULCANIZED TO FLG.)
EXTERIOR PAINTING SPEC.
UNIT TO BE SANDBLASTED (O.S ONLY) (SSPC-6) AND PAINTED WITH (1) ONE COAT OF ROWE PRODUCT #7A-20 (TWO (2) DRY MILL THK.)

APPROX. DEAD WT.
CYCLONIC SCRUBBER 18,650 LBS.
VENTURI 7,100 LBS.

CERTIFIED
DIMENSIONS FOR: Dorr-Oliver Eng Ltd.
CUST. SPECS. NO. J-3047-107
DUCON CONTRACT NO. C-73-300 DATE 11/21/73
APPROVED BY: [signature]



NOTE: FOR HDR. SPRAY BOX ASSEMBLY SEE DWG. K-73-300-7

REACTOR
1G-662Y
1ST STAGE

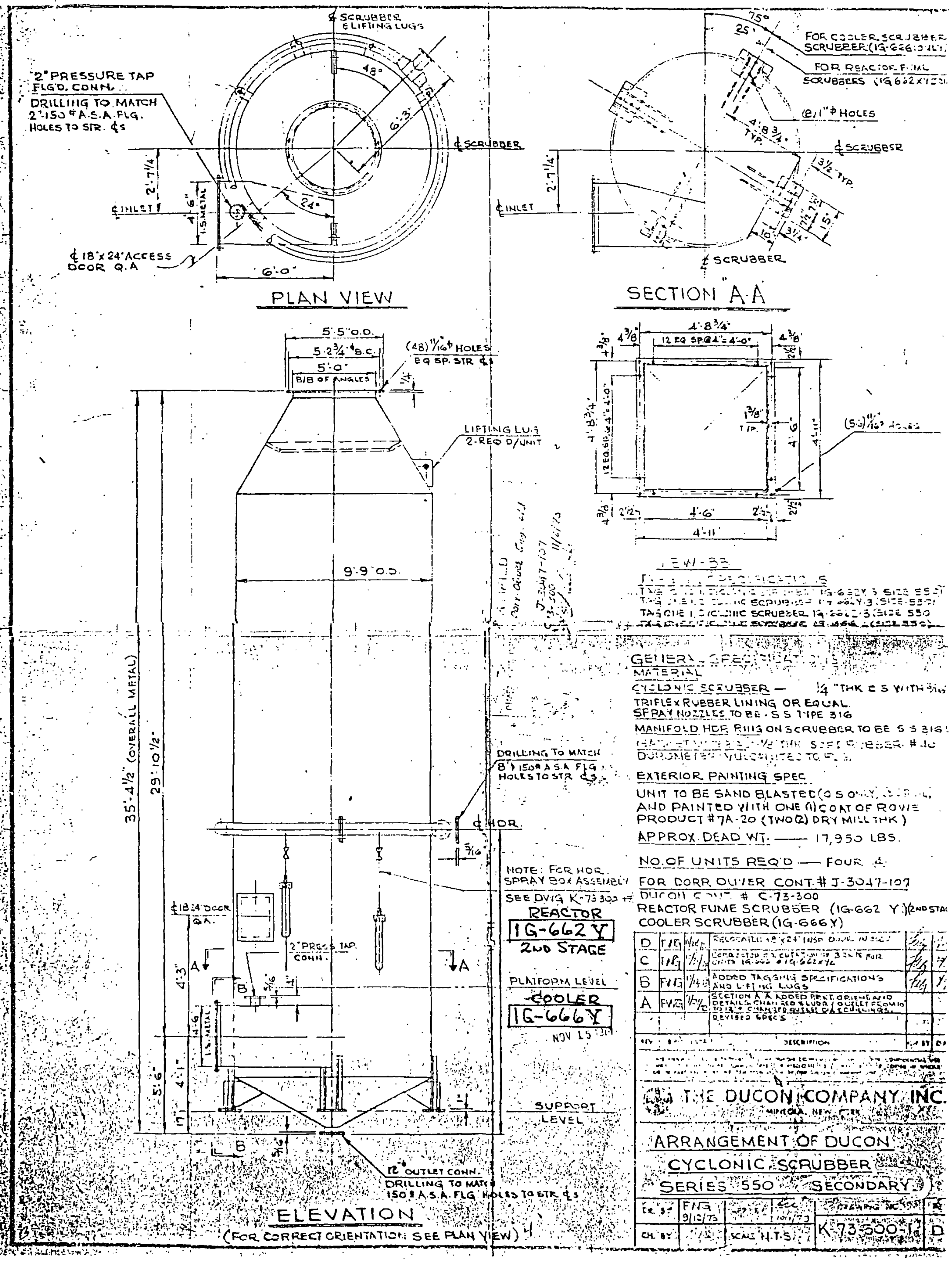
ELEVATION
(FOR CORRECT ORIENTATION SEE PLAN VIEW)

REV	BY	DATE	DESCRIPTION	CHK'D BY	DATE
D	FVG	11/13	DELETED FAN & SPRAY BOX HDR.		
C	FVG	9/13	ADDED ASS'D SLURRY IN HDR		
B	FVG	7/13	ADDED TAGGING SPECIFICATIONS		
A	FVG	5/13	REVISED SLURRY OUTLET, TOP/MAT. BRKTS, SPECS, ETC		

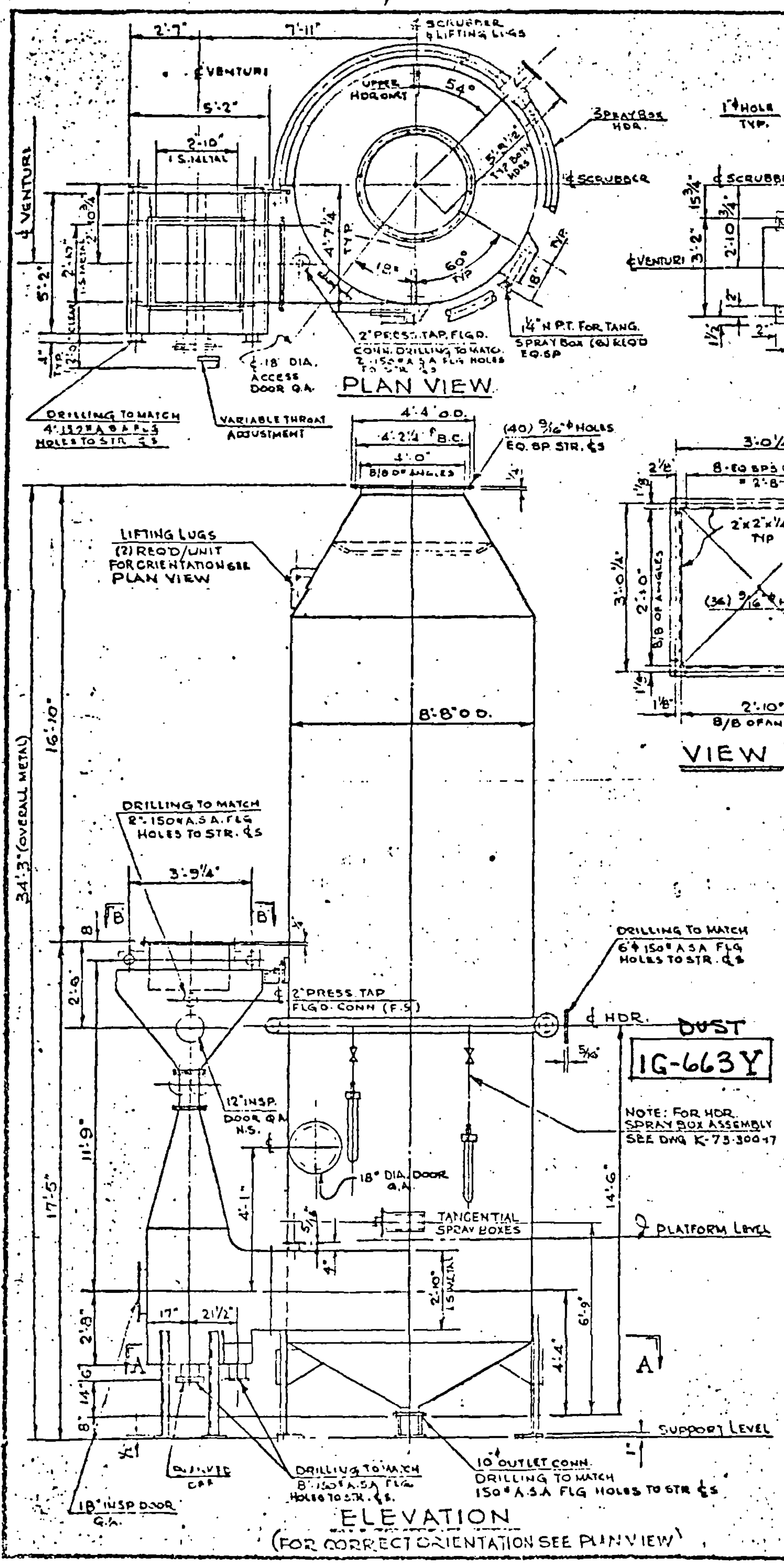
THE DUCON COMPANY INC.
MINEOLA, NEW YORK

ARRANGEMENT OF DUCON VENTURI/CYCLONIC SCRUBBER SERIES 455X/550 PRIMARY

DR. BY	CH. BY	APP. BY	DRAWING NO.	REV.
FVG 9/12/73		11/13/73	K-73-300-4	D
		SCALE N.T.S.		



℄ SCRUBBER & LIFTING LUGS
2" PRESSURE TAP FLG'D. CONN.
DRILLING TO MATCH 2"-150# A.S.A. FLG. HOLES TO STR. ℄s
48°
6'-3"
℄ SCRUBBER
2'-7 1/4"
℄ INLET
4'-6" I.S. METAL
24°
℄ 18"x 24" ACCESS DOOR Q.A.
6'-0"
PLAN VIEW
75°
25°
FOR COOLER SCRUBBER
FOR REACTOR FUME SCRUBBERS
(8) 1" ⌀ HOLES
4'-8 3/4" TYP.
℄ SCRUBBER
2'-7 1/4"
℄ INLET
3 1/2" TYP.
15"
3 1/4"
℄ SCRUBBER
SECTION "A-A"
4'-8 3/4"
12 EQ SP @ 4" = 4'-0"
4 3/8
1 3/8" TYP.
4'-6"
4'-11"
2 1/2"
VIEW-BB
5'-5" O.D.
5'-2 3/4" ⌀ B.C.
5'-0"
B/B OF ANGLES
(48) 11/16" ⌀ HOLES EQ SP. STR ℄s
1/4"
LIFTING LUG 2-REQ'D/UNIT
9'-9" O.D.
35'-4 1/2" (OVERALL METAL)
29'-10 1/2"
DRILLING TO MATCH 8" 150# A.S.A. FLG HOLES TO STR ℄s
℄ HDR.
5/16"
NOTE: FOR HDR. SPRAY BOX ASSEMBLY SEE DWG K-73300
℄ 18"x24" DOOR Q.A.
2" PRESS TAP CONN.
A
A
4'-3"
B
5/16"
4'-6" I.S. METAL
4'-1"
5'-6"
1'-7"
B
REACTOR 1G-662 Y 2ND STAGE
PLATFORM LEVEL
COOLER 1G-666 Y
NOV 15
SUPPORT LEVEL
12" OUTLET CONN.
DRILLING TO MATCH 150# A.S.A. FLG HOLES TO STR ℄s
ELEVATION
(FOR CORRECT ORIENTATION SEE PLAN VIEW)
GENERAL SPECIFICATIONS
MATERIAL
CYCLONIC SCRUBBER — 1/4" THK C.S. WITH 3/16
TRIFLEX RUBBER LINING OR EQUAL.
SPRAY NOZZLES TO BE S.S. TYPE 316
MANIFOLD HDR RING ON SCRUBBER TO BE S.S. 316
EXTERIOR PAINTING SPEC
UNIT TO BE SAND BLASTED
AND PAINTED WITH ONE (1) COAT OF ROWE PRODUCT #7A-20 (TWO (2) DRY MILL THK)
APPROX. DEAD WT. —— 17,950 LBS.
NO. OF UNITS REQ'D —— FOUR (4)
FOR DORR OLIVER CONT. # J-3047-107
DUCON CONT. # C-73-300
REACTOR FUME SCRUBBER (1G-662 Y) (2ND STAGE)
COOLER SCRUBBER (1G-666 Y)
D
C
B ADDED TAGGING SPECIFICATIONS AND LIFTING LUGS
A SECTION A-A ADDED
REV. DATE DESCRIPTION
THE DUCON COMPANY INC.
MINEOLA, NEW YORK
ARRANGEMENT OF DUCON
CYCLONIC SCRUBBER
SERIES 550 SECONDARY
DR. BY FNG 9/12/73
CH. BY
SCALE N.T.S.
K-73-300-1



CERTIFIED

DIMENSIONS FOR Dorr-Oliver Eng Ltd.

CUSTOMER: J-3047-107

OUR CONTRACT: C73-300 11/2/73

APPROVED BY:

TAGGING SPECIFICATIONS

TAG ONE (1) VENTURI SECTION IG-663X-1 (SIZE 425)

TAG ONE (1) VENTURI SECTION IG-663Y-1 (SIZE 425)

TAG ONE (1) VENTURI SECTION IG-663Z-1 (SIZE 425)

TAG ONE (1) CYCLONIC SCRUBBER IG-663X-2 (SIZE 535)

TAG ONE (1) CYCLONIC SCRUBBER IG-663Y-2 (SIZE 535)

TAG ONE (1) CYCLONIC SCRUBBER IG-663Z-2 (SIZE 535)

GENERAL SPECIFICATIONS

MATERIAL

CYCLONIC SCRUBBER — ¼" THK C.S WITH 3/16" THK TRIFLEX RUBBER LINING OR EQUAL. SPRAY NOZZLES TO BE - S.S. TYPE 316

VENTURI INLET AND VENTURI ELBOW TO BE ¼" THK R.C.S WITH 3/16" THK TRIFLEX RUBBER LINING OR EQUAL.

VENTURI THROAT - TO BE ¼" THK. R.C.S WITH 3/16" THK TRIFLEX RUBBER LINING EXCEPT END PLATES AND DAMPER BLADES AND SHAFT TO BE S.S. TYPE 316

MANIFOLD HDR RING ON CYCLONIC SCRUBBER TO BE S.S. 316L

GASKET MATERIAL: ⅛" THK. SOFT RUBBER #40 DUROMETER; VULCANIZED TO FLG.

EXTERIOR PAINTING SPEC.

UNIT TO BE SANDBLASTED (O.S ONLY) (S.S.P.C.-6) AND PAINTED WITH ONE COAT OF ROWE PRODUCT NO. 7A-20 (TWO 1/2 DRY MILL THK.)

APPROX. DEAD WT:

CYCLONIC SCRUBBER 15,225 LBS.

VENTURI 4,100 LBS.

NO. OF UNITS REQ'D — THREE (3)

FOR DORR OLIVER CONT. NO. J-3047-107

DUCON CONT. NO. C-73-300

DUST SCRUBBERS (IG-663 X (2) 1ST STAGE

REV	BY	DATE	DESCRIPTION		
E			REVISED ... 18" DIA.		
D			DELETED ...		
C					
B			ADDED TAGGING SPECS AND LIFTING LUGS		
A			... TOP OUTLET ... SPECS.		

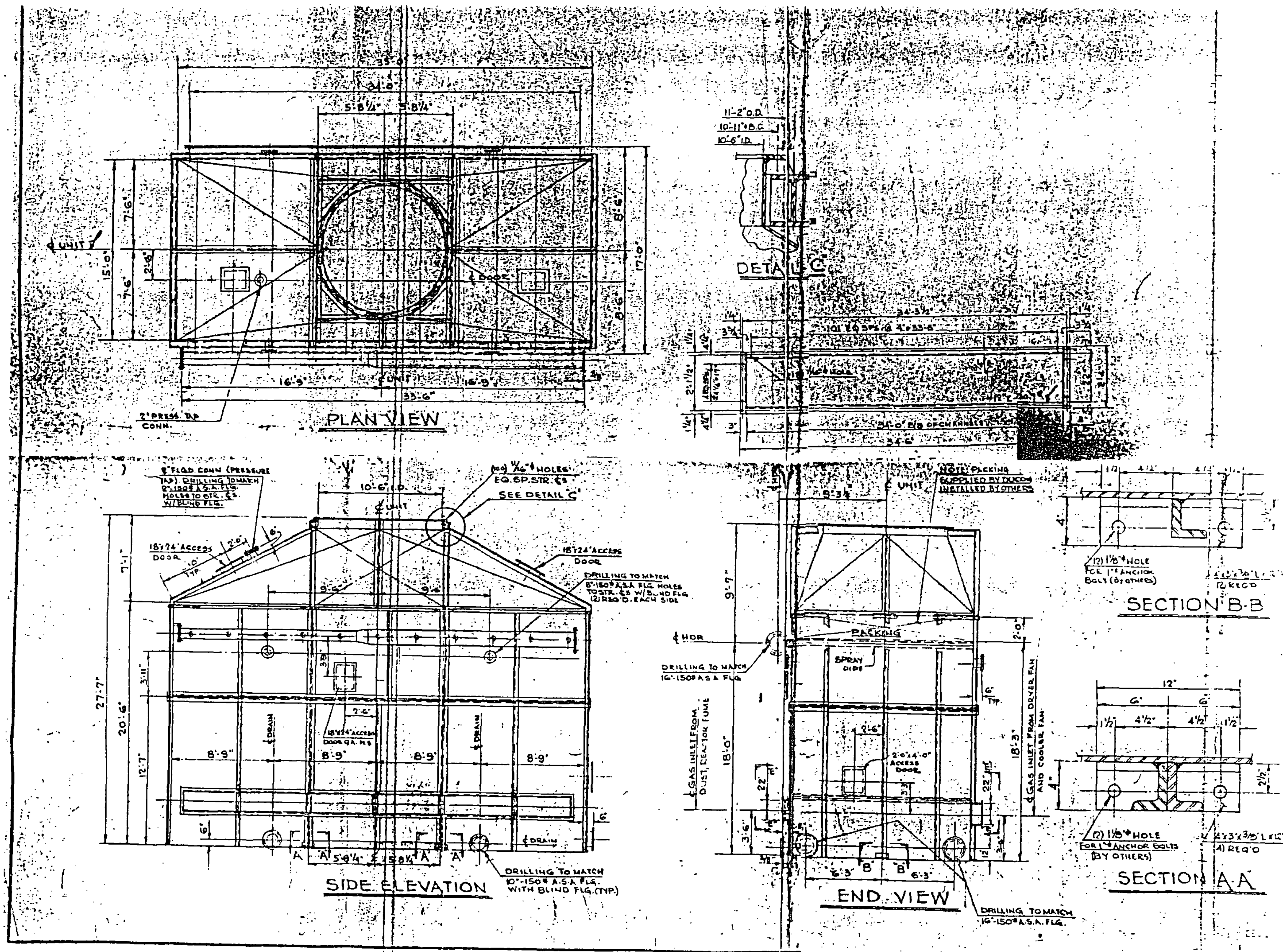
THE DUCON COMPANY INC.

MINEOLA NEW YORK

JAN 14 1974

ARRANGEMENT OF DUCON VENTURI/CYCLONIC SCRUBBER SERIES 425/535 PRIMARY

DR. BY	APP. BY	DRAWING NO.	REV
FWG 9/2/73		K-73-300-3	E
CH BY	SCALE N.T.S.		



ITEM	REQ'D	DESCRIPTION	MATERIAL

SPECIFICATIONS

MATERIAL:

UNIT TO BE FABRICATED FROM 1/4" THK. CARBON STEEL PLATE (EXCEPT AS NOTE

HEADER MANIFOLD AND SPRAY PIPES TO BE S.S 316L

LINING. UNIT TO BE LINED WITH 3/16" THK. TRIFLEX RUBBER LINING (OR EQUAL)

BOLTS AND NUTS: C.S. CADMIUM PLATE

EXTERIOR PAINTING SPEC.

UNIT TO BE SAND BLASTED (O.S ONLY) (SSPC
AND PAINTED WITH ONE (1) COAT OF ROWE
PRODUCT NO. 7A-20 (TWO (2) DRY MILL THK.)

GASKETS: 1/8" THK. SOFT RUBBER # 40 DURO
VULCANIZED TO FLANGE

APPROX: DEAD WEIGHT - 70.000 LBS

C73 300 11/7/73

NO OF UNITS REQ'D THREE (3)

1G-664Y

FOR D.H.K. OLIVER
CONTRACT NO. J-2047-107
TAG ONE UNIT 1G-664 X
TAG ONE UNIT 1G-664 Y
TAG ONE UNIT 1G-664 Z

REV	BY	DATE	DESCRIPTION	CH BY
D		1/8/75	REVISED INLET DIMS AND ADDED VIEW "E-E"	
C		1/7/75	ADDED (4) 3" FLGD NOZZLE CONNS. FOR PRESS. TAPS. RELOCATED FLG.	
B		1/4/75	REVISED OUTLET DRILLING	
A	FWG	11/2/73	RELOCATED DOOR IN SIDE VIEW. ADDED BAFFLE. ADDED OUTLET DRILLING. DELETED 4" DRAIN & LEVEL CONTROL CONNECTIONS [illegible]	

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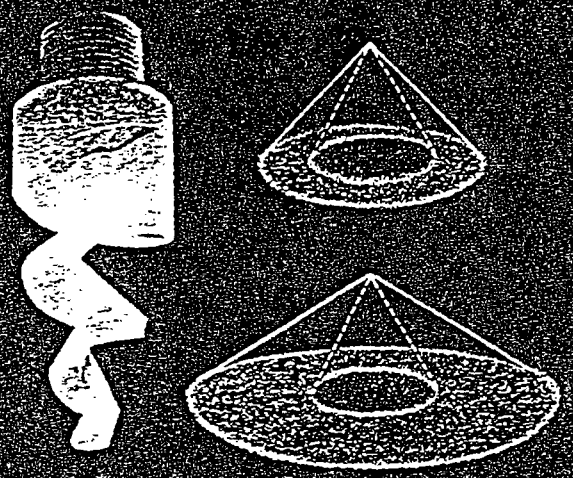
THE DUCON COMPANY INC
MINEOLA, NEW YORK

ARRANGEMENT OF
DUCON FLUORINE ABATEMENT
SCRUBBER - SIZE - 15/35

DR BY	FWG 7/-/73	APP. BY	10/-/73	DRAWING NO.
CH BY		SCALE		K-73-300-15

TFXP



Spiral

DESIGN
New spiral design features largest openings
HIGH ENERGY EFFICIENCY
Passes particles equal to orifice size
Non-clogging
One-piece extra heavy construction

SPRAY CHARACTERISTICS
Wide range of flow rates
Fine atomization
Spray pattern - full cone
Spray angles - 90° and 120°
Flow rates - 3.0 to3350 gpm

2-23-89

BETE NOZZLES

X,Y,Z FUME

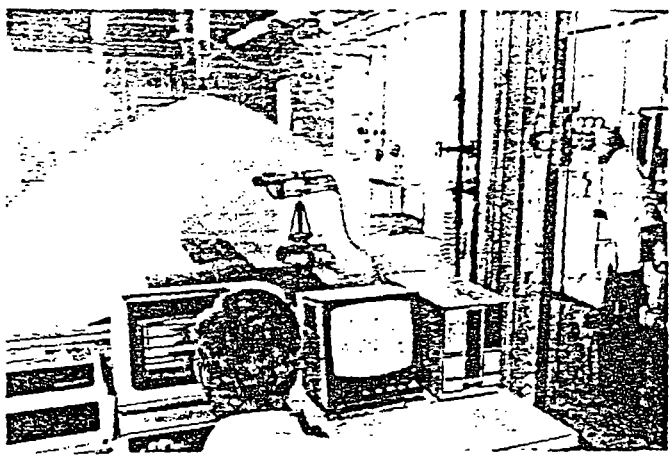
ABATEMENT SCRUBBERS

TF28XP 120°

PVC FULL CONE

Male Alloy

MATERIALS
Teflon
PVC
303 Stainless Steel
316 Stainless Steel
Stellite 6, with Stainless Steel threads
Other castable alloys



Drop Size Analysis - Actual spray droplets being measured are visible on video monitor. Flow pressures of 300 gpm are set at right.

FULL CONE

Spray Angle	Male Pipe Size	Nozzle Number	Orifice Dia.	Free Passage Dia.	Overall Length	Hex. or Round Dia.	Weight Plastic Oz.	Weight Metal Oz.	GALLONS PER MINUTE @ PSI 10	20	30	40	50	60	80	100	200*	400*
120°	3/8	TF12XP	3/16	3/16	2 3/4	7/8	1 1/4	2 1/2	3.0	4.2	5.2	6.0	6.7	7.4	8.5	9.5	13.4	19
		TF14XP	7/32	7/32	2 3/4	7/8	1 1/4	2 1/2	4.0	5.7	7.0	8.1	9.0	10.0	11.4	12.5	18	25
		TF16XP	1/4	1/4	2 3/4	7/8	1 1/4	2 1/2	5.3	7.5	9.2	10.6	11.8	13.0	15.0	16.7	24	33
		TF20XP	5/16	5/16	2 3/4	7/8	1 1/4	2 1/2	8.2	11.7	14.3	16.5	18.4	20.0	23.2	26.1	36	52
	1/2	TF24XP	3/8	3/8	3 3/8	1 1/8	2 1/2	5	12.0	17	20.8	24.1	26.8	29.4	34	38	54	76
		TF28XP	7/16	7/16	3 3/8	1 1/8	2 1/2	5	16.4	23	28	33	37	40	46	52	74	104
	3/4	TF32XP	1/2	1/2	5 1/8	1 3/4	10	24	21.2	30	37	42	47	52	60	67	94	134
	1	TF40XP	5/8	5/8	5 1/8	2	12	30	34	48	57	67	74	81	94	105	148	210
		TF48XP	3/4	3/4	6 3/4	2 1/4	26	78	47	67	83	95	107	117	135	151	214	302
	1 1/2	TF56XP	7/8	7/8	6 3/4	2 1/2	25	75	64	93	112	129	145	159	184	205	290	410
		TF64XP	1	1	6 3/4	2 1/2	24	72	84	120	147	169	190	208	240	268	380	536
		TF72XP	1 1/8	1 1/8	6 3/4	2 1/2	23	70	96	137	165	192	213	235	270	302	426	604
	2	TF88XP	1 3/8	1 3/8	10 1/2	2 1/2	29	88	140	198	240	280	310	340	395	438	620	876
		TF96XP	1 1/2	1 1/2	11	2 1/2	27	82	178	250	310	355	395	430	505	560	790	1120
	3	TF112XP	1 3/4	1 1/2	11 7/8	3 1/2	50	155	256	362	448	516	580	636	736	810	1160	1220
		TF128XP	2	1 1/2	11 7/8	3 1/2	46	150	336	480	588	676	760	832	960	1072	1520	2140
	4	TF160XP	2 1/2	1 1/2	12	4 1/4	60	230	525	750	920	1058	1188	1300	1500	1675	2370	350

For adapters and bushings, refer to Accessories page.

*High pressure operation recommended for

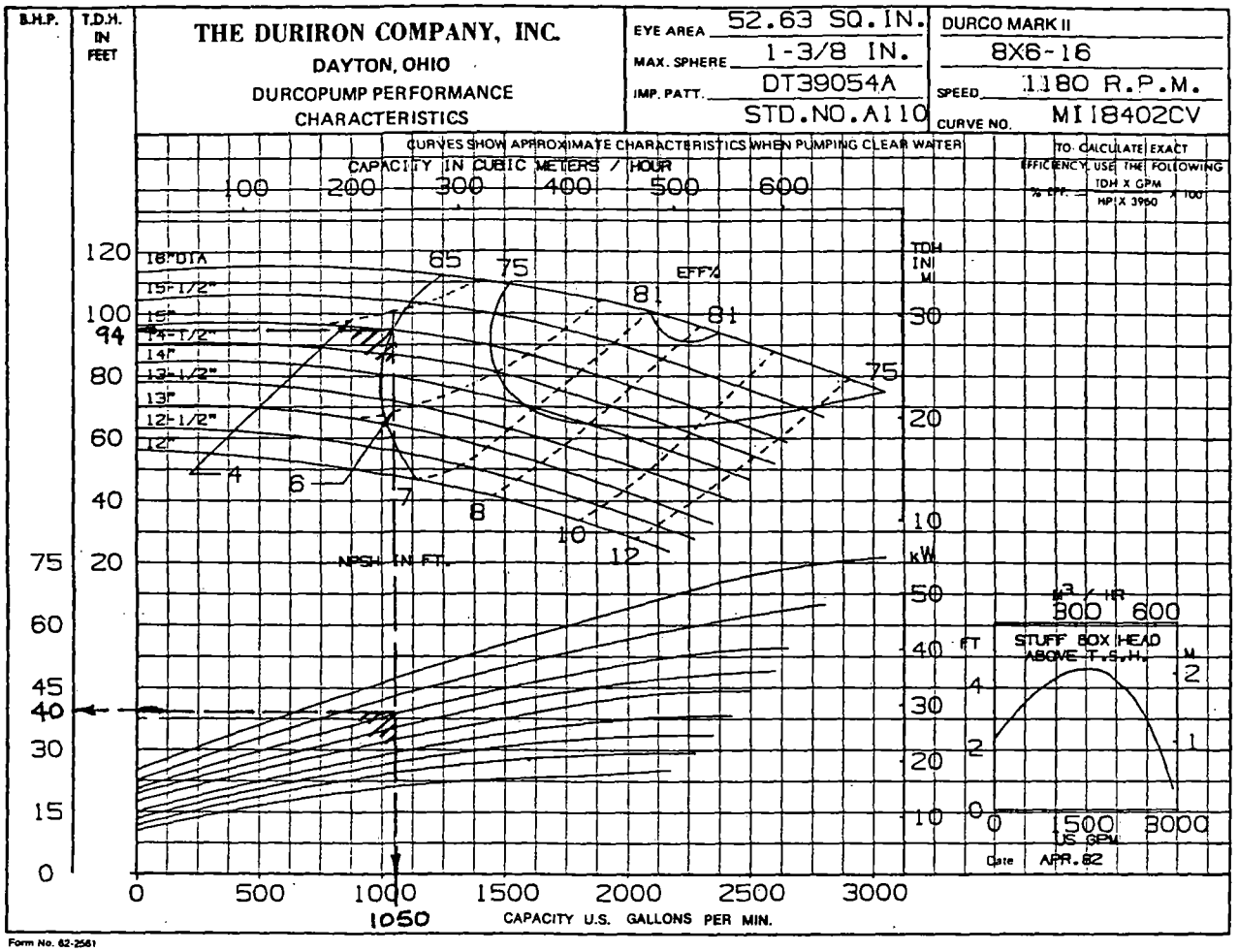
Fluoride Abatement Scrubber Packing

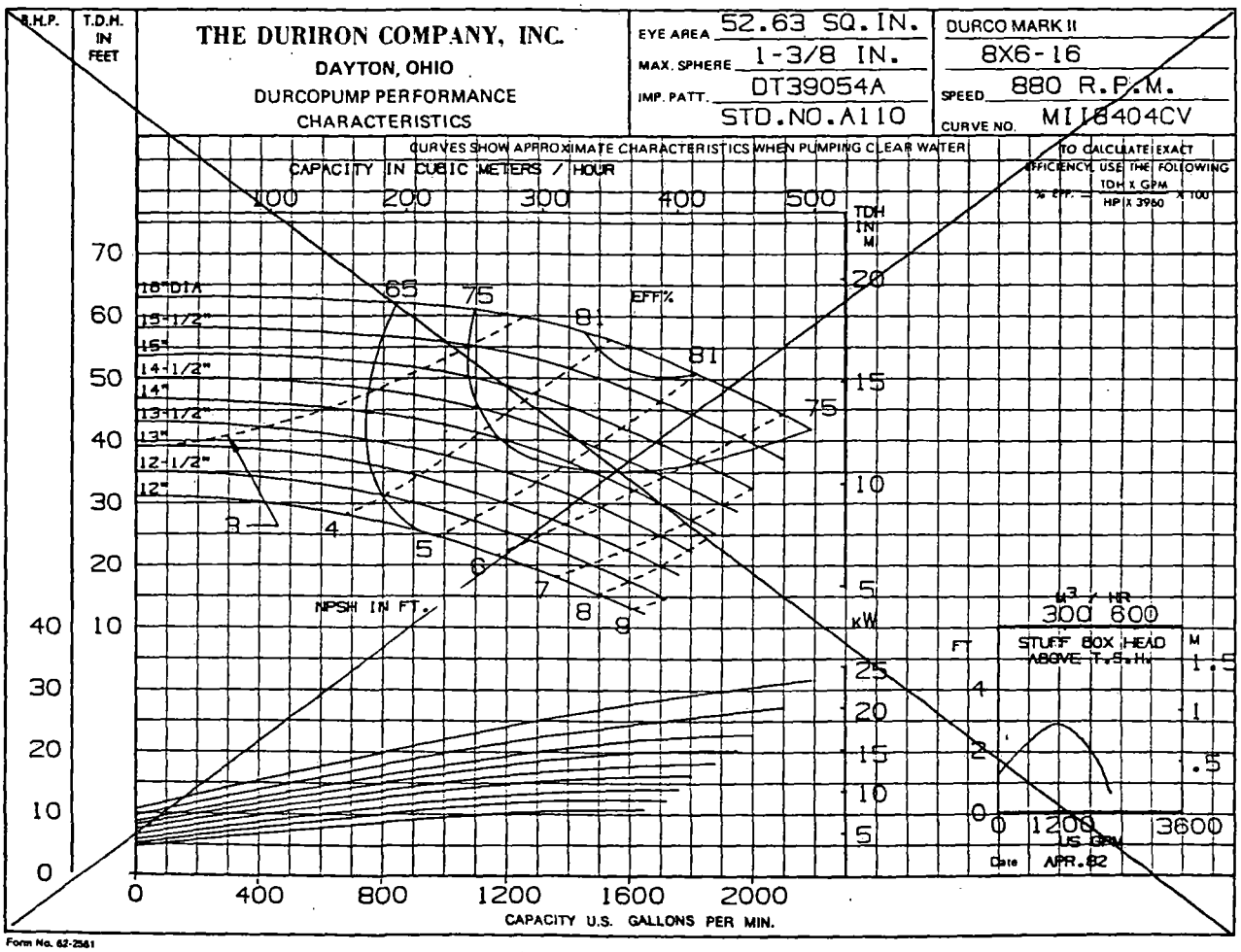
Kimre, Inc.
P.O. Box 570846
Perrine, FL. 33157

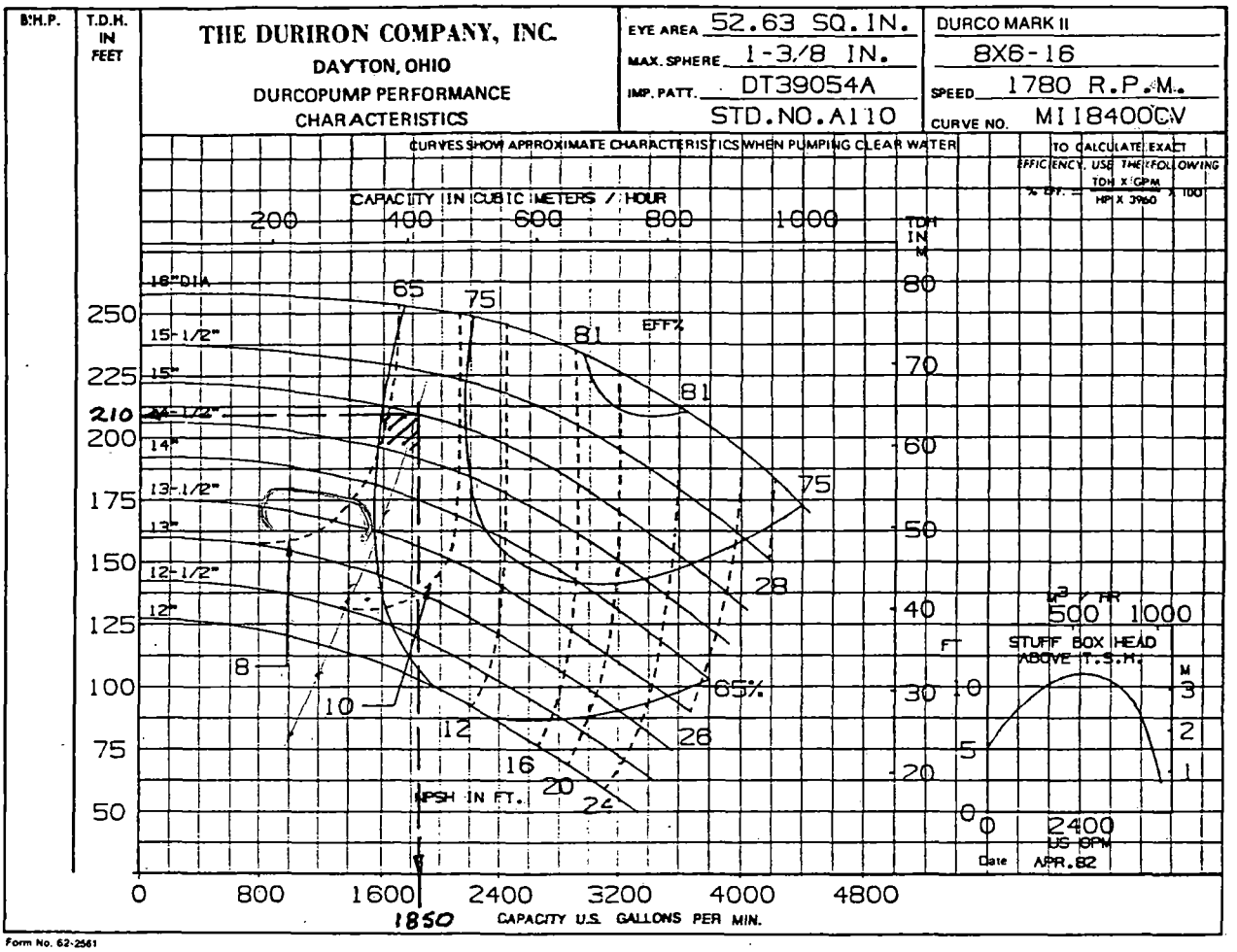
Type: B-Gon Mist Eliminator

1st 3 layers of style 37/97
next 4 layers of style 37/94

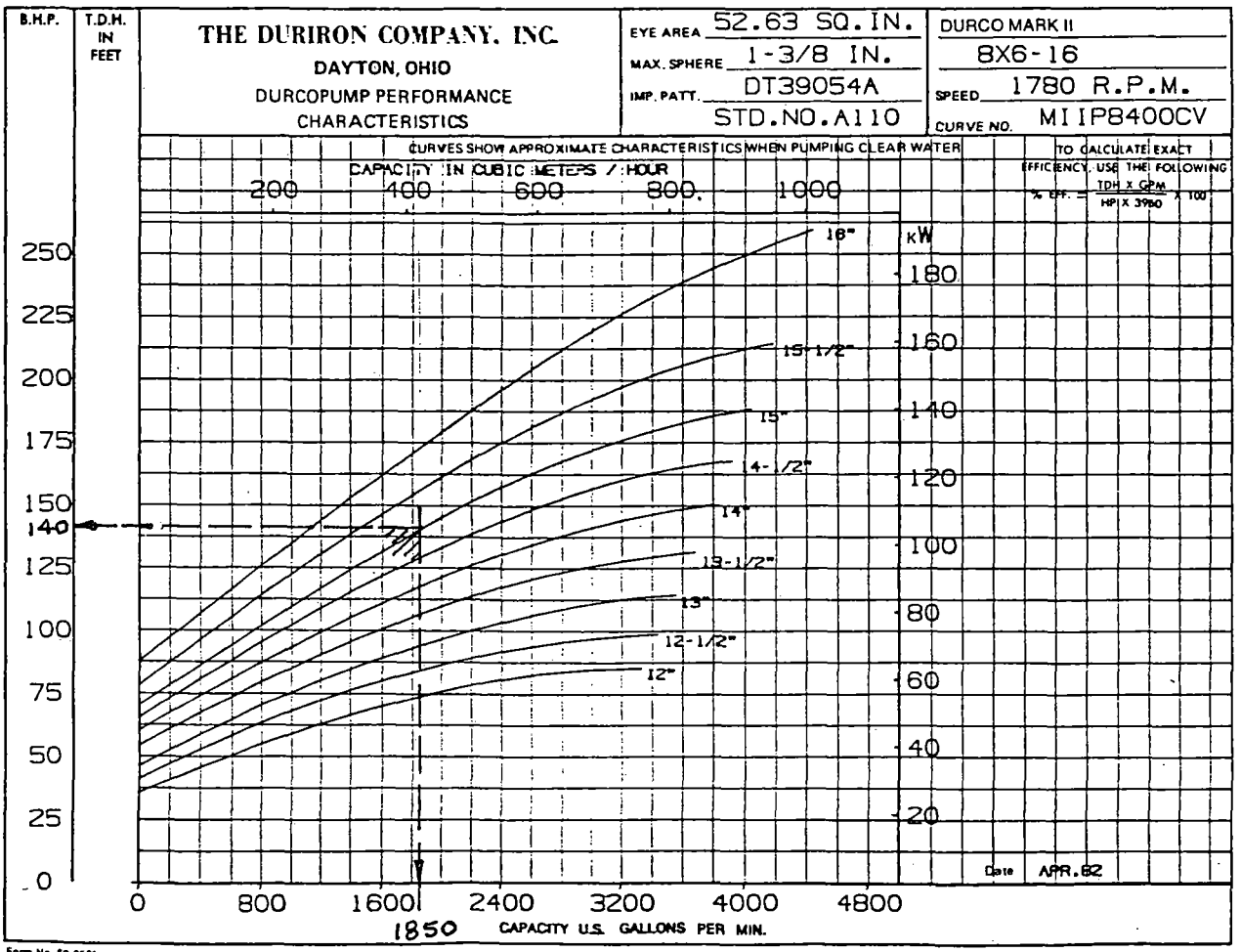
IP-164Y


B.H.P.
T.D.H. IN FEET
THE DURIRON COMPANY, INC.
DAYTON, OHIO
DURCOPUMP PERFORMANCE CHARACTERISTICS
EYE AREA 52.63 SQ. IN.
MAX. SPHERE 1-3/8 IN.
IMP. PATT. DT39054A
STD. NO. A110
DURCO MARK II
8X6-16
SPEED 1180 R.P.M.
CURVE NO. MII8402CV
CURVES SHOW APPROXIMATE CHARACTERISTICS WHEN PUMPING CLEAR WATER
TO CALCULATE EXACT EFFICIENCY, USE THE FOLLOWING
% EFF. = TDH X GPM / HP X 3960 X 100
CAPACITY IN CUBIC METERS / HOUR
100 200 300 400 500 600
18"DIA
15-1/2"
15"
14-1/2"
14"
13-1/2"
13"
12-1/2"
12"
EFF%
65 75 81
NPSH IN FT.
TDH IN M
kW
FT
M
m3 / HR
300 600
STUFF BOX HEAD ABOVE T.S.H.
0 1500 3000 US GPM
0 500 1000 1500 2000 2500 3000
1050
CAPACITY U.S. GALLONS PER MIN.
Date APR. 82
Form No. 62-2561


B.H.P.
T.D.H. IN FEET
THE DURIRON COMPANY, INC.
DAYTON, OHIO
DURCOPUMP PERFORMANCE CHARACTERISTICS
EYE AREA 52.63 SQ. IN.
MAX. SPHERE 1-3/8 IN.
IMP. PATT. DT39054A
STD. NO. A110
DURCO MARK II
8X6-16
SPEED 880 R.P.M.
CURVE NO. MII8404CV
CURVES SHOW APPROXIMATE CHARACTERISTICS WHEN PUMPING CLEAR WATER
TO CALCULATE EXACT EFFICIENCY, USE THE FOLLOWING
% EFF. = TDH X GPM / HP X 3960 X 100
CAPACITY IN CUBIC METERS / HOUR
100 200 300 400 500
18"DIA
15-1/2"
15"
14-1/2"
14"
13-1/2"
13"
12-1/2"
12"
EFF%
65 75 81
NPSH IN FT.
TDH IN M
kW
FT
M
m3 / HR
300 600
STUFF BOX HEAD ABOVE T.S.H.
0 1200 3600 US GPM
0 400 800 1200 1600 2000
CAPACITY U.S. GALLONS PER MIN.
Date APR. 82
Form No. 62-2561


B.H.P.
T.D.H. IN FEET
THE DURIRON COMPANY, INC.
DAYTON, OHIO
DURCOPUMP PERFORMANCE CHARACTERISTICS
EYE AREA 52.63 SQ. IN.
MAX. SPHERE 1-3/8 IN.
IMP. PATT. DT39054A
STD. NO. A110
DURCO MARK II
8X6-16
SPEED 1780 R.P.M.
CURVE NO. MII8400CV
CURVES SHOW APPROXIMATE CHARACTERISTICS WHEN PUMPING CLEAR WATER
TO CALCULATE EXACT EFFICIENCY, USE THE FOLLOWING
% EFF. = TDH X GPM / HP X 3960 X 100
CAPACITY IN CUBIC METERS / HOUR
200 400 600 800 1000
TDH IN M
18"DIA
15-1/2"
15"
14-1/2"
14"
13-1/2"
13"
12-1/2"
12"
EFF%
65
75
81
81
75
28
65%
26
8
10
12
16
20
24
NPSH IN FT.
250 225 210 200 175 150 125 100 75 50
80 70 60 50 40 30 20
M³/HR 500 1000
FT
STUFF BOX HEAD ABOVE T.S.H.
10 5 0
M 3 2 1 0
0 800 1600 2400 3200 4000 4800
1850 CAPACITY U.S. GALLONS PER MIN.
2400 US GPM
Date APR.82
Form No. 62-2561

1P-173 Y

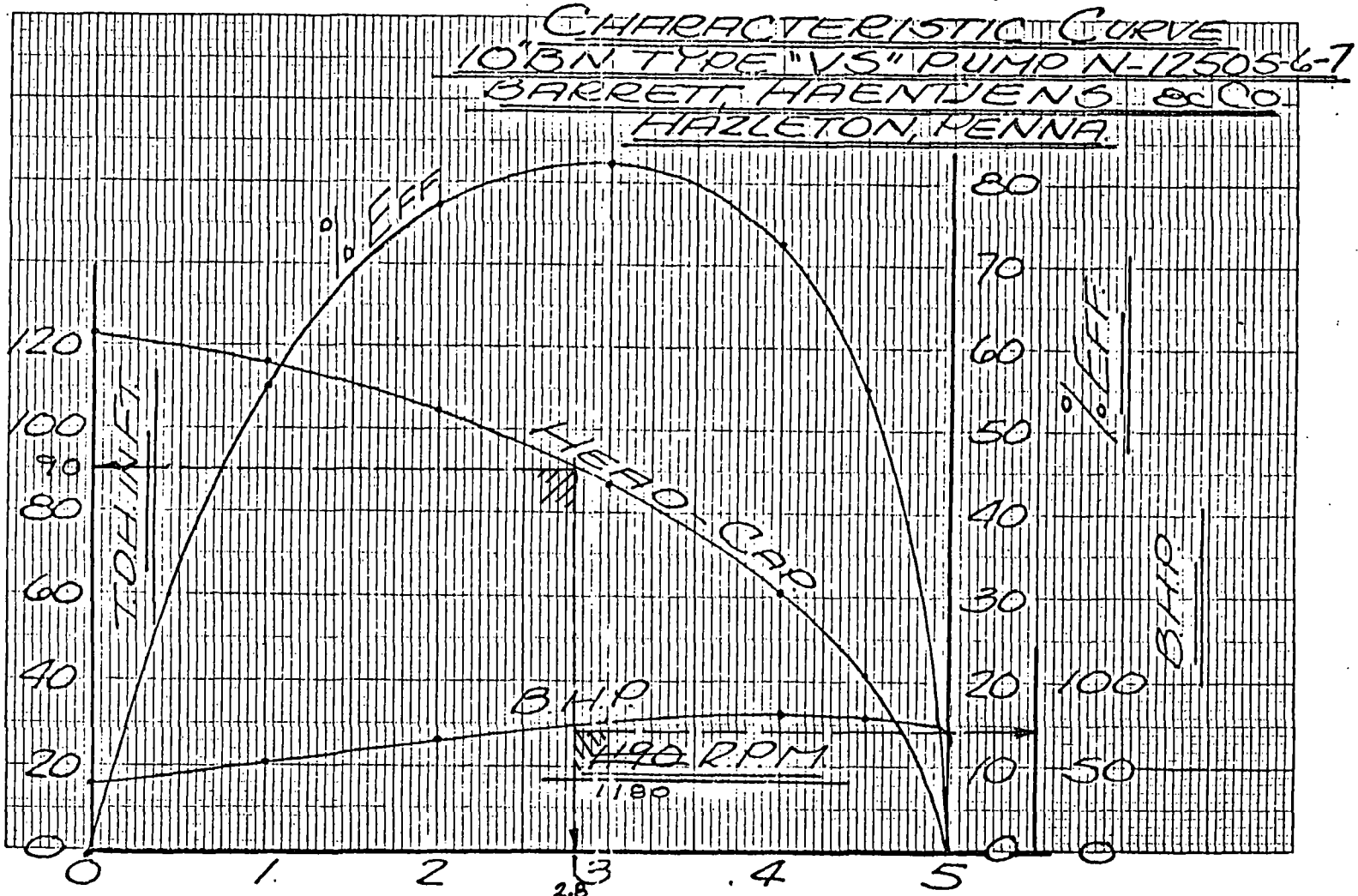

B.H.P.
T.D.H. IN FEET
THE DURIRON COMPANY, INC.
DAYTON, OHIO
DURCOPUMP PERFORMANCE CHARACTERISTICS
EYE AREA 52.63 SQ. IN.
MAX. SPHERE 1-3/8 IN.
IMP. PATT. DT39054A
STD. NO. A110
DURCO MARK II
8X6-16
SPEED 1780 R.P.M.
CURVE NO. MII P8400CV
CURVES SHOW APPROXIMATE CHARACTERISTICS WHEN PUMPING CLEAR WATER
TO CALCULATE EXACT EFFICIENCY, USE THE FOLLOWING
% EFF. = TDH X GPM / HP X 3960 X 100
CAPACITY IN CUBIC METERS / HOUR
200 400 600 800 1000
kW
18"
15-1/2"
15"
14-1/2"
14"
13-1/2"
13"
12-1/2"
12"
250 225 200 175 150 140 125 100 75 50 25 0
180 160 140 120 100 80 60 40 20
0 800 1600 2400 3200 4000 4800
1850 CAPACITY U.S. GALLONS PER MIN.
Date APR.82
Form No. 62-2561

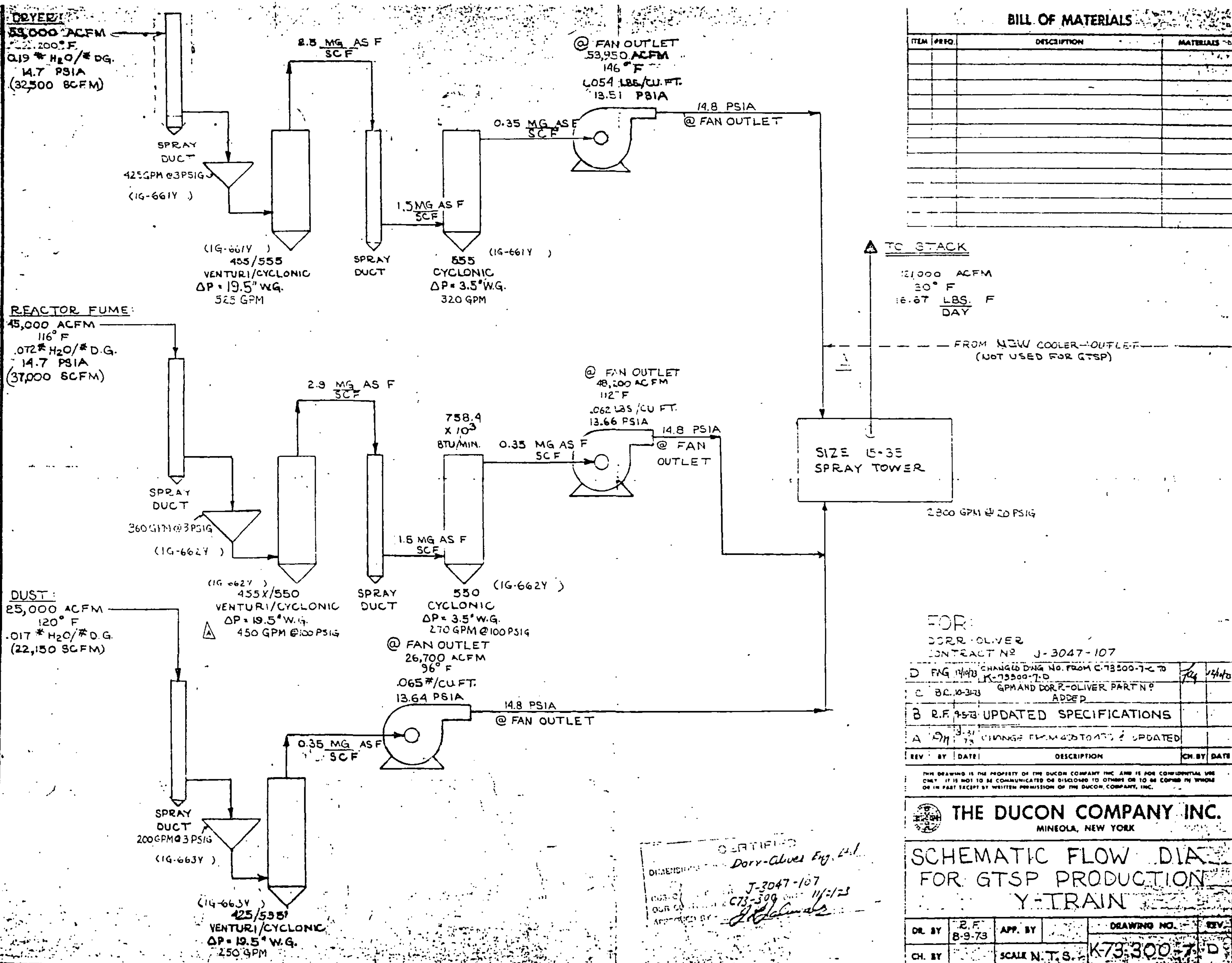
"HAZLETON" PUMPS

BARRETT, HAENTJENS & CO. HAZLETON, PA.

CHARACTERISTIC
PERFORMANCE
CURVE
1P-168 Y

CAS.D10059 P7361-V10059-21.000B.-IMP.D10065 P6656-M=90%
SV7365-16.000T.





BILL OF MATERIALS

ITEM	REQ.	DESCRIPTION	MATERIALS

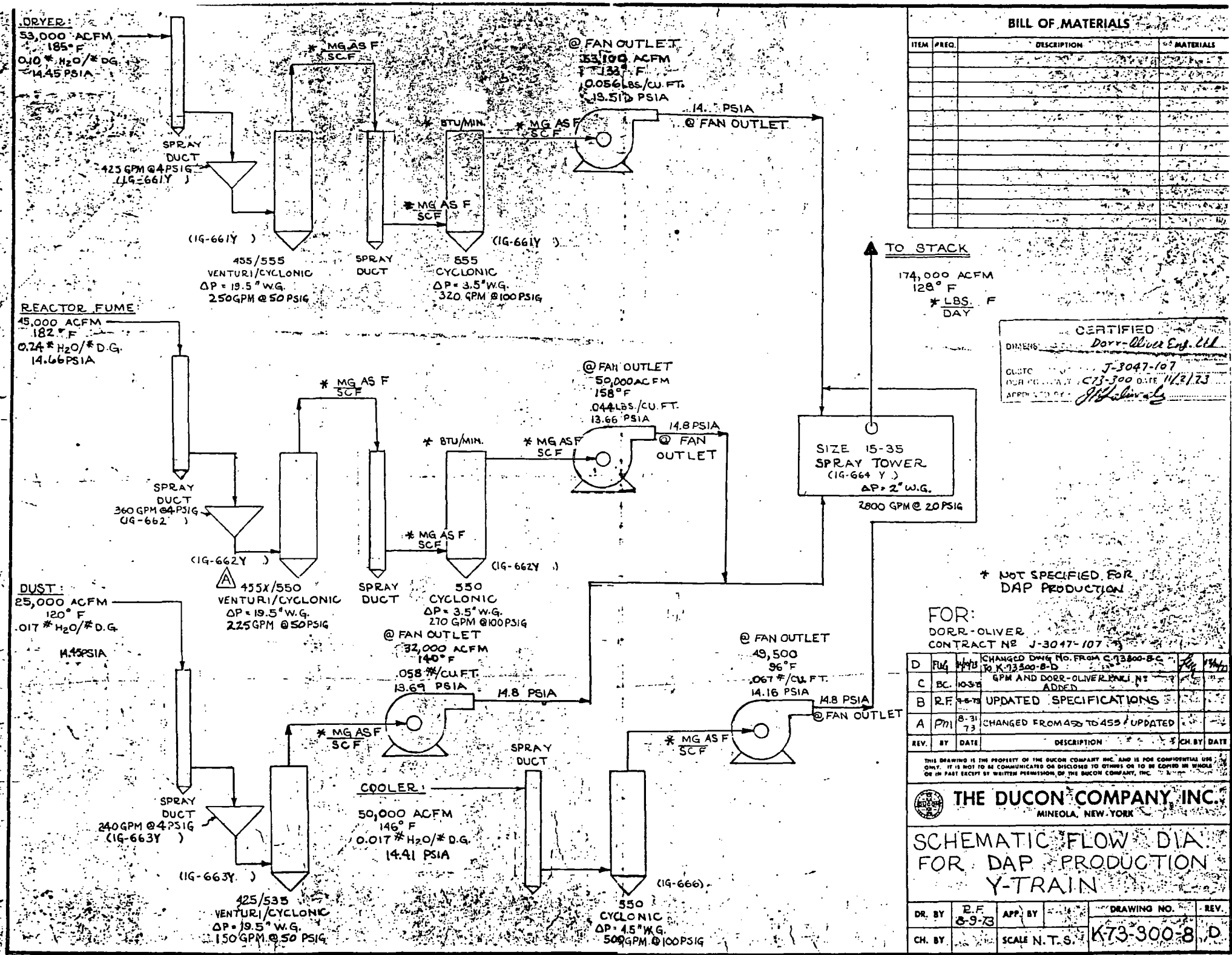
FOR:
DORR-OLIVER
CONTRACT Nº J-3047-107

REV	BY	DATE	DESCRIPTION	CH. BY	DATE
D	FAG	12/10/73	CHANGED DWG NO. FROM C-73300-7-C TO K-73300-7-D	FAG	12/10/73
C	B.C.	10-31-73	GPM AND DORR-OLIVER PART Nº ADDED		
B	R.F.	9-5-73	UPDATED SPECIFICATIONS		
A	[illegible]	3-31-73	CHANGE FROM 425 TO 455 & UPDATED		

THE DUCON COMPANY INC.
MINEOLA, NEW YORK

SCHEMATIC FLOW DIAG. FOR GTSP PRODUCTION Y-TRAIN

DR. BY	R.F. 8-9-73	APP. BY		DRAWING NO.	REV.
CH. BY		SCALE N.T.S.		K-73-300-7	D



BILL OF MATERIALS

ITEM	REQ.	DESCRIPTION	MATERIALS

CERTIFIED
DWGS: Dorr-Oliver Eng. Ltd.
CUSTOMER: J-3047-107
OUR PROPOSAL NO.: C73-300 DATE: 11/2/73
APPROVED BY: J.H. Oliver

FOR:
DORR-OLIVER
CONTRACT NO J-3047-107

REV.	BY	DATE	DESCRIPTION	CH. BY	DATE
D	FUG	9/9/75	CHANGED DWG NO. FROM C-13800-8-C TO K-13800-8-D	Fug	9/9/75
C	BC.	10-3-73	GPM AND DORR-OLIVER PART NO. ADDED		
B	R.F.	9-6-73	UPDATED SPECIFICATIONS		
A	Phi	8-31-73	CHANGED FROM 450 TO 455 / UPDATED		

THE DUCON COMPANY, INC.
MINEOLA, NEW YORK

SCHEMATIC FLOW DIA. FOR DAP PRODUCTION Y-TRAIN

DR. BY	R.F. 8-9-73	APP. BY		DRAWING NO.	REV.
CH. BY		SCALE N.T.S.		K-73-300-8	D