Subcode 01

Receipt #117528
$1000.00
AC53-146409

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

RECEIVED
MAR 02 1988
DER - BAQM

SOUTHWEST DISTRICT
7601 HIGHWAY 301 NORTH
TAMPA, FLORIDA 33610-9544

APPLICATION TO ~~OPERATE~~/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: No. 4 DAP Fertilizer Plant [ ] New[1] [X] Existing[1] (DER I.D. # 24)

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

COMPANY NAME: W. R. Grace & Co., Bartow Works COUNTY: Polk

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) Stack No. 41

SOURCE LOCATION: Street 1 mile north of SR 60 City 3 mi. W of Bartow

UTM: East 409.29 km North 3086.96 km

Latitude 27 ° 54 ' 13 "N Longitude 81 ° 55 ' 17 "W

APPLICANT NAME AND TITLE: Kenneth V. Ford, Manager Environmental Affairs

APPLICANT ADDRESS: POB 471, Bartow, FL 33830

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of W. R. Grace & Co.

I certify that the statements made in this application for a permit modification 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

Signed: Kenneth V. Ford

Kenneth V. Ford. Mgr., Enviro. Affairs
Name and Title (Please Type)

Date: 2/25/88 Telephone No. 813-533-2171

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)

AFFIDAVIT OF AUTHORIZATION

I, D. G. Snipes, Vice President Operations, hereby authorize Kenneth V. Ford, as Manager, Environmental Affairs Department, to sign permit applications on behalf of W. R. Grace & Co.

W. R. GRACE & CO.

By: D G Snipes
D. G. Snipes
Vice President Operations

STATE OF TENNESSEE
COUNTY OF SHELBY

SWORN and subscribed to before me this 24th day of February, 1988.

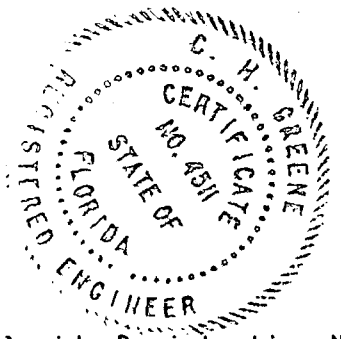
Notary Public

My Commission Expires:

1-6-90

Seal

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 C. H. Greene

C. H. Greene, P.E.
Name (Please Type)

W. R. Grace & Co.
Company Name (Please Type)

POB 471, Bartow, FL 33830
Mailing Address (Please Type)

Florida Registration No. 4511 Date: 2/25/88 Telephone No. 813-533-2171

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.

Elimination of two major bottlenecks: 1) Rebuilding of feed distribution chutes to vibrating screens; and 2) addition of special baffles inside the granulator to accelerate movement of product. The original pollution control equipment remains unchanged.

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

Start of Construction Jan 1987 (experiments) Completion of Construction Sep 1988

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.)

$30,000 screen feed distribution

40,000 modify granular, additional baffles

$70,000 total, including experimental work

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

AC53-24460 7/3/80, extended on 6/23/83 through 3/30/84

AO53-82350 9/21/84 through 9/14/89 (applied on 2/9/84)

Permitted emission: 3.6 lb F /hour; 29.9 lbs PM/hour and 41.9 lbs SO_2/hour

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 50 ;

if power plant, hrs/yr ____ ; if seasonal, describe: or 350/days/year

F. If this is a new source or major modification, answer the following questions.
(Yes or (No)) This is a minor modification not affecting pollution control equipment or actual hourly and annual emission levels.

1. Is this source in a non-attainment area for a particular pollutant? NO

   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. See permits AC53-24460 and AO53-82350. YES

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

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

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

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.

Permit AO53-82350: 130 TPH DAP & 800,000 TPY DAP at 3.60 lbs. F/hr. & 29.9 lbs. PM/hour

*Tests of:	6/1984 at	121 TPH	DAP & 58 TPH	P_2O_5 input =	2.94 lb.F/hr & 2.72 lb.PM/hr
	2 & 9/1985 at	141 TPH	DAP & 68 TPH	" =	2.04 lb.F/hr & 2.2 lb.PM/hr
	10/1986 at	143 TPH	& 69 TPH	" =	1.55 " & 9.2 "
	1 & 12/1987 at	150 TPH	& 72 TPH	" =	1.73 " & 20.0 "
(Max. 1-hour run was at		160 TPH	and emitted only		0.40 " & 10.5 ")

*Complete sets of these test data were duly submitted to Tampa-DER.

We request permission to operate at 165 TPH and produce up to 1,300,000 TPY of DAP. Emissions will not increase from the present range because the rate of production between the 120-170 TPH range has not been the governing factor.

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

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

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Phos Acid*	fluorides	1.8 - 3.8%	165,000	Existing stack # 41
Ammonia		100%	75,000	
Sulfuric Acid		100%	5,000	
Inert filter	-	-	As required	

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

1. Total Process Input Rate (lbs/hr): 165,000 as 100% P_2O_5

2. Product Weight (lbs/hr): 330,000 as DAP

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

Remain Unchanged

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr (Pres. permitted)	Inlet laoding (4) Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr estimated	T/yr	
Particulates	28 BACT	98	0.5#/T P_2O_5	29.9	<1000	<3500	Existing
Fluorides	3.6 BACT	12	0.6#/ "	3.6	< 70	<245	Stack #41
SO_2 *	10	<35	BACT	39	<100	<175	
NO *	8	28	BACT	NA	NA		
CO *	2	7	BACT	NA	NA		

(NA=not applicable)

*Insignificant: We operated only on natural gas since 1981; no. 5 oil may be used only for emergency if gas supply were to be interrupted temporarily.

[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).

This source's pollution equipment cannot be by-passed or operated without scrubbing liquids because it is a part of the manufacturing (chemical) process.

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)
Scrubbing system by "Ducon"; overall system by Bearden-Potter Engineering Co., Debottlenecking by W. R. Grace personnel	DAP dust	> 96%	NA	Performance
	Fluorides	> 95%	NA	Test results
	Ammonia	> 98%	NA	NA
	SO_2	> 65%	NA	NA
	NOx	NA	NA	NA
	CO	NA	NA	NA

E. Fuels Natural gas at 1040 BTU/CF

Type (Be Specific)	Consumption* 000 CF/hr		Maximum Heat Input (MMBTU/hr)
	@130 TPH avg/hr	@ 165 TPH max./hr	
Natural gas , or	40 mcf	50 MCF	52
during brief emergency -			
No. 5 Fuel Oil	2200#=286 gal.	3000#=390 gal.	(55)

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

Fuel Analysis: No. 5 oil has not been used since 1981.

Percent Sulfur: It contained ≤2.4% S Percent Ash: and 0.04

Density: " 7.7% lbs/gal Typical Percent Nitrogen: NA

Heat Capacity: " 18,500 BTU/lb 142,000 BTU/gal

Other Fuel Contaminants (which may cause air pollution): -

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.

None: DAP plant has a negative water balance. Scrubber water is recirculated through a separate process water cooling lagoon.

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

Stack Height: 140 ft. Stack Diameter: 11.0 ft.

Gas Flow Rate: 252,100 ACFM 217,000 DSCFM Gas Exit Temperature: 110-130 °F.

Water Vapor Content: saturated 6-9% % Velocity: 44 FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

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)]
   Statistically, annual average has been 0.48 T 100% P_2O_5 (in H_3PO_4)/T of 18-46-0 DAP.
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.
   Stack test data: 1984 - 1987 (submitted to Tampa-DER).
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
   See AO53-82350, and/or AC53-24460 issued on July 30, 1980.
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.)
   See AC53-24460.
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).
   See AC53-24460.

*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.

* See enclosed stack test data of December 5, 1987.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation. $1,000 check is enclosed

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. Not applicable.

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?

[X] Yes [ ] No

Contaminant	Rate or Concentration
Fluorides	0.06 lbs/T of 100% P_2O_5 input
Particulates	0.5 lbs/T of 100% P_2O_5 input
Sulfur Dioxide	0.7 lbs/T of 1005 P_2O_5 input

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

[X] Yes [ ] No

Contaminant	Rate or Concentration
	Same as in A. above.
Fluorides	0.06 lbs/T of 100% P_2O_5 input
Particulates	0.30 lbs./T of DAP product
SO_2	NA

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

Contaminant	Rate or Concentration same as A. above.
Unchanged: not to exceed presently permitted levels at 130 TPH	
Fluorides	3.6 lbs/hour, and 11.8 T/Y maximum
Particulates	29.9 lbs/hour, and 98.0 T/Y maximum
Sulfur Dioxide	41.9 lbs/hour, and 122.5 T/Y maximum*

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

1. **Control Device/System:** Venturi cyclonic and packed scrubber
2. **Operating Principles:** Acceleration, hydrolization, deceleration, condensation, & inertial impact
3. **Efficiency:*** 95-98% per design engineer's criteria
4. **Capital Costs:** $2,500,000 originally Debottlenecking: $70,000 thru 9/1988.

***Explain method of determining**
We do not have the ductwork configuration required to sample inlets to scrubbers.

* Assuming use of #5 fuel oil, which has not been used at Grace-Bartow since 1981, (natural gas containing only 20-25 grains/100CF has been used without interruption since 1981) and is not expected to be used in the next six months; and then only during brief emergencies.

5. **Useful Life:** approx. 11 yrs. (parking 2 years)
6. **Operating Costs:** 250,000 - 400,000/Year
7. **Energy:** 2000 KWH (from our cogeneration plant)
8. **Maintenance Cost:** 250,000 - 400,000/Year
9. **Emissions:**

Contaminant	Rate or Concentration
Fluorides	0.5 - 3.4 lbs/hour
Particulates	2 - 20 lbs/hour
Sulfur Dioxide	<25 lbs/hour: negligible: neutralized by NH_3 and scrubbed

10. **Stack Parameters**

a. **Height:** 140 ft. b. **Diameter:** 11.0 ft.

c. **Flow Rate:** 251,000 ACFM d. **Temperature:** 110-130 °F.

e. **Velocity:** 44 FPS

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

1. Not applicable. See construction & operating permits AC53-24460 and AO53-82350.

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. Not applicable.

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: Unchanged. See Existing Controls, D.

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: W. R. Grace & Co.

(2) Mailing Address: POB 471

(3) City: Bartow (4) State: FL 33830

(5) Environmental Manager: Kenneth V. Ford

(6) Telephone No.: 813-533-2171

(7) Emissions:[1]

Contaminant	Rate or Concentration
Fluorides	0.5 - 3.4 lbs/hour
Particulates	2 - 20 lbs/hour
Sulfur Dioxide	<25 lbs/hour: negligible due to NH_3, plus scrubbing

(8) Process Rate:[1] Present 120-160 TPH of DAP, or 60-80 TPH P_2O_5 input

10. Reason for selection and description of systems: Operated within permitted BACT limits

[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

NOT APPLICABLE - SYSTEM HAS BEEN IN SATISFACTORY OPERATION SINCE 1984.

A. Company Monitored Data

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

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

Other data recorded Annual and semiannual reports have been submitted to Tampa-DER.

Attach all data or statistical summaries to this application. (See stack test data summary on page 3.)

*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 NA

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, as per Operating Permit A053-82350 valid thru 9/14/89.

Pollutant	Emission Rate			
TSP	29.9 lbs/hour	or	= 3.767	grams/sec
SO^2	41.9 lbs/hour	or	= 5.279	grams/sec

E. Emission Data Used in Modeling Not Applicable - no change.

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. NA- no change from present.

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. NA

W. R. GRACE & CO., BARTOW WORKS
#4 FERTILIZER PLANT; PERMIT #A053-82350 I.D.No. 24
STACK # 41; PERMITTED EMISSIONS: FLUORIDES: 3.6 LB/HR.
PARTICULATES: 29.9 LB/HR.

GAS SAMPLE SUMMARY

DATE: 12/05/87	RUN #1	RUN #2	RUN #3	AVERAGE
TIME: 09:15 - 01:41	09:15-10:31	10:45-12:01	12:20-01:41	1.00 HR.EA
BAROMETRIC PRESSURE: IN. HG.	30.01	30.01	30.01	30.01
STACK PRESSURE (PS): IN. HG.	30.03	30.03	30.03	30.03
STACK: I.D.= 11.00 FT				
GAS TEMP (TS): DEG. F	110	110	110	110
MOISTURE (BWS): BY VOLUME	.072	.061	.067	.066
VELOCITY (VS): FT/SEC.	44.06	43.97	44.08	44.03
VOLUME (Q): ACFM	251,222	250,709	251,336	251,089
VOLUME (Q STD.): DSCFM	216,648	218,718	217,884	217,750
NO. OF POINTS SAMPLED:	24	24	24	24
SAMPLE DURATION: MIN.	60	60	60	60
LEAK CHECK: CU.FT.	.00	.00	.00	.00
VOLUME METERED: ACF	45.00	45.30	44.90	45.07
VOLUME SAMPLED (VM): DSCF	45.29	44.84	43.88	44.67
AVG. METER TEMP.(TM): DEG. F	72.54	81.46	88.50	80.83
AVG. PUMP VACUUM: IN. HG.	9.40	7.20	7.60	8.06
AVG.ORIF.PRES.DIF.(ΔH):IN.WTR	1.89	1.87	1.89	1.88
NOZZLE TIP DIA: IN. = .2480				
PITOT TUBE FACTOR:(CP) = .830				
AVG. ISOKINETIC RATIO (%I):	98.7%	96.8%	95.0%	96.8%
RATE: TONS PER HOUR DAP	145.4	145.4	145.4	145.40
TPH: INPUT P2O5	69.5	69.5	69.5	69.50
-----CONTAMINANTS-----				
F: LBS./HR.	1.63	1.85	1.70	1.73
PARTICULATES: LBS./HR.	18.03	22.97	18.98	19.99

SAMPLED & ANALYZED BY EPA & DER METHODS 1, 2, 4 AND ~~EITHER~~ 5, ~~OR 8,~~ AND ~~OR~~ 13-B.

I CERTIFY THAT THE DATA SUBMITTED ARE TRUE TO THE BEST OF MY KNOWLEDGE.

X SIGNATURE M. J. Martinasek

M. J. MARTINASEK
SR. ENVIRONMENTAL ENGNR.

STACK TEST REPORT

W. R. GRACE & CO., BARTOW WORKS

I. INTRODUCTION

a) Scrubbing System on No. 4 FERTILIZER PLANT

1. Designed by: "DUCON Engr. Co." and

2. Manufactured by: locally

b) Testing Organization: Dept. of Environmental Affairs (DEA)
W. R. Grace & Co.
Bartow, Florida

c) Test Data (see attached test sheets) of STACK No. 41

1. Test Date: Dec. 5, 1987

2. Persons present during test: Jim Boyd, Supervisor; David Blanc, Technician; Sandy Cundiff, Technician; occasionally Mickey Martinasek, Sr. Environmental Engineer.

3. Location of test: S. West SIDE OF CHEMICAL COMPLEX (see summary sheet & plot plan)

d) Schematic drawing of scrubber: (copy ~~of permit~~ attached) ✓

1. Stack Section (schematic) sketch with sampling points: enclosed

2. Stack sampling points: indicated above (2 ports @ 90°)

e) Operating Principles of scrubber tested: ✓ See 2 ENCLOSED SHEETS (incl. schem

1. Maximum production rate: 145.4 DURING TESTING ACCELERATION/CENTRIFUGAL FORCE/IMPACT (on PACKING)

2. Operating parameters of scrubbing system: 250,000 ACFM (see our application for construction permit or for the first operating permit for

details)

II. **SUMMARY** (see:)

a) Computerized summary sheet, see front page ✓

b) Computerized summary sheet of each run ✓

c) Operating level: See 145 TPH rate in #1 summary sheet (HIGH) see process statement sheet, at the end.

III. **PROCEDURE**

Environmental Protection Agency reference methods as adopted by DER, Chapter 17-2, and approved by EPA.

a) Enclosed is a schematic of our EPA stack sampler, Andersen Universal #1283

b) Reference methods Nos. 1, 2, 4, 5, ~~8~~, ~~9~~, and 13-B ✓

IV. **ANALYTICAL TECHNIQUE**

a) Equipment operation calibration and maintenance as per EPA's book APTD-0576

b) Laboratory procedure as per EPA reference methods 5, ~~8~~, and 13-B for particulate, ~~SO2~~ and ~~acid mist~~, and fluorides ✓

V. **DATA AND CALCULATIONS**

a) Field data: Handwritten ✓, and as entered into the computer ✓

b) Laboratory data ✓

c) Calculations used in determination of emission rates: EPA formulas from the above EPA reference methods are programmed into the computer, examined, and approved by DER in 1984

d) Determination of the traverse points, EPA reference method 1, revised ~~9/22/83~~ 9-14-87 ✓, Federal

Register Appendix A of 40 CFR, Part 60. (Marked CURVE OR tables are attached.)

e) Determination of moisture sheet

VI. CHAIN OF CUSTODY

The same Environmental Affairs technicians sample all stacks and give the filters and bottles to the Environmental Affairs chemist, W. T. Tjiong, who runs all the analyses. A form to this effect is attached at your request; ~~it was not required, in our case, in the past.~~

VII. APPENDIX

Calibration sheets for sampling equipment:

a) Pitot tube, if different than 0.830

b) Pitot tube post-test inspection

c) Meter box (against wet meter)

d) Meter box pre-test Y coefficient check (Y<3%)

e) Meter box post-test calibration check (3@10 CF) at maximum vacuum encountered during test

f) Probe nozzle calibration and post-check

g) Thermocouple and thermometer calibration sheets, pre- and post-test

h) V. E. DETERMINATION SHEET, if required ×(N.R.)

VIII. VERIFICATION OF PRODUCTION

✓Process statement sheets summary enclosed (strip charts are removed only once every three weeks) are stored and may be verified)✓

✓MJM:lhc
2/20/87
Rev. 1/7/88

```
?Unrecognized command - Does not match switch or keyword - 'X'
@TY *.IMG
 AIRDIS.IMG.13
```

DATE: 12/05/87
STACK: 41
RUN: 1
FILTER: #527
---PREV. DATA----------

---CALIBRATION---------
ΔH @ 1.83
Cp = 0.830
Dn = 0.248 in.
An = 0.0003355 ft.*2
---NEW DATA-----------
Pb = 30.01 "Hg SITE
Vm = 45.0 ACF
ΔH = 1.89 "H2-O
Tm = 532.54 deg.R
H2Oc (std) 67.000
H2Os (std) 8.100
($\sqrt{P}$**.5) avg = 0.757
Ts = 570.00 deg. R
Ps = 30.03 "Hg STACK
As = 95.03 ft.**2
Time = 1.00 HR

Mn (F)	= 2.58 mg.	PMR =	1.63 lb./HR
Mn (Part)	= 28.50 mg.	PMR =	18.03 lb./HR
Mn (mist)	= 0.00 mg.	PMR =	0.00 lb./HR
Mn (SO2)	= 0.00 mg.	PMR =	0.0 lb./HR
Mn (N)	= 0.00 mg.	PMR =	0.00 lb./HR
Mn (P2O5)	= 0.00 mg.	PMR =	0.00 LB./HR.

Vm (std) = 45.299 DSCF
Vw c (std = 3.154 SCF
Vw sg (std) = 0.382 SCF
Vw(std) = 3.536 SCF
Bws = 0.072 (7.2% MOIST.)
Ms = 28.208
Vs = 44.06 FPS
Qstd = 216648 DSCFM 12998924 DSCFH
%I = 98.71 %
Cs = 0.0000000000000 lb./CF

TO PRINT THIS SCREEN ENTER <CTRL>P,
(HOLD KEY <CTRL> DOWN, PRESS P).
WOULD YOU LIKE TO CONTINUE ? (Y/N):

DATE: 12/05/87
STACK: 41
RUN: 2
FILTER: #528
---PREV. DATA----------

---CALIBRATION---------
ΔH @ 1.83
Cp = 0.830
Dn = 0.248 in.
An = 0.0003355 ft.**2
---NEW DATA-----------
Pb = 30.01 "Hg SITE
Vm = 45.3 ACF
ΔH = 1.87 "H2-O
Tm = 541.46 deg.R
H2Oc (std) 54.000
H2Osg (std) 7.800
($\sqrt{P}$**.5) avg = 0.757
Ts = 570.13 deg. R
Ps = 30.03 "Hg STACK
As = 95.03 ft.**2
Time = 1.00 HR

Mn (F) = 2.87 mg. PMR = 1.85 lb./HR
Mn (Part) = 35.60 mg. PMR = 22.97 lb./HR
Mn (mist) = 0.00 mg. PMR = 0.00 lb./HR
Mn (SO2) = 0.00 mg. PMR = 0.0 lb./HR
Mn (N) = 0.00 mg. PMR = 0.00 lb./HR
Mn (P205) = 0.00 mg. PMR = 0.00 LB./HR.

Vm (std) = 44.848 DSCF
Vw c (std = 2.542 SCF
Vw sg (std) = 0.368 SCF
Vw(std) = 2.910 SCF
Bws = 0.061 (6.1% Moist.)
Ms = 28.329
Vs = 43.97 FPS
Qstd = 218718 DSCFM 13123146 DSCFH
%I = 96.80 %
Cs = 0.0000000000000 lb./CF

TO PRINT THIS SCREEN ENTER <CTRL>P,
(HOLD KEY <CTRL> DOWN, PRESS P).
WOULD YOU LIKE TO CONTINUE ? (Y/N):

DATE: 12/05/87
STACK: 41
RUN: 3
FILTER: #529
---PREV. DATA----------

---CALIBRATION---------
ΔH @ 1.83
Cp = 0.830
Dn = 0.248 in.
An = 0.0003355 ft.**2
---NEW DATA-------------
Pb = 30.01 "Hg SITE
Vm = 44.9 ACF
ΔH = 1.89 "H2-O
Tm = 548.50 deg.R
H2Oc (std) 60.000
H2Oss (std) 7.300
($\sqrt{P}$**.5) avg = 0.758
Ts = 570.08 deg. R
Ps = 30.03 "Hg STACK
As = 95.03 ft.**2
Time = 1.00 HR

Mn (F)	=	2.59 mg.	PMR =	1.70 lb./HR
Mn (Part)	=	28.90 mg.	PMR =	18.98 lb./HR
Mn (mist)	=	0.00 mg.	PMR =	0.00 lb./HR
Mn (SO2)	=	0.00 mg.	PMR =	0.0 lb./HR
Mn (N)	=	0.00 mg.	PMR =	0.00 lb./HR
Mn (P2O5)	=	0.00 mg.	PMR =	0.00 LB./HR.

Vm (std) = 43.884 DSCF
Vw c (std = 2.824 SCF
Vw ss (std) = 0.344 SCF
Vw(std) = 3.168 SCF
Bws = 0.067 (6.7% Moist)
Ms = 28.263
Vs = 44.08 FPS
Qstd = 217884 DSCFM 13073059 DSCFH
%I = 95.08 %
~~Cs = 0.000000000000 lb./CF~~

TO PRINT THIS SCREEN ENTER <CTRL>P,
(HOLD KEY <CTRL> DOWN, PRESS P).
WOULD YOU LIKE TO CONTINUE ? (Y/N):

AIRIPT.IMG.19

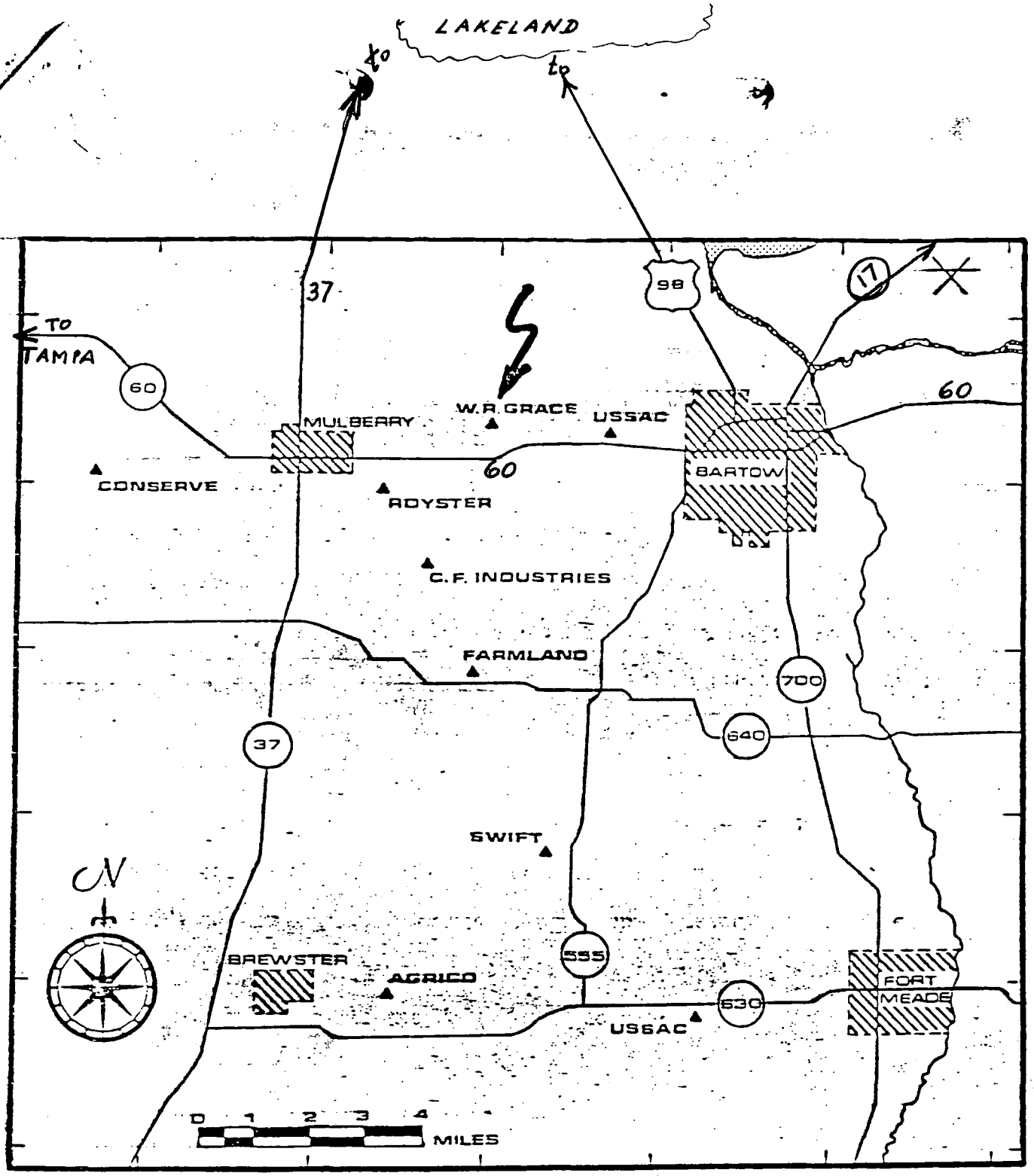
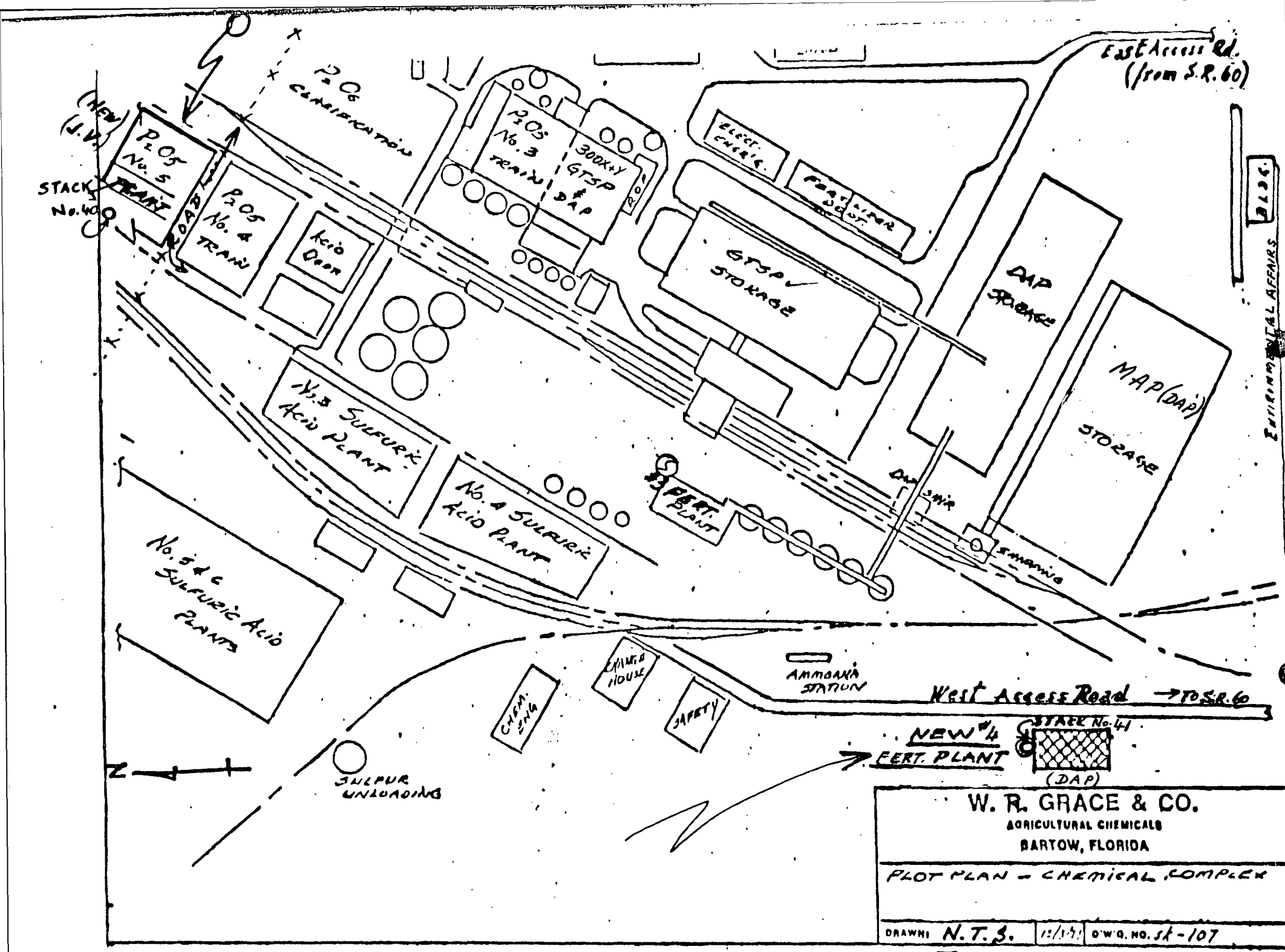


Figure 2. Study Area



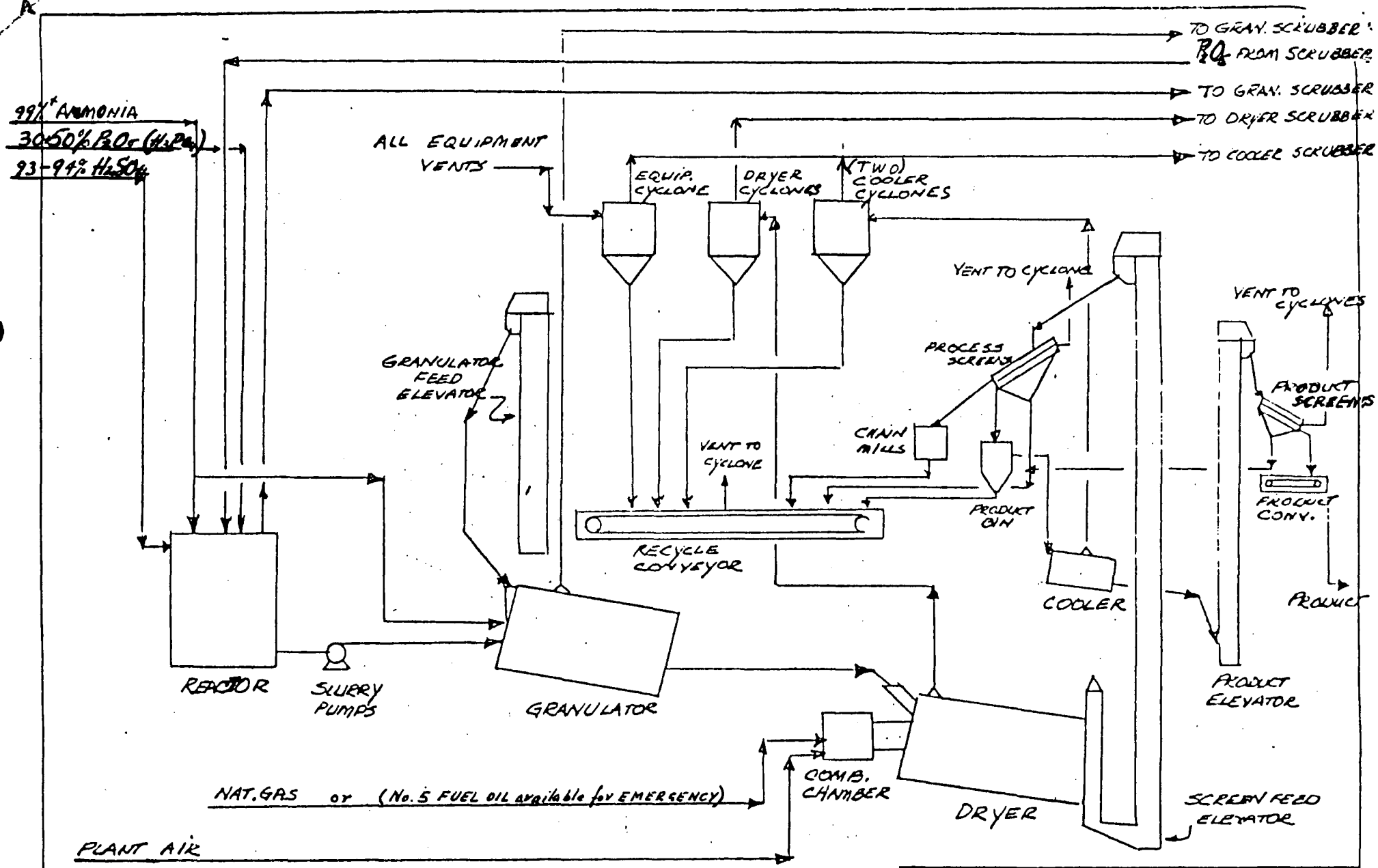
W. R. GRACE & CO.

AGRICULTURAL CHEMICALS

BARTOW, FLORIDA

PLOT PLAN – CHEMICAL COMPLEX

DRAWN: N.T.S.	12/17/	D.W.G. NO. SK-107

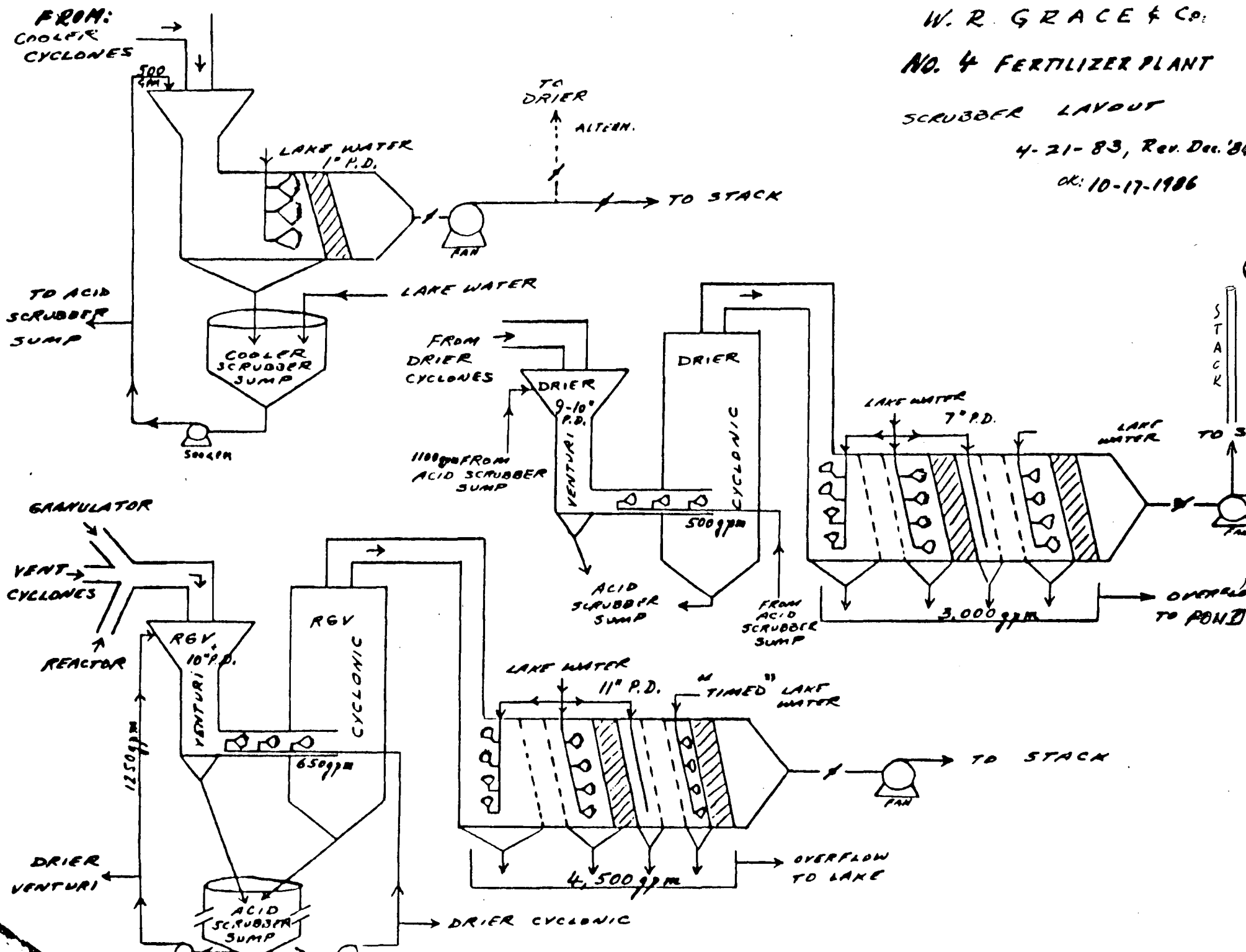


W. R. GRACE & CO.
AGRICULTURAL CHEMICALS
BARTOW, FLORIDA

DAP GRANULATION PLANT No. 4
PROCESS FLOW DIAGRAM - PROCESS

DRAWN: H. CORTES | 12/79 | D'W'G. NO. 1

Sect. V, 6.


W. R. GRACE & Co.
NO. 4 FERTILIZER PLANT
SCRUBBER LAYOUT
4-21-83, Rev. Dec. '86
OK: 10-17-1986
FROM:
COOLER CYCLONES
500 GPM
LAKE WATER 1° P.D.
TO DRIER
ALTERN.
TO STACK
FAN
TO ACID SCRUBBER SUMP
LAKE WATER
COOLER SCRUBBER SUMP
500 GPM
FROM DRIER CYCLONES
DRIER
9-10° P.D.
VENTURI
DRIER
CYCLONIC
1100 GPM FROM ACID SCRUBBER SUMP
500 GPM
LAKE WATER
7° P.D.
LAKE WATER
STACK
TO STACK
GRANULATOR
VENT CYCLONES
REACTOR
RGV
10" P.D.
VENTURI
RGV
CYCLONIC
1250 GPM
650 GPM
ACID SCRUBBER SUMP
FROM ACID SCRUBBER SUMP
3,000 GPM
OVERFLOW TO POND
LAKE WATER
11" P.D.
"TIMED" LAKE WATER
TO STACK
FAN
4,500 GPM
OVERFLOW TO LAKE
DRIER VENTURI
DRIER CYCLONIC

W. R. GRACE & Co., Barlow Works, STACK No. 41 ✓

3.8 SCRUBBER - CHECKLIST FOR CONTROL DEVICE MONITOR

Parameters of design and operation affecting performance:

Monitor Name "DUCON" Test date 12-5-87

Type of scrubber

✓venturi plate ✓other CYCLONIC and PACKED CROSS FLOW SCRUBBERS

turbulent bed spray

Design of efficiency F:85%; P.M:96 %

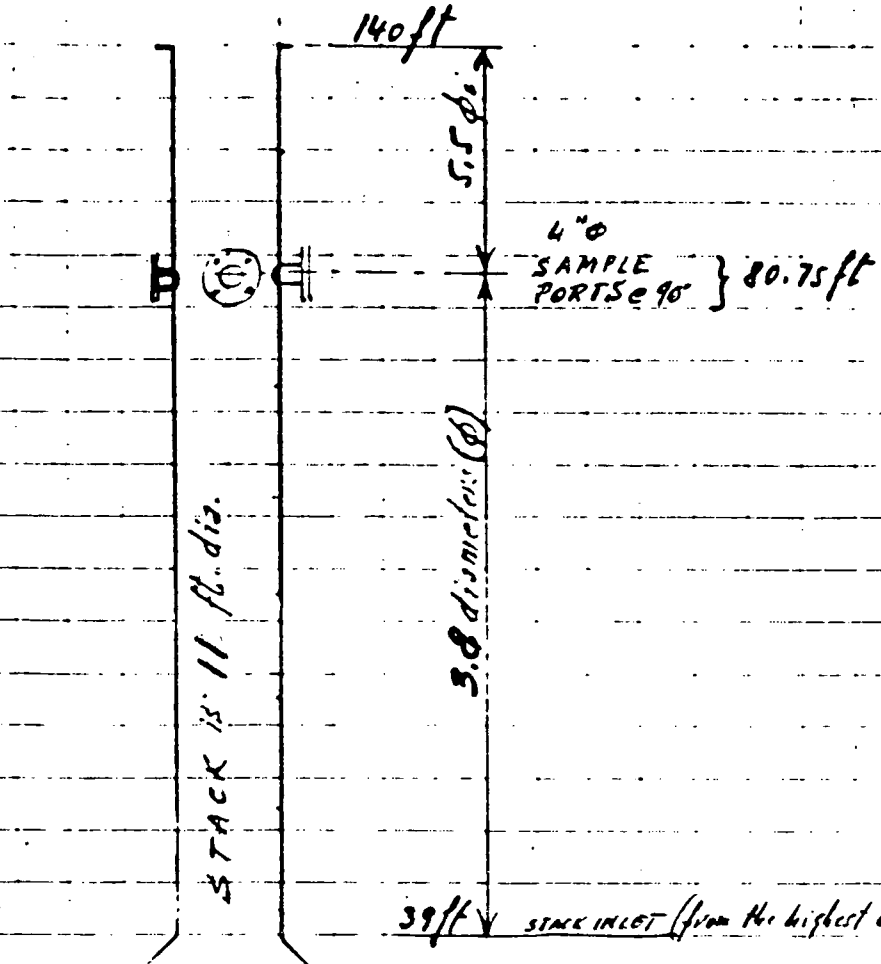
	Design	During test
Pressure drop across scrubber, in H_2O	29	21
Nozzle pressure, pounds/sq in	60	20-25
Gas volume flow out of scrubber a cfm	250,000	251,000
Fan motor ampers	N.A.	—
Liquid flow rate to scrubber gal/min	12,300	12,000
Liquid/gas rates L/g		
Recirculation of scrubbing liquid %	100% THEN A NEARBY LAGOON	
Gas temperature of scrubber of	100-130°F	110°

Preconditioning or dilution air None

M.J.M.

Agricultural Chemicals Group
W. R. Grace & Co.
P.O. Box 471
Bartow, Florida 33830

SHEET NO No. 4 FERTILIZER Plant Stack No. 4
CALCULATED BY MJM DATE 12/5/86
CHECKED BY DATE rev. 1/10/88
SCALE N.T.S. MJM



VENTURI & CYCLONIC & CROSS FLOW packed SCRUBBERS by "DUCON"

SAMPLE:
12 pts. each (ø) way:
6 pts. from each of the 4 ports, from the outside of the stack to the center.

Figure 1. DER minimum traverse points for particulate traverses.

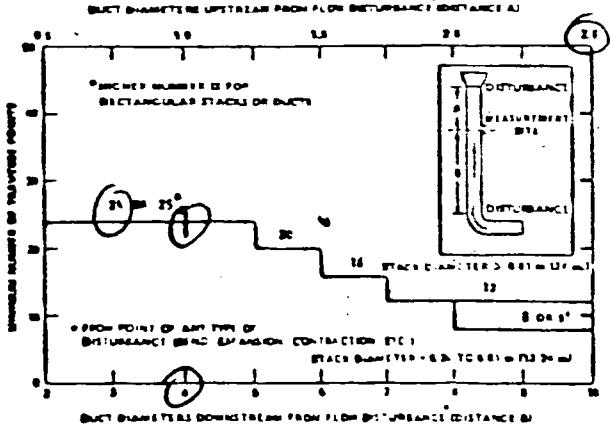


Figure 2. EPA minimum traverse points for particulate traverses.