Check Sheet

Company Name: PCR, Inc.
Permit Number: AC 01-235570, -235085
PSD Number: └ Issued └ Withdrawn
Permit Engineer: JAR JAR

Application:

- ☐ Initial Application
  - ☐ Incompleteness Letters
  - ☐ Responses
  - ☐ Waiver of Department Action
  - ☐ Department Response
  - ☐ Other

Cross References:

- ☐
- ☐
- ☐

GENERAL

Intent:

- ☐ Intent to Issue
- ☐ Notice of Intent to Issue
- ☐ Technical Evaluation
- ☒ BACT or LAER Determination
- ☐ Unsigned Permit
  - Correspondence with:
    - ☐ EPA
    - ☐ Park Services
    - ☐ Other
- ☐ Proof of Publication
  - ☐ Petitions - (Related to extensions, hearings, etc.)
  - ☐ Waiver of Department Action
  - ☐ Other

Final Determination:

- ☐ Final Determination
- ☐ Signed Permit
- ☒ BACT or LAER Determination
  - ☐ Other

Post Permit Correspondence:

- ☐ Extensions/Amendments/Modifications
- ☐ Other

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET

POST OFFICE BOX 6526

TALLAHASSEE, FLORIDA 32314

(904) 222-7500

FAX (904) 224-8551

FAX (904) 425-3415

Writer's Direct Dial No.
(904) 425-2360

October 28, 1994

VIA HAND DELIVERY

Mr. Bruce Mitchell
Environmental Manager
Florida Department of
Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road, MS-5505
Tallahassee, FL 32399-2400

RE: PCR, Inc.
Permit Application No. 257730

Dear Bruce:

I wanted to let you know that Northeast District personnel and PCR apparently have made arrangements to tour the chemical plant in Gainesville and then discuss DEP's October 11 comment letter this Monday, October 31. If you or John Reynolds would like to participate by telephone in the discussions on the comment letter, please call PCR at 904/376-8246, and ask for Pat at extension 222. As I understand it, approximately 11:15 a.m. would be the appropriate time to call. If you have any questions or concerns, please call me at my office on Monday morning (I'm not planning to attend this meeting).

Enclosed, for your information, are copies of KBN's July 1, 1994 letter to the Northeast District, Clair Fancy's May 13, 1994 memorandum to the Northeast District, and my May 12, 1994 letter to Clair.

As always, thanks for your courtesy and cooperation.

Sincerely,

Jim

James S. Alves

JSA:lb
enclosures

July 1, 1994

Ms. Rita C. Felton
Florida Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7577

Re: Alachua County - AP
PCR, Inc.
AC01-235570
AC01-235085
Facility Permit

Dear Ms. Felton:

On behalf of PCR, Inc., I would like to thank you and Mr. Bob Leetch for your time in meeting with us on June 2, 1994, to discuss the pending construction permits and facility permit for the PCR facility. I believe the meeting was very productive in defining the remaining steps in permitting the facility, and the permit conditions that are acceptable to both PCR and FDEP which allow flexibility to manufacture specialty chemicals.

By this correspondence, I would like to confirm the agreements reached at this meeting. These are summarized as follows:

1) A single permit application will be submitted covering all of the regulated air emissions at PCR's facility, including the processes already permitted or for which an Intent To Issue draft permit has been issued.

2) PCR will withdraw the previously submitted ammoniation process permit application (AC01-235085), since this will be included in the new, facility-wide permit application. By means of this letter, PCR hereby withdraws the ammoniation process permit application. It is our understanding that this will result in automatic revocation of DEP's January 28, 1994, Intent To Issue, which never became final due to PCR's requests for extension of time.

3) FDEP will proceed with issuing the new Prosil operating permit, with conditions the same as in the current permit. This permit will later be rolled into the facility operating permit, when issued.

13357A1/5

4) PCR utilizes several small process scrubbers on an as needed basis for the purpose of enhancing worker health and safety. The emissions from these processes are very minor, and the scrubbers are not necessary from an ambient air quality standpoint. In the facility-wide permit application, PCR will provide an estimate of the uncontrolled emissions from these processes for FDEP review. PCR's understanding is that under the facility-wide permit it may continue to operate these small process scrubbers only on an as needed basis for enhancing worker health and safety.

5) In the facility-wide permit application, PCR will present a list of all hazardous air pollutants (HAPs) potentially emitted by the facility (those HAPs regulated by the Clean Air Act).

6) Due to the large number of chemicals potentially manufactured at PCR, detailed emission calculations will not be submitted with the facility-wide permit application (these calculations will be performed starting with the first monthly report required to be submitted under the construction permit). However, the methodology for performing the calculations will be presented in the permit application. This methodology will essentially be the same as that presented in the R-10 permit application.

7) Small size batch processes less than 50 gallons in size will not be regulated under the air permit, due to the insignificant nature of such operations. However, emissions from these small batch processes will be accounted for in the monthly air emissions reporting. In this respect, PCR will propose methods to conservatively estimate emissions from these small batch processes.

8) In regard to the draft permit language contained in Clair Fancy's memo to Rita Felton dated May 13, 1994, the Northeast District finds these conditions to be acceptable. The only change to these draft conditions agreed upon was to draft Specific Condition 7(b), dealing with operation of control devices. It was agreed that this condition would be modified to read as follows:

> The air pollution control equipment specified in this permit shall be operated at all times during which the process equipment associated with the control equipment is operated under conditions where there is a potential to emit a VOC, HAP, or other regulated air pollutant, except during periods of malfunctions or emergencies when operation of such equipment is not feasible. The control equipment shall be operated and maintained in a manner consistent with the information presented in the application.

9) PCR will submit the facility-wide permit application as soon as possible. FDEP will issue the draft permit in approximately September, 1994. The construction permit will be issued for a period of time to allow PCR to fully implement a pollutant reporting system, as well as any required monitoring and recordkeeping. The first reporting/recordkeeping will be piloted beginning in January 1995. The construction permit expiration date will be approximately June 30, 1995, to allow several months to fine tune the reporting procedures, perform any additional compliance testing, and time to prepare an operating permit application for submittal by April 30, 1995. The first monthly report submitted to DEP will be for March 1995, which will be due by April 28, 1995. This report will accompany the operating permit application.

Once again, on behalf of PCR let me thank you and Bob for meeting with us to discuss these issues. If you have any questions concerning this matter, please call me at your earliest convenience.

Sincerely,

David A. Buff

David A. Buff, P.E.
Principal Engineer

DAB/mlb

cc: Files
Warren McClain
Bruce Hardman
Keith Baucom
John Bailey
Jim Alves

Memorandum

Florida Department of Environmental Protection

RECEIVED

MAY 17 1994

Hopping Boyd Green & Sams

TO: Chris Kirts, District Air Program Administrator
Northeast District

FROM: Clair Fancy, Chief, Bureau of Air Regulation

DATE: May 13, 1994

SUBJECT: PCR, Inc.

On Monday, May 9, John Reynolds and I met with Attorney Jim Alves, David Buff, and employees of PCR, Inc., to discuss permit conditions that would protect the environment, give a meaningful compliance determination mechanism, insure that the source (facility) is a non-Title V source, and still allow this company the operational flexibility for them to be able to develop and manufacture customized chemical products on a rapid basis. The attached letter and specific conditions (particularly #4, 5a, b, and c, 6, 10, and 11) should meet all of these needs. Please utilize the attached conditions for the permit. If you or your staff have any questions, call me.

CHF/ch

attachments

cc: John Brown
John Reynolds

I N T E R O F F I C E   M E M O R A N D U M

Date: 06-Oct-1994 01:41pm ES
From: Bruce Mitchell TAL
MITCHELL_B
Dept: Air Resources Manageme
Tel No: 904/488-1344
SUNCOM:

TO: Rita Felton JAX (FELTON_R@A1@JAX1)

Subject: RE: PCR

October 6, 1994

Rita,

For the HAPs, all you have to state to the company is that they have to quantify all of the potential emissions for those HAPs that they emit in their processes and listed in Chapter 62-213, F.A.C.; and, therefore, cannot be exempted. Secondly, I will track down a copy of Subpart RRR and forward it to you.

Take care,

Bruce
SC/278-1344

I N T E R O F F I C E   M E M O R A N D U M

Date: 06-Oct-1994 09:10am EST
From: Rita Felton JAX
FELTON_R@A1@JAX1
Dept: Northeast District Office
Tel No: 904/448-4310 Ext. 237
SUNCOM:

TO: Bruce Mitchell TAL (MITCHELL_B @ A1 @ DER)

Subject: PCR

Good Morning, Bruce.

I was wondering what was the status on you're E-mail concerning the language that should be used in the completeness letter to PCR explaining that there sources of VOC and HAPs cannot be exempted pursuant to 62-4?

Also, PCR had sated in their permit that they are subject to 40 CFR Part 60 Subpart RRR. The copy of the CFR that I have calls this section reserved. Could you have it sent to me so I can read the requirements?

Thank you.

Rita

I N T E R O F F I C E   M E M O R A N D U M

Date: 06-Oct-1994 01:10pm ES
From: Bruce Mitchell TAL
MITCHELL_B
Dept: Air Resources Manageme
Tel No: 904/488-1344
SUNCOM:

TO: Rita Felton JAX (FELTON_R@A1@JAX1)

Subject: RE: PCR, Inc.

October 6, 1994

Rita,

As we spoke of last week, PCR, Inc. is a Title V Source due to NSPS/NESHAPS affected emissions units/facilities at the facility.

Again, we do not yet have the permitting SIP avenue to restrict 112r type pollutants or HAPs; however, it does appear that EPA will approve the direction that we are approaching on the issue in the recent corrective amendments and we will soon (~ Dec.-Jan.) be able to address these pollutants in a permitting action and establish federally enforceable conditions that could make a facility a non-Title V Source. Through permitting, we can establish non-Title V status regarding the criteria pollutants without a problem if the facility desires it, but the permit conditions need to be carefully written so that we have no problem verifying compliance [i.e., just restricting a pollutant to 39.9 TPY (threshold of 40 TPY) is not adequate....there needs to be some type critical record keeping and reporting requirements also].

I hope I have addressed your comments and concerns regarding this facility. If there are any questions, please drop me an E-mail or give me a call. Take care.

Bruce Mitchell
SC/278-1344

I N T E R O F F I C E   M E M O R A N D U M

Date: 26-Sep-1994 11:39am ES
From: Bruce Mitchell TAL
MITCHELL_B
Dept: Air Resources Manageme
Tel No: 904/488-1344
SUNCOM:

TO: Rita Felton JAX (FELTON_R@A1@JAX1)

Subject: RE: PCR, Inc.

September 26, 1994

Rita,

We have received the application this a.m. We will review and advise. You are correct in your assessment for HAPs regarding synthetic issues.

Sincerely,

Bruce

I N T E R O F F I C E   M E M O R A N D U M

Date: 22-Sep-1994 09:33am EST
From: Rita Felton JAX
FELTON_R@A1@JAX1
Dept: Northeast District Office
Tel No: 904/448-4310 Ext. 237
SUNCOM:

TO: Bruce Mitchell TAL (MITCHELL_B @ A1 @ DER)

Subject: PCR, Inc.

Bruce---

I have received an application for PCR, Inc. in Gainesville that appears, at first glance, to be similar to Sheffield Steel as far as the classification of the facility.

PCR, has stated in the application that overall facility emissions, including fugitive emissions will not exceed 10 TPY of any one HAP, 25 TPY of any combination of HAPs, or 100 TPY of any regulated air pollutant. The facility also included a list of the potential HAPs being/or that will be emitted from the facility (approximately 90 are listed).

Since the State currently does not have a synthetic non-Title V mechanism for HAP emitting sources, the above statements would not be considered to be federally enforceable, correct? And therefore, the facility would be classified as Title V.

I am sending you a copy of the application that was submitted to the NED office. Could you please review it and make a determination as to whether the facility would be classified as a Title V or synthetic non-Title V source?

Thank you in advance for your prompt attention to this matter.

Rita

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT
RECEIVED
SEP 19 1994
DEP JACKSONVILLE

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: *Specialty Chemical Manufacturer* [ ] New[1] [x] Existing[1]

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

COMPANY NAME: *PCR, Inc.* COUNTY: *Alachua*

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) *Facility Emissions*

SOURCE LOCATION: Street *5002 Sperry Drive* City *Gainesville*

UTM: East *377.6* North *3286.7*

Latitude *29* ° *42* ' *21* "N Longitude *81* ° *15* ' *58* "W

APPLICANT NAME AND TITLE: *John W. Bailey, Jr., Vice President - Manufacturing*

APPLICANT ADDRESS: *P.O. Box 1466, Gainesville, Florida 32602*

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

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

I certify that the statements made in this application for a *construction* 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: John W. Bailey Jr.

John W. Bailey, Jr., Vice President-Manufacturing
Name and Title (Please Type)

Date: 9-16-94 Telephone No. *(904) 376-8246*

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 Administration 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 David A. Buff

David A. Buff
Name (Please Type)

KBN Engineering and Applied Sciences, Inc.
Company Name (Please Type)

1034 NW 57th Street, Gainesville, FL 32605
Mailing Address (Please Type)

Florida Registration No. *19011* Date: *09/16/94* Telephone No. *(904) 331-9000*

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.

Refer to Attachment A

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

Start of Construction *Upon permit issuance* Completion of Construction *July 1995*

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.)

Total of 9 wet scrubbers: Duall PT500, 5 units, $27,000 each installed; Duall F-102, 1 unit, $8,600 installed; Duall FW-300, 1 unit, $18,000 installed; Duall FW-303,1 unit, $31,000 installed; and a 2-ft-diameter x 20-ft tall scrubber, $25,000 installed

Prosil scrubbers/adsorbers are already permitted; therefore, costs not provided.

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

AO01-250775 for Prosil Process: Issued June 23, 1994; expires June 30, 1999

AC01-235570 for R-10 Process: Issued February 14, 1994; expires March 31, 1995.

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)

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. _No_
3. Does the State "Prevention of Significant Deterioration" (PSD) requirement apply to this source? If yes, see Sections VI and VII. _No_
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? _No_
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? _Refer to Att. A_

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.

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		
See Attachment A				

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

1. Total Process Input Rate (lbs/hr): *See Attachment A*

2. Product Weight (lbs/hr): *See Attachment A*

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/hr	T/yr	
	See Attachment A tables						

[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 with~~out~~ 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)
See Attachment A				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Not Applicable			

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

Fuel Analysis:

Percent Sulfur: ____________ Percent Ash: ____________

Density: ____________ lbs/gal Typical Percent Nitrogen: ____________

Heat Capacity: ____________ BTU/lb ____________ BTU/gal

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

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

Annual Average *Not Applicable* Maximum ____________

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

Process water is treated in plant process water treatment system and then discharged to publicly owned treatment works.

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

Stack Height: *See Attachment A* ft. Stack Diameter: ______ ft.

Gas Flow Rate: ______ ACFM ______ DSCFM Gas Exit Temperature: ______ °F.

Water Vapor Content: ______ % Velocity: ______ FPS

SECTION IV: INCINERATOR INFORMATION

Not Applicable

Type of Waste	Type O (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 Inciner-ated							
Uncon-trolled (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 Diameter: ______ 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 devices: [ ] 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)]
   See Attachment A.
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.
   See Attachment A.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
   See Attachment A.
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 Attachments A and B.
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 Attachment A.
6. An 8 ½" 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.
   See Attachment A.
7. An 8 ½" 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 (Examples: Copy of relevant portion of USGS topographic map).
   See Attachment A.
8. An 8 ½" 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 Attachment A.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.
A check for $5,000 is attached to cover the permit application fee.

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

Not Applicable

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

[ ] Yes [ ] 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 Devices:

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 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:

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

Not Applicable

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 ____

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.

ATTACHMENT A

ATTACHMENT A

1.0 INTRODUCTION

PCR, Inc., is a specialty chemical manufacturer located in Gainesville, Florida specializing primarily in organosilicon and organofluorine technology. The company was founded in 1953 and currently occupies a 19-acre plant site situated just north of the Gainesville Regional Airport. Its business is largely a service-oriented supply business. Customers select PCR based significantly on PCR's ability to supply customized chemical products on a timely basis so that the customer's schedules can be met. The location of the site in relation to the surrounding area is presented in Figure 1-1.

PCR manufactures organofunctional silanes and organofluorine intermediates. Silanes are used by customers to manufacture polymer composites, semiconductors, adhesives, sealants, coatings, silicone polymer intermediates and additives, and concrete and masonry water repellents. Organofluorine intermediates are used to make pharmaceuticals, insecticides, herbicides, polymers, and functional fluids and as a substitute for ozone-depleting chlorofluorocarbons.

PCR manufactures approximately 850 products annually, with about 100 of these being made on commercial scale each year and the remainder being made on laboratory and pilot plant scale as needed to maintain inventory and to meet customer demand. PCR has a staff of chemists and engineers who develop new products for PCR in cooperation with its customers. On average, about 30 projects are actively being pursued at any specific time. Each of these can involve a different chemical product and may involve a number of different chemical feedstocks and intermediates as well. The elapsed time for the development of the products from concept to actual manufacture varies from 2 weeks to a few months.

Although the overall quantity of volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions associated with PCR's activities is very small, a wide variety of HAPs are potentially emitted. PCR does not normally operate equipment dedicated to a single product. Most equipment is general purpose for batch processing and is used in a flexible manner to process any appropriate product based on scheduling and customer needs. PCR needs the regulatory flexibility to process any of its 850 chemical products on very short notice.

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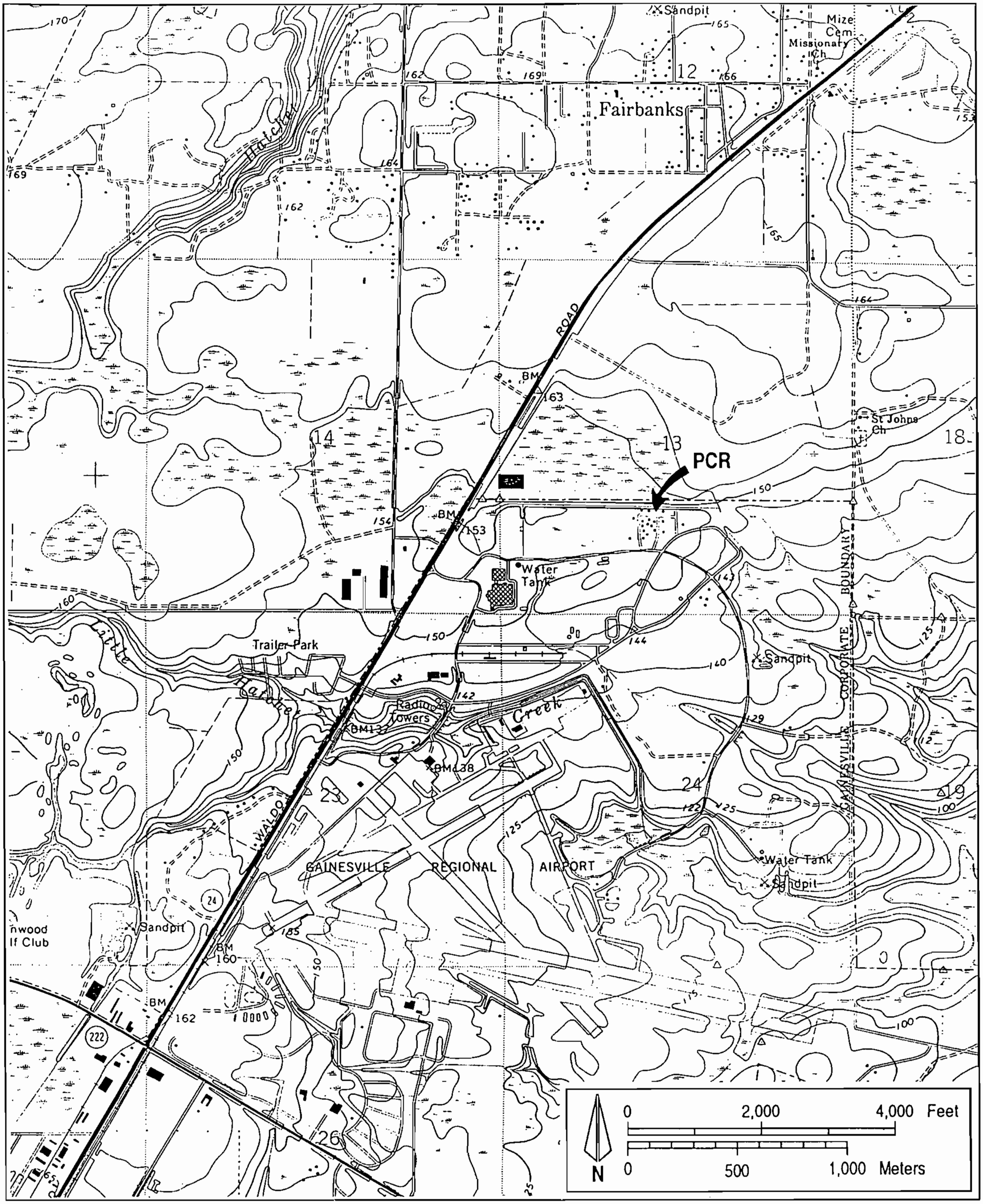

Figure 1-1
General Location of PCR Facility

In addition to several operations that manufacture a number of specialty chemicals, product research and development (R&D) is ongoing at the facility. These activities are directed towards improving existing products as well as developing new products and applications.

Due to the types of chemicals manufactured at PCR, information regarding manufacturing processes, quantities of raw materials utilized, and chemicals produced is highly sensitive. Therefore, such information is classified as confidential.

This application is being submitted to obtain an air construction permit for the entire PCR facility, covering all existing air emission sources at the facility (including the R-10 process, which has already been issued a construction permit and is currently under construction, to be completed in September/October 1994). Currently, the facility has an operating permit for the Prosil process and has withdrawn an application to construct for the Ammoniation process in Building 32a. It is intended to incorporate the R-10 process, ammoniation process, and Prosil process permits into this single construction permit for the entire facility. This single permit will cover all air emission sources located at the facility (unless exempt) and will lead to a facility operating permit. The facility/operating permit will also include the R-10 process, Ammoniation process, the Prosil process, the Norbornadiene process (to be constructed beginning in January 1995) and any other present and future processes. Another project may be the manufacture of vinyl methyl cyclics in the R-10 process. Additional details shall follow as soon as they become available.

2.0 MANUFACTURING PROCESSES

PCR's facility in Gainesville, Florida, consists of approximately 50 buildings/process units. A plot plan of the facility is presented in Figure 2-1. Forty-one of these areas contain processes/equipment which have the potential to emit regulated air pollutants as defined in Title V of the Clean Air Act Amendments of 1990. Some of these areas emit what are considered to be insignificant amounts of pollutants. The remaining buildings/process areas do not result in any air emissions or are exempt from being permitted due to categorical exemptions provided in Florida Department of Environmental Protection (FDEP) Rules. A list of each building and the types of pollutants which may potentially be emitted are listed in Table 2-1.

This table identifies those process areas which are categorically exempt (by FDEP Rule 62-210.300) or are requested to be exempted by virtue of insignificant emissions pursuant to FDEP Rule 62-4.040.

The location of major emission points are also shown on the plot plan in Figure 2-1.

The following discussion describes: 1) products manufactured at PCR, 2) process equipment, 3) types of emissions, 4) emission points, and 5) control devices for each of these buildings/areas.

Throughout the discussion, the term *exempt from permitting* is used to describe emissions units that emit very small amounts of pollutants. It is requested that these activities not be specifically regulated in the air permit. However, PCR is proposing to track emissions of these sources on a routine basis.

PCR utilizes several small scrubbers in the facility for purely OSHA (work place) purposes. In discussions with FDEP staff, it was agreed that these scrubbers would not be regulated in the air permit if emissions from these scrubbers are reported as uncontrolled emissions. In PCR's monthly tracking of air emissions, emissions from processes containing these small scrubbers will be reported as uncontrolled. These scrubbers are identified in the following discussion and in Section 4.0.

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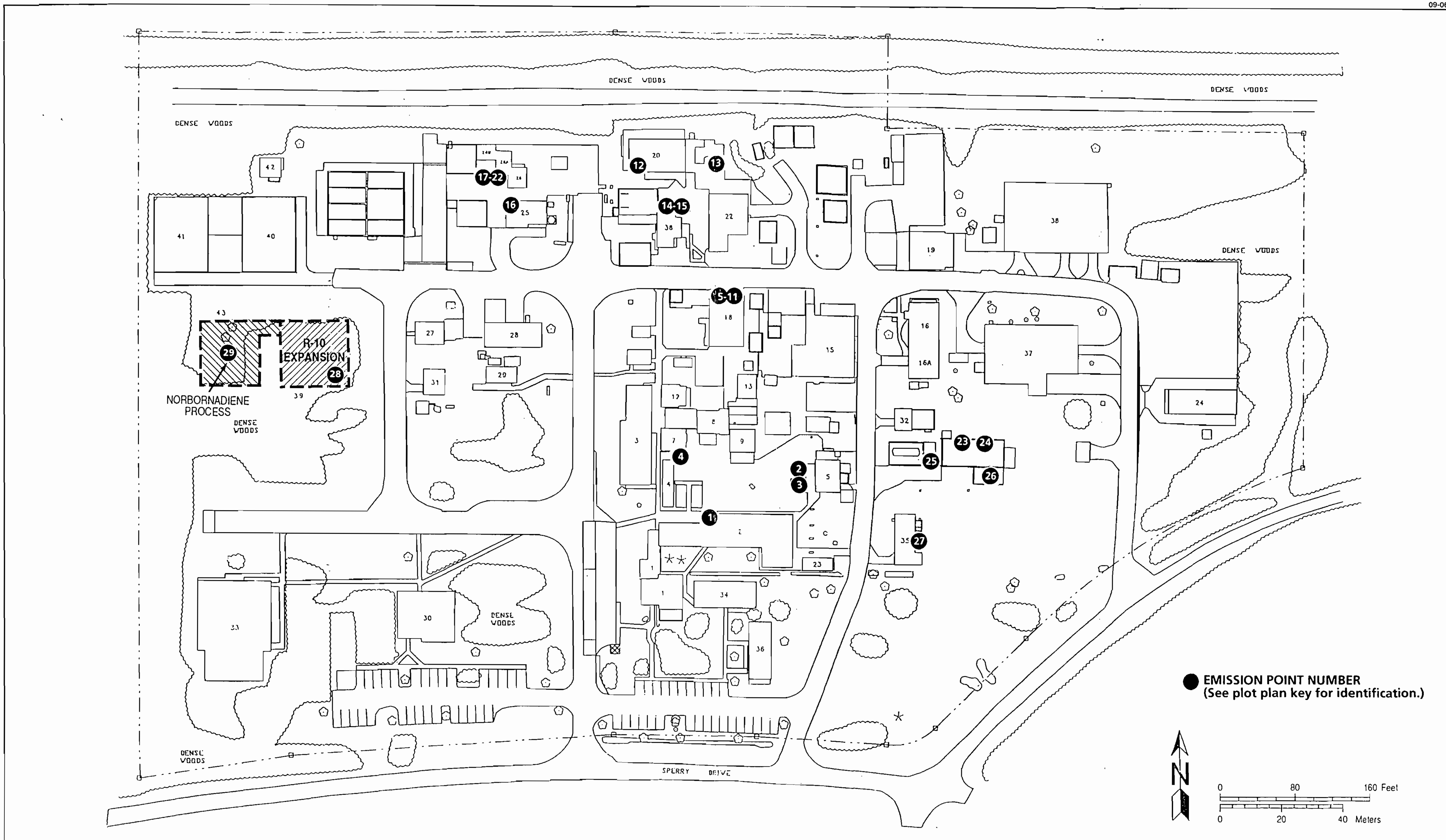

Figure 2-1
Plot Plan of PCR Production Plant Site

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Plot Plan Key

Emission Point Number	Building Number	Emission Point Source	Abbreviation
1	2 West	Vertical packed-bed fume scrubber	WS 2-1
2	5	Vertical packed-bed fume scrubber	WS 5-1
3	5	Aspirator/venturi scrubber	
4	7	Vertical packed-bed fume scrubber	WS 7-1
5	18	Autoclave	
6	18	Aspirator	A-1 (East)
7	18	Aspirator	A-2 (West)
8	18	Vertical venturi packed-bed fume scrubber with demister	WS 18-1 (East)
9	18	Vertical packed-bed fume scrubber	WS 18-2 (West)
10	18	Vertical packed-bed fume scrubbers (2) in series	WS 18-3 (NW)
11	18	Carbon bed absorber	
12	20 (South)	Vertical packed-bed fume scrubber	WS 20-1
13	20 (East)	Vertical packed-bed fume scrubber	WS 20-2
14	21	Acid mist eliminator	WS 21-1
15	21	Scrubber/Flare for Uracil process	WS 21-2
16	25	Distillation column	S-4
17	26	Silane absorber	WS 26-1
18	26	Venturi vertical packed-bed fume scrubber	WS 26-2
19	26	HCl absorber	WS 26-3
20	26	HCl absorber	WS 26-4
21	26	Caustic vertical packed-bed fume scrubber	WS 26-5
22	26	Venturi vertical packed-bed fume scrubber	WS 26-6
23	32a	HCl storage tank venturi eductor	
24	32b	Ammoniation tanks (2)	
25	32b	Ammonia stripper tower	
26	32c	VOC stripper	
27	35	Vertical packed-bed fume scrubber	WS 35-1
28	39	Venturi vertical packed-bed fume scrubber	WS-39-1
28	39	Vertical packed-bed fume scrubber	WS-39-2
29	43	Flare for Norbornadiene process	

Table 2-1. PCR, Inc. Buildings and Types of Pollutants Potentially Emitted (Page 1 of 3)

Building Number	Building Name	Types of Air Pollutant(s)	Categorically Exempt Emissions per FDEP Rule 62-210.300	Insignificant Emissions per FDEP Rule 62-4.040
1	Plant Office	None		
2 West	Research & Development (R&D) Lab	HAP, VOC		Yes
2 East	Catalog Manufacturing	HAP, VOC		Yes
3	Analytical Wet Lab	VOC	Yes: Physical/ Chemical Analysis Only	
4	Quality/Compliance Trailer Offices	None		
5	Pilot plant			
	< 50 gallon	HAP, VOC		Yes (<50 gallons)
	≥ 50 gallon	HAP, VOC		
6	Analytical Instrumentation Lab		Yes: Physical/ Chemical Analysis Only	
7	R&D Lab	HAP, VOC		Yes
8	Catalog Manufacturing Lab	HAP, VOC		Yes
9	Material control setting facility	HAP, VOC		Yes
10	R&D Chemical Storage	HAP, VOC		Yes
11	R&D/Catalog Equipment Storage	None		
12	Sample Retention Room	VOC		Yes
13	Boilers (30 and 60 HP) Hot Oil Heater (<30 HP)	Products of natural gas combustion	Yes	
14	Air Compressor	None		
15	Material Control Shipping/Receiving Offices	VOC		Yes
15a	Material Control Vault	HAP, VOC		Yes
16	Manufacturing Offices	None		
17	Plant Snackroom	None		
18	Commercial Reactors	HAP, VOC		
	Mechanical Chiller	HAP, VOC		Yes
	Drum Washing	HAP, VOC		Yes

Table 2-1. PCR, Inc. Buildings and Types of Pollutants Potentially Emitted (Page 2 of 3)

Building Number	Building Name	Types of Air Pollutant(s)	Categorically Exempt Emissions per FDEP Rule 62-210.300	Insignificant Emissions per FDEP Rule 62-4.040
19	Maintenance Shop Offices	None		
20	R&D/Catalog Autoclaves (1 gallon - 20 gallons)	HAP, VOC		Yes
20a	Autoclaves (20 and 200 gallon autoclave)	HAP, VOC		Yes (20 gal autoclave only)
21	Uracil Manufacturing	Sulfuric Acid Mist, SO_3, CO		Yes (CO only)
22	Uracil Drying Area	None		
22a	Operator Control Room	None		
22b	Mechanical Chillers (2)	None		
23	Pilot Plant Mechanical Chiller	HAP		Yes
24	Maintenance/Finished Goods/ Raw Material Storage	HAP, VOC		Yes
25	Prosil Distillation (S-4, S-5, and S-6)	HAP, VOC		
26, 26a, 26b	Prosil Production (R-8, R-11, and R-14)	HAP, VOC		Yes (tank farm/ drumming operation only).
	Prosil Mechanical Chiller	HAP, VOC		Yes
27	200 HP Boiler	Products of natural gas combustion	Yes; <50 MMBtu/hr for site	
27a	200 HP Boiler	Products of natural gas combustion	Yes; <50 MMBtu/hr for site	
28	West Maintenance Shop	VOC		Yes
28a	Instrumentation & Electrical Office and Shop	None		
29	Cooling Tower (1)/ Mechanical Chillers (2)	None		
30	Shower/Locker Rooms	None		
31	Material Coating Storage	HAP, VOC		Yes
31a	Liquid Nitrogen & Evaporator	None		
32	Final pH Control Center	HAP, VOC		Yes

Table 2-1. PCR, Inc. Buildings and Types of Pollutants Potentially Emitted (Page 3 of 3)

Building Number	Building Name	Types of Air Pollutant(s)	Categorically Exempt Emissions per FDEP Rule 62-210.300	Insignificant Emissions per FDEP Rule 62-4.040
32a	Bulk Caustic & HCl Storage (for pH control)	HAP		Yes
32b	Ammoniation Process	Ammonia, HAP, VOC		
32c	VOC Stripper	HAP, VOC		
32d	Ammonia Stripper	Ammonia		
32e	Magnesium Hydroxide Storage & Delivery	None		
33	Fluids Lab	HAP, VOC		Yes
	Mechanical Chiller	HAP, VOC		Yes
34	R&D Trailer Offices	None		
35	Catalog Manufacturing	HAP, VOC		Yes
36	Engineering Trailer Offices	None		
37	Material Control Warehouse	HAP, VOC		Yes
38	Intermediate/Raw Material/90 Day Pad	HAP, VOC		Yes
39	R-10 Process	HAP, VOC		
40	Intermediate Storage Pad (Drums)	HAP, VOC		Yes
41	Intermediate Storage Pad (Drums)	HAP, VOC		Yes
42	Fire Pump House (diesel)	VOC	Yes; Fire and Safety Equipment	
43	Norbornadiene Process	HAP, VOC		

Building 1 - Plant Office

This building is the main plant office; therefore, there are no emissions.

Building 2 West - Research & Development Lab

This area contains two lab bench hoods vented to the atmosphere and two walk-in hoods with one vented to a vertical packed-bed fume scrubber (WS 2-1). This scrubber also controls emissions from all the lab racks and are utilized for OSHA purposes. Research and development chemicals are prototyped here to be sent to customers as samples. Consequently, production quantities are very small and resulting emissions, consisting of VOC and HAPs, from these activities are extremely low. Therefore, it is requested that these emissions be exempt from permitting. Refer to Section 3.3, Insignificant Emissions.

Building 2 East - Catalog Manufacturing

PCR's catalog chemicals are manufactured as dictated by market demand. Production quantities are very small; consequently, manufacturing occurs in a laboratory setting. This building contains six walk-in lab hoods which are vented to the vertical packed-bed fume scrubber (WS 35-1) in Building 35. These hoods are also connected to the scrubber (WS 7-1) located in Building 7, but are only routed to this scrubber in an emergency. Resulting emissions from these activities, consisting of VOC and HAPs, are extremely low; therefore, it is requested that these emissions be exempt from permitting. Refer to Section 3.3, Insignificant Emissions.

Building 3 - Analytical Wet Lab

Only research based analytical and chemical analysis is performed in this lab area, not manufacturing. Therefore, emissions from this area are exempt from being permitted, pursuant to Rule 62-210.300(3)(o).

Building 4 - Quality/Compliance Trailer Offices

This building contains only offices; therefore, there are no air pollutant emissions.

Building 5 - Pilot Plant

The pilot plant consists of equipment which can be connected in any combination depending on the desired product. The following is a list of all the equipment available at this location: 1) a scrubber, WS 5-1 (custom design from Goodco); 2) an aspirator/venturi scrubber; 3) a 50-gallon steel tank reactor; 4) a 22-liter (5.8 gallon) glass tank reactor; 5) a 10-gallon high-pressure still; 6) a rotary evaporator; 7) a vapor tight, explosion proof centrifuge; and 8) two glass-lined stirred reactors (50 and 100 gallons). Emissions from reactors ($\leq$50 gallons) and major production chemicals consist of VOC and are extremely low; therefore, it is requested that they be exempt from permitting. Refer to Section 3.3, Insignificant Emissions.

Building 6 - Analytical Instrumentation Lab

Only research based analytical and chemical analysis is performed in this lab area, not manufacturing. Therefore, emissions from this area are exempt from being permitted, pursuant to Rule 62-210.300(3)(o).

Less than 1 liter (L) of benzene is used per year in this lab as an internal standard for gas chromatography and mass spectrometry analysis. Benzene waste generated from the standard is stored in a waste drum and transferred offsite for disposal. PCR's total annual benzene quantity from facility waste is less than 1 megagram per year.

Building 7 - Research & Development Lab

This building contains a lab hood vented to a vertical packed-bed fume scrubber (WS 7-1) to control emissions from the production of research and development chemicals. This scrubber is used only for OSHA purposes and is therefore not required for ambient air quality purposes. These chemicals are manufactured in small sample batches per customer specifications. Therefore, resulting emissions, consisting of VOC and HAPs, from these activities are extremely low and it is requested that these emissions be exempt from permitting. Refer to Section 3.3, Insignificant Emissions.

Building 8 - Catalog Manufacturing Lab

Specialty chemicals are manufactured in Building 8 using laboratory batch operations. These chemicals fall within 29 product categories as specified in PCR's Research Chemicals Catalog. These chemicals are manufactured in a laboratory setting. Captured emissions are vented to a vertical packed-bed fume scrubber (WS 35-1) located in Building 35. The scrubber in Building 7 (WS 7-1) is used as back-up when necessary. Production quantities are very small; consequently, resulting emissions, consisting of VOC and HAPs, from these activities are extremely low. Therefore, it is requested that these emissions be exempt from permitting as an insignificant source. Emissions estimates are presented in Section 3.3, Insignificant Emissions.

Building 9 - Material Control Setting Facility

Product bottling of hexamethyldisilazane (HMDS) and a solution of HMDS in propylene glycol monomethylether acetate (PGMEA) occurs in this building. Fugitive VOC emissions may occur during the bottling process. Emissions are a function of the volume of product bottled with the assumption that the vapor displaced is saturated by the product. Tank wagon loading and drum unloading also occur outside of the building. Emissions from Building 9 consist of VOC and HAPs and may occur during tankwagon filling, tank filling, bottle filling, and venting tankwagons. The quantity of emissions is very small; consequently, it is requested that these emissions be exempt from permitting. Emissions estimates can be found in Section 3.3, Insignificant Emissions.

Building 10 - R&D Chemical Storage

This area contains bottled R&D chemical storage. All bottles are closed; however, fugitive emissions may escape from the seals. These emissions are extremely small; therefore, it is requested that this area be exempt from permitting as an insignificant source.

Building 11 - R&D/Catalog Equipment Storage

This area contains only stored equipment for R&D/Catalog chemical analysis and manufacture; therefore, there are no air pollutant emissions.

Building 12 - Sample Retention Room

This area contains bottled quality control samples. All bottles are closed; however, fugitive VOC emissions may escape from the seals. These emissions are extremely small; therefore, it is requested that this area be exempt from permitting as an insignificant source.

Building 13 - Boiler Pad

This area contains two boilers that are no longer used and slated for removal and a hot oil heater (<30 hp). Emissions from this equipment are the products of natural gas combustion. The heat input of these boilers along with the other two facility boilers (200 hp) are within those limits specified in FDEP Rule 62-210.300(3)(a) as being exempt from permitting (overall heat input of less than 50 MMBtu/hr). Heat input for the other two boilers can be found under Building 27 and 27a - Boiler Pad. The hot oil heater is not listed as an exemption in FDEP Rule 62-210.300(3)(a). The heat input of the hot oil heater is 1.2 MMBtu/hr; therefore, it is requested that it also be exempt as an insignificant source.

Building 14 - Air Compressor

This area only contains an air compressor; therefore, there are no emissions.

Building 15 - Material Control, Shipping/Receiving Offices

Catalog chemicals are bottled in small quantities under lab bench hoods. Potential emissions consist of VOC and HAPs. Emissions estimates can be found in Section 3.3, Insignificant Emissions. Due to the very low emissions from this building, it is requested that these activities be exempt from permitting as an insignificant source.

Building 15a - Material Control Vault

This area contains bottled pharmaceutical chemical storage. All bottles are closed; however, fugitive emissions may escape from the seals. These emissions are extremely small; therefore, it is requested that this area be exempt from permitting as an insignificant source.

Building 16 - Manufacturing Offices

This building contains manufacturing offices; therefore, there are no air pollutant emissions.

Building 17 - Production Snackroom

This building is the employee snackroom; therefore, there are no air pollutant emissions.

Building 18 - Commercial Reactors

The reactors in Building 18 are used to manufacture several categories of specialty chemicals using batch operations. These categories can be summarized as follows:

1. alkyl alkoxy silanes,
2. functional silicones,

3. phenyl silicones,
4. silazanes,
5. silicone resins,
6. siloxanes/organo siloxanes,
7. organosilanes/organo chlorosilanes,
8. halogenated alkanes/alkenes,
9. organometallics,
10. ethers,
11. alcohols, and
12. fluoroalkyls.

Chemicals in each of these categories may be manufactured in batches at any time during a year depending on the market demand. Process procedures vary due to the physical characteristics of each of these chemicals; therefore, for the purposes of this permit application, a general process procedure is described below. Slight variations in this procedure may occur depending on the product manufactured. A simplified process flow diagram is presented in Figure 2-2. This figure shows the general material flow, the route of vapors through the process, major process equipment, and control devices.

The following is a list of the equipment available for the manufacturing process in Building 18:

A. Seven stirred reactors:	R-1, R-2, R-3, R-4, R-7, R-9, and R-1518	
B. Distillation column:	S-1	
C. Three vacuum pumps		
D. Three scrubbers:	WS 18-1 (East)	Vertical venturi/packed bed fume scrubber with demister using caustic to remove ammonia emissions from alkoxysilanes and silazanes production.
	WS 18-2 (West)	Vertical/packed bed fume scrubber using sulfuric acid to remove allylamine emissions.
	WS 18-3 (NW)	Dual vertical packed bed fume scrubbers in series using caustic

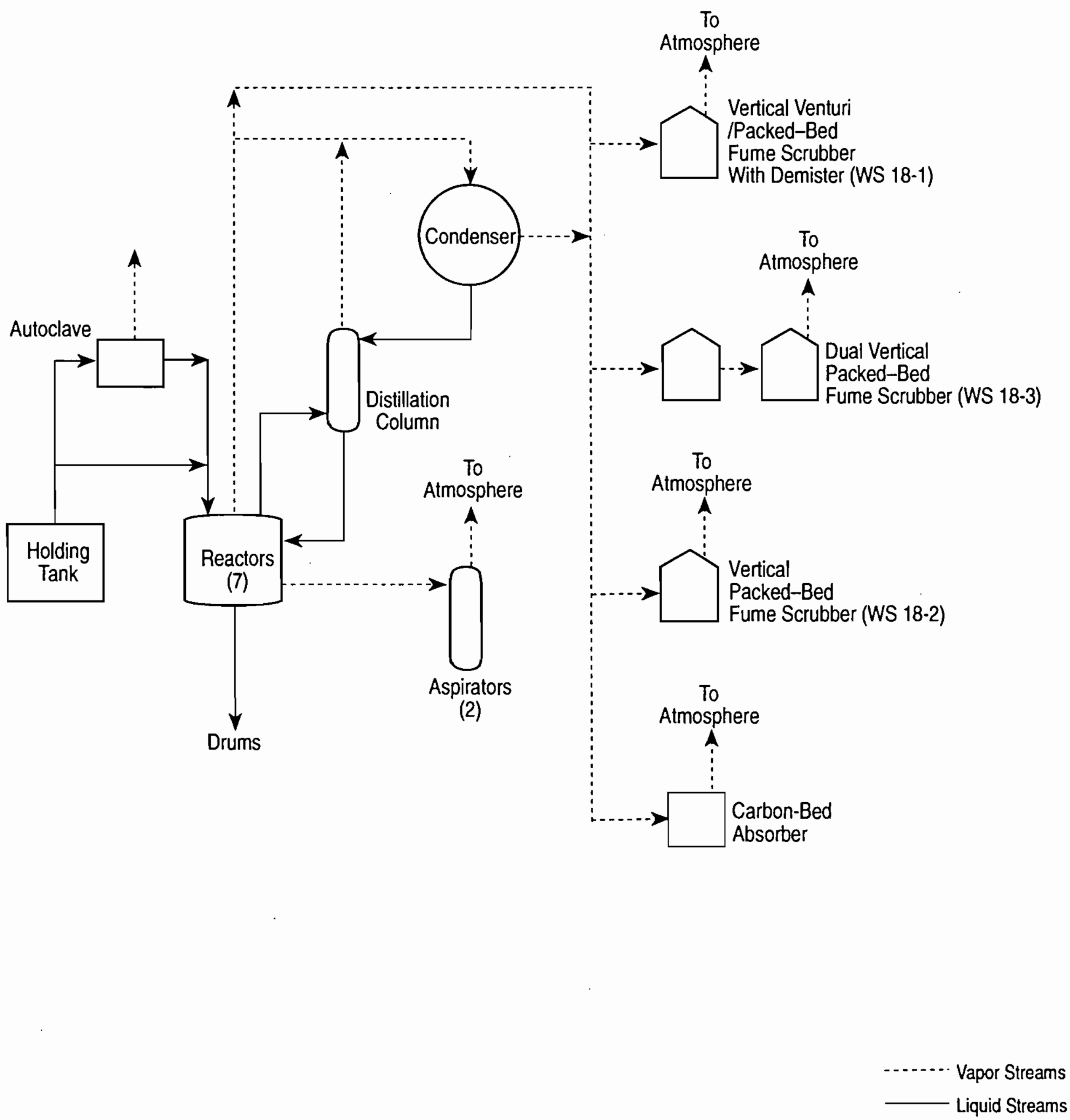

Figure 2-2
Simplified Flow Diagram of
Commercial Reactor Process in Building 18.

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and/or solvent to remove chlorosilanes and hydrochloric acid gas emissions.

E. Carbon bed absorber to control VOC emissions from tetramethyl tin (TMT) production

F. Two aspirators: A-1 (East) and A-2 (West) Aspirators are used to pull vacuum.

G. Ammonium chloride storage tank.

H. TMCS storage tank vented to scrubber WS 18-1.

I. Mechanical Chiller.

Processing for each chemical varies; therefore, this equipment can be used interchangeably on a product specific basis.

In general, the processes conducted in any of the seven reactors can consist of one or more of the following steps: raw material charging, reaction, distillation, filtering, product storage, and product loading. A typical reaction process cycle takes place as follows. Raw materials and solvents are charged into the evacuated reactor at the beginning of a production run. These raw materials are liquids or are in solution and are easily drawn into the vessel by vacuum. Consequently, no air emissions result from charging the reactor.

After the charging is completed, the mixer is turned on and the temperature raised as required by introducing steam to the built-in steam jacket surrounding the reactor vessel. The additional heating speeds up the reaction and also allows the contents to reflux over a period of time from 15 minutes to several hours. When the reaction is completed, the reactor vessel may be used as a distillation pot for the subsequent separation process or the product can be transferred to another holding vessel.

The separation process is performed by the distillation process for liquid phase separation and by the filtration process for solid-liquid separation. The distillation process involves boiling off liquids in a packed column under reflux conditions. The reactor is used as the boiler pot in the distillation process. A primary condenser, using chilled water, and a reflux splitter may be used to return a portion the of the distilled product back into the column. The temperature of the column is maintained at the boiling temperature of a certain product or solvent in order to separate each liquid component from the mixture. The process is carried out under full vacuum for some processes and at atmospheric conditions for others.

The solid-liquid separation is performed by filtering techniques. The reacted product is first cooled, then passed through a filter to separate the liquid product from the solid residue or byproduct.

The cleaning process is performed by using water or a solvent wash. The actual cleaning procedure and the materials used vary. Sometimes the water wash is followed by a solvent wash to aid in drying the reactor. In most cases, all wetted surfaces used in the previous production steps are cleaned. The cleaning solution is first loaded into the reactor vessel and then heated and refluxed through the distillation column (if used) in order to clean out the entire system. The final cleaning step may involve purging of the system with inert gas to remove all traces of chemicals.

Emissions are potentially produced during the reactor filling process, the reaction process, the separation process, and the cleaning process. Between manufacturing of different products, the reactor will be cleaned out completely to avoid contamination that may cause unwanted reactions. A list of hazardous air pollutants (HAPs) which may potentially be emitted is presented in Section 3.1, Facility Emissions.

This area also contains a mechanical chiller which uses a mixture of ethylene glycol and water to cool non-contact water from some of the processes in Building 18. Ethylene glycol is emitted in extremely small quantities from the enclosed holding tank. Therefore, it is requested that these emissions be exempt from permitting as an insignificant source. Refer to Section 3.3, Insignificant Emissions.

A drum washing area is located adjacent to Building 18. In this area, drums are turned upside down over a spray nozzle, and high-pressured water is sprayed into the drum until the contents of the drum are rinsed clean. This water is piped to the process water treatment area. Due to the very low potential emissions from this area, it is requested that these activities be exempt from permitting as an insignificant source. Refer to Section 3.3, Insignificant Emissions. VOC absorbed into the process water may be emitted subsequently in the VOC air stripper (refer to Building 32c.)

Building 19 - Maintenance Shop Offices

This building only contains offices; therefore, there are no air pollutant emissions.

Buildings 20 and 20a - Research & Development/Autoclave Bunkers

This area contains high pressure autoclaves (sizes range from 1 to 20 gallons) which are vented to a vertical fume scrubber, WS 20-1 (South). This scrubber is used only for OSHA purposes and is therefore not required for ambient air quality purposes. Each autoclave is housed in a three-walled concrete block bunker. Twenty- and 200-gallon autoclaves are also contained within bunkers. The 20- and 200-gallon autoclaves are also vented to a horizontal fume scrubber, WS 20-2 (East). VOC and HAP emissions potentially occur from this process. Emissions from the reactors which are less than 50 gallons are extremely low; therefore, it is requested that these reactors be exempt from permitting as an insignificant source. Emission estimates are presented in Section 3.3, Insignificant Emissions.

Building 21 - Uracil Manufacturing

Uracil is manufactured in two forms at PCR, "wet Uracil" and "white Uracil." A general description of the manufacturing processes follows. A simplified flow diagram of this process is presented in Figure 2-3.

R-5 Reactor System:

Urea, malic acid, and oleum are fed to a stirred reactor (R-5) to produce crude Uracil in sulfuric acid. This solution is quenched in recycle weak sulfuric acid and cooled through two stirred cooling tanks to precipitate out Uracil. The slurry is then centrifuged through four centrifuges (C-2, C-3, C-5, and C-6) to separate out "wet Uracil" as the product. During centrifuging, weak sulfuric acid (3 to 5 percent) and water are added in various cycles and recycles to wash the Uracil and remove excess strong sulfuric acid (30 to 35 percent). When the weak sulfuric acid is added, it forms 6 to 10 percent sulfuric acid from the strong sulfuric acid.

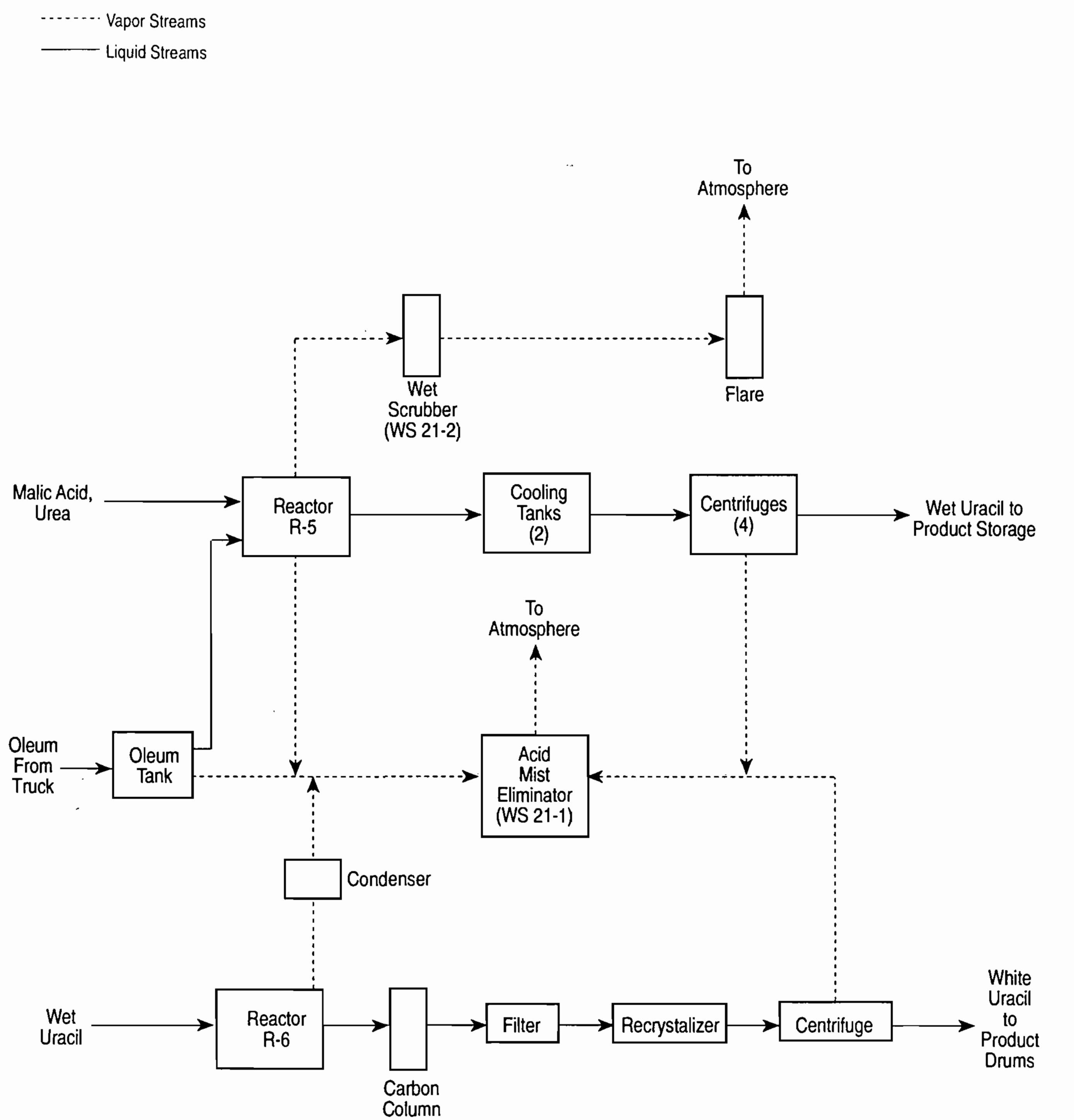

Figure 2-3
Simplified Flow Diagram of Uracil Manufacturing Process

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The 6 to 10 percent sulfuric acid is then recycled to be added to the two cooling tanks to aid in the crystallization. The resulting "wet Uracil" can either be redissolved in water in the R-6 reactor for further purification or sent to the baking ovens in Building 22 to produce "dry Uracil" for export.

Carbon monoxide, sulfuric acid mist, and sulfur trioxide may be emitted during this process. These reaction by-products from the reactor are passed through a packed tower (WS 21-2) and then to a natural gas flare. Vapors from the four centrifuges and oleum storage tank pass through a sulfuric acid mist eliminator (WS 21-1). CO emissions are quantified in Section 3.3, Insignificant Emissions.

R-6 Reactor System:
"Wet Uracil" and water are added to a 1,000-gallon stirred reactor (R-6) to dissolve the "wet Uracil". Vapors from the reactor are sent through a vapor condenser and then a mist eliminator (WS 21-1). The wet Uracil is passed through a carbon absorber and a horizontal plate filter before being sent to a stirred holding tank for recrystallization. After the Uracil is recrystallized, it is precipitated out through a centrifuge (C-4) to produce "white Uracil." The spent water contains approximately 0.3 percent Uracil. A small portion is sent to the plant process water. The "white Uracil" is drummed directly from the centrifuge. The vapors from the centrifuge are also passed through the mist eliminator (WS 21-1).

Building 22 - Uracil Process Area
"Wet Uracil" is dried to its final product, "dry Uracil," using a steam heated oven. There are no air pollutant emissions from this process.

Building 22a - Operator Control Room
This area contains the operator control room for the Uracil manufacturing process; therefore, there are no air pollutant emissions.

Building 22b - Mechanical Chillers
This area contains two mechanical chillers which use water to cool non-contact water from the Uracil process in Building 21.

Building 23 - Mechanical Chiller

This area contains a mechanical chiller which uses a mixture of ethylene glycol and water to cool non-contact water from the pilot plant processes in Building 5. Ethylene glycol is emitted in extremely small quantities from the enclosed holding tanks. It is requested that these emissions be exempt as an insignificant source. Refer to Section 3.3, Insignificant Emissions.

Building 24 - Maintenance/Finished Goods/Raw Material Storage

This building only contains ethyl ether storage and office area. All storage bottles are closed; however, fugitive HAP and VOC emissions may escape from the seals. These emissions are extremely small; therefore, it is requested that this area be exempt from permitting as an insignificant source.

Building 25 - Prosil Distillation

This area contains three distillation columns (S-4, S-5, and S-6) used in the Prosil manufacturing process. These columns are currently permitted under the application to operate the Prosil process; however, this present application updates the Prosil process information, as described for Building 26.

Building 26, 26a, and 26b - Prosil Manufacturing

PCR manufactures a variety of synthetic organic chemicals in the Prosil area. The classes of compounds manufactured include those listed below.

1. vinyl silanes
2. alkoxy silanes
3. ammonia products
4. siloxane products
5. chlorinated compounds

A simplified flow diagram is presented in Figure 2-4. Tank farm and drumming operation emissions are estimated in Section 3.3, Insignificant Emissions. Emissions from the tank farm (Figure 2-5) and drumming operations are extremely low; therefore, it is requested that these operations be exempt from permitting as insignificant sources.

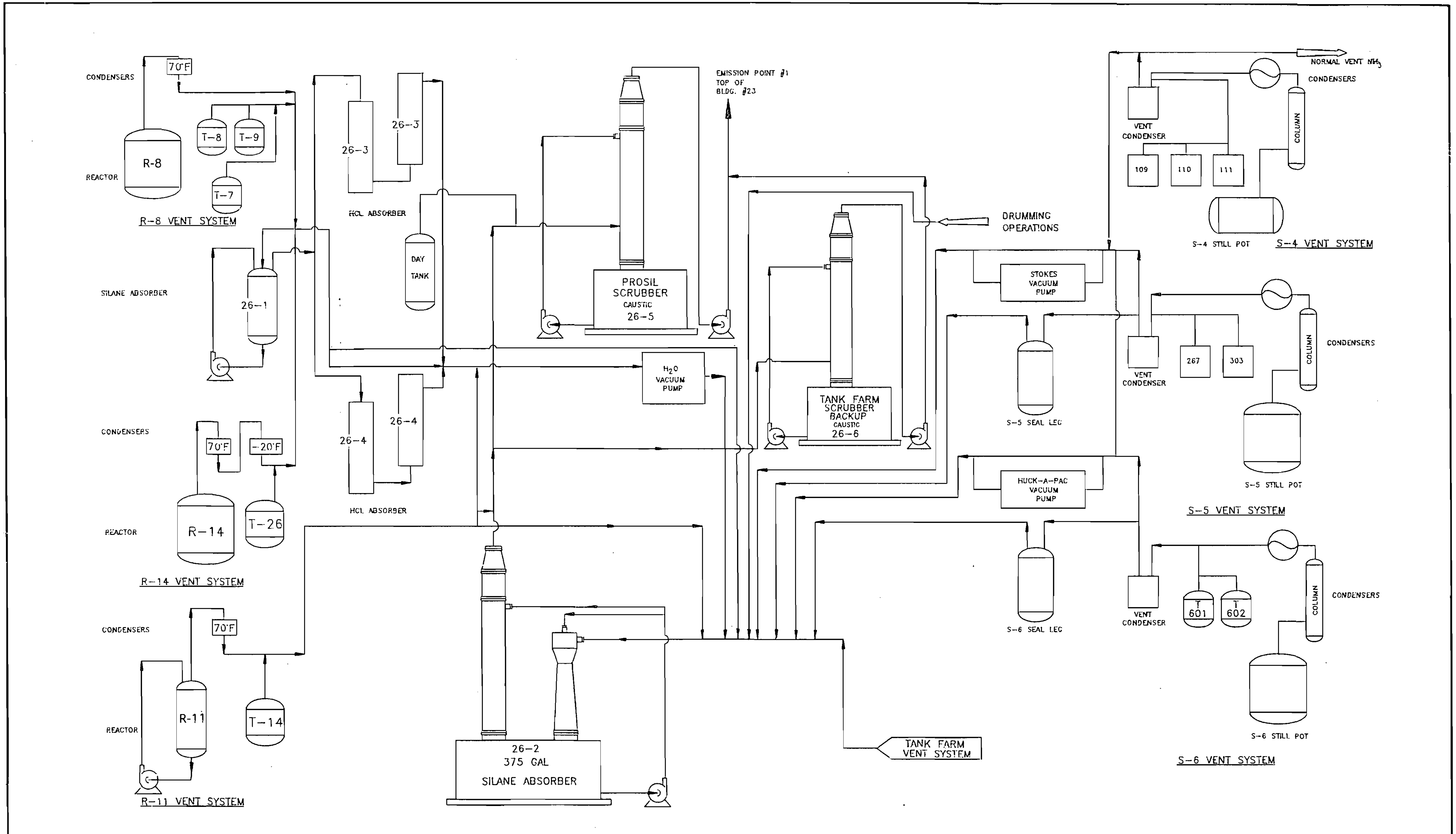

Figure 2-4
Simplified Flow Diagram of the Prosil Process

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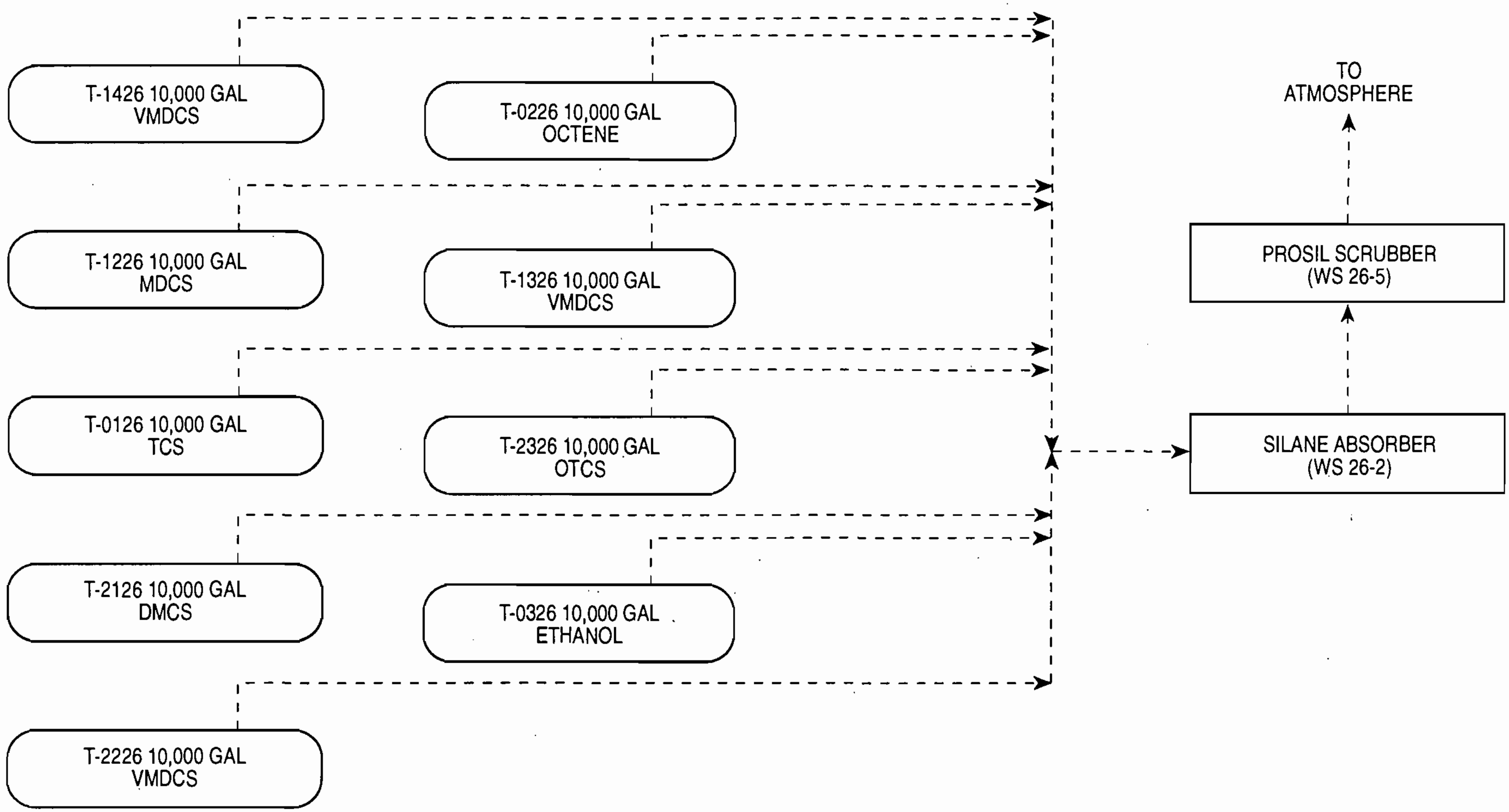

Figure 2-5
Tank Farm Flow Diagram

Source: PCR, Inc., Gainesville, FL

This area contains a mechanical chiller which uses a mixture of ethylene glycol and water to cool non-contact water from the Prosil process. Ethylene glycol is emitted in extremely small quantities from the enclosed holding tanks. Therefore, it is requested that these emissions be exempt as an insignificant source. Refer to Section 3.3, Insignificant Emissions.

The process in this area and the tank farm are currently permitted under the operating permit, AO01-250775. However, this permit does not accurately reflect the current configuration of the equipment. The following is a brief process description of the current equipment and operations for the Prosil process (Figure 2-4). Semi-continuous and batch reactions (Reactors R-8, R-11, and R-14) and distillations (Distillation Columns S-4, S-5, and S-6 located in Building 25) are carried out in the process area. An aspirator is used to pull vacuum on a reactor to evacuate the vessel prior to introducing raw materials. The reactor is then isolated from the aspirator and the raw material is drawn into the evacuated reactor space. A vacuum pump may also be used instead of the aspirator. A tank farm is also located in the Prosil area. This farm stores raw materials, intermediates, and final products. Emissions from these areas include HCl, Cl_2, and various VOCs, including some which are HAPs.

PCR is tentatively planning a new project to add another distillation column, a 10,000-gallon storage tank, and possibly a flare to oxidize evolved hydrogen to water instead of utilizing the existing caustic scrubbers. The flare shall be the same flare that is proposed for the Norbornadiene project. This project is entitled the *Tries Project* and further information shall be submitted as it becomes available.

Vessel exhaust streams can be divided into two groups: organic silanes and other reaction byproducts/impurities. Organic silanes (typically, alkoxy silanes and chloro silanes) readily react with water to form oligomers and either alcohols (alkoxy silanes) or HCl (chloro silanes). Other reaction byproducts/impurities that are not condensed are either captured by the wet scrubber or are emitted to the atmosphere.

Emissions are controlled by a series of control devices. Most reactors and distillation column have a vent condenser cooled by 70°F water. Reactions emitting significant quantities of HCl are also connected to HCl absorbers. A silane absorber is also in service when needed to absorb any chlorosilane compounds that carry over from the reactors. Acetylene offgas from vinyl reactions are controlled by the Prosil scrubber (WS 26-5).

The following is a list of the control devices utilized in the Prosil process:

WS 26-1	Original silane absorber. Glass-lined steel tank using caustic and/or solvents to absorb silanes.
WS 26-2	New venturi vertical packed bed fume scrubber using caustic and/or solvents to react chlorosilanes. All streams enter this scrubber prior to the Prosil scrubber (WS 26-5).
WS 26-3	Hydrochloric acid (HCl) absorber using fresh water to absorb HCl prior to entering the Prosil scrubber (WS 26-5). Manufactured by Corning Glass. A vacuum pump may be used instead of WS 26-3 for streams that do not generate HCl prior to entering the Prosil scrubber.
WS 26-4	HCl absorber using fresh water to absorb HCl prior to entering the Prosil scrubber (WS 26-5). Manufactured by Carbone. A vacuum pump may be used instead of WS 26-4 for streams that do not generate HCl prior to entering the Prosil scrubber.
WS 26-5	Caustic vertical packed-bed fume scrubber (Prosil scrubber) using caustic to remove residual HCl.
WS 26-6	Venturi vertical packed-bed fume scrubber which uses caustic. This scrubber is only used as a backup for WS 26-5.

The tank farm storage tanks are controlled by pressure/vacuum vents, equalization lines, and by a venturi scrubber (WS 26-2 or WS 26-5). These points all tie into a caustic scrubber known as the Prosil Scrubber prior to venting, except for the ethanol storage tank.

Reactors and distillation columns process a variety of products depending upon PCR sales. Although reactors and columns tend to process different products, PCR utilizes alternative reactors and distillation columns as needed.

Building 27 and 27a - Boiler Pad

This area contains two 200-horsepower (hp) boilers. Emissions from this equipment are the products of natural gas combustion. The heat input (assuming each boiler is 85 percent efficient) for each 200-hp boiler is 6.7 MMBtu/hr. The heat input of these boilers along with the other two facility boilers (30- and 60-hp) are below those limits specified in Rule 62-210.300(3)(a) (overall heat input of 50 MMBtu/hr) and are therefore exempt from permitting. Heat input for the other two boilers can be found in the description for Building 13 - Boiler Pad.

Building 28 - West Maintenance Shop

This area contains a batch cold cleaner for cleaning mechanical parts. It currently uses a non-halogenated cleaning solvent in small quantities. Emissions from this area are very low; therefore, it is requested that they be exempt from permitting as an insignificant source. Emissions estimates can be found in Section 3.3, Insignificant Emissions.

Building 28a - Instrumentation & Electrical Office and Shop

This building only contains offices; therefore, there are no air pollutant emissions.

Building 29 - Cooling Tower/Mechanical Chillers

This area contains a cooling tower and two mechanical chillers which use water to cool non-contact water from the Prosil process.

Building 30 - Shower/Locker Rooms

This area contains the employee shower and locker rooms; therefore, there are no air pollutant emissions.

Building 31 - Material Coating Storage

This building contains paint supplies which are used periodically throughout the entire plant. The paints are applied by hand lay-up or spray lay-up techniques. Estimates of these emissions are based on application rate and VOC and/or HAP content of each coating. Since the emissions are very low, it is requested that this area be exempt from permitting (see Section 3.3).

Building 31a - Liquid Nitrogen & Evaporator

This area contains an enclosed tank of liquid nitrogen which passes through an enclosed evaporator to convert liquid nitrogen to gaseous nitrogen. Therefore, there are no air pollutant emissions from this area.

Building 32 - Final pH Control Center

This area contains a tank and aeration open water reservoir. The process water receives a final pH adjustment in the tank before being discharged to the reservoir and then to the sanitary sewer. Consequently, there are insignificant emissions from this source. Refer to Section 3.3, Insignificant Emissions, for emission estimates for the process water reservoir.

Building 32a - Bulk Caustic & Hydrochloric Acid Storage

This area contains two storage tanks. The caustic tank holds caustic; therefore, no VOC or HAP emissions occur from the caustic storage tank. The hydrochloric acid storage tank is currently uncontrolled, however, it is planned to vent the tank to a venturi eductor (WS 32-1) in the near future. This scrubber is used only for OSHA purposes and is therefore not required for ambient air quality purposes. Due to the very low emissions from Building 32a, it is requested that these activities be exempt from permitting as an insignificant source. Emissions estimates for the hydrochloric acid storage tank can be found in Section 3.3, Insignificant Emissions.

Building 32b - Ammoniation Process

The processes and emissions from this area have been described in the application for the ammoniation process previously submitted to the FDEP. An Intent to Issue a construction permit was issued for the process by FDEP on January 27, 1994. This permit to construct application was withdrawn in order to be included in the facility permit.

Anhydrous ammonia is a reagent in the manufacture of specialty organic chemicals. Ammonia must be used in excess of the stoichiometric amount in each reaction. The excess ammonia is vented from the process equipment at the end of some of the reactions and is water washed from other reactions. Ammonia is vented from reactor head spaces and distillation columns at Emission Points 1 and 2 (Figure 2-6). At Emission Points 3 and 4, process water from other reactors is pH adjusted and air stripped to remove ammonia (Figure 2-7). The dissolved ammonium ion in these waste streams must be reduced to meet the strict limits on the maximum concentration of ammonia in process water that the Gainesville Regional Utilities has implemented. No current technique exists to recycle or reuse the excess ammonia within the chemical processes.

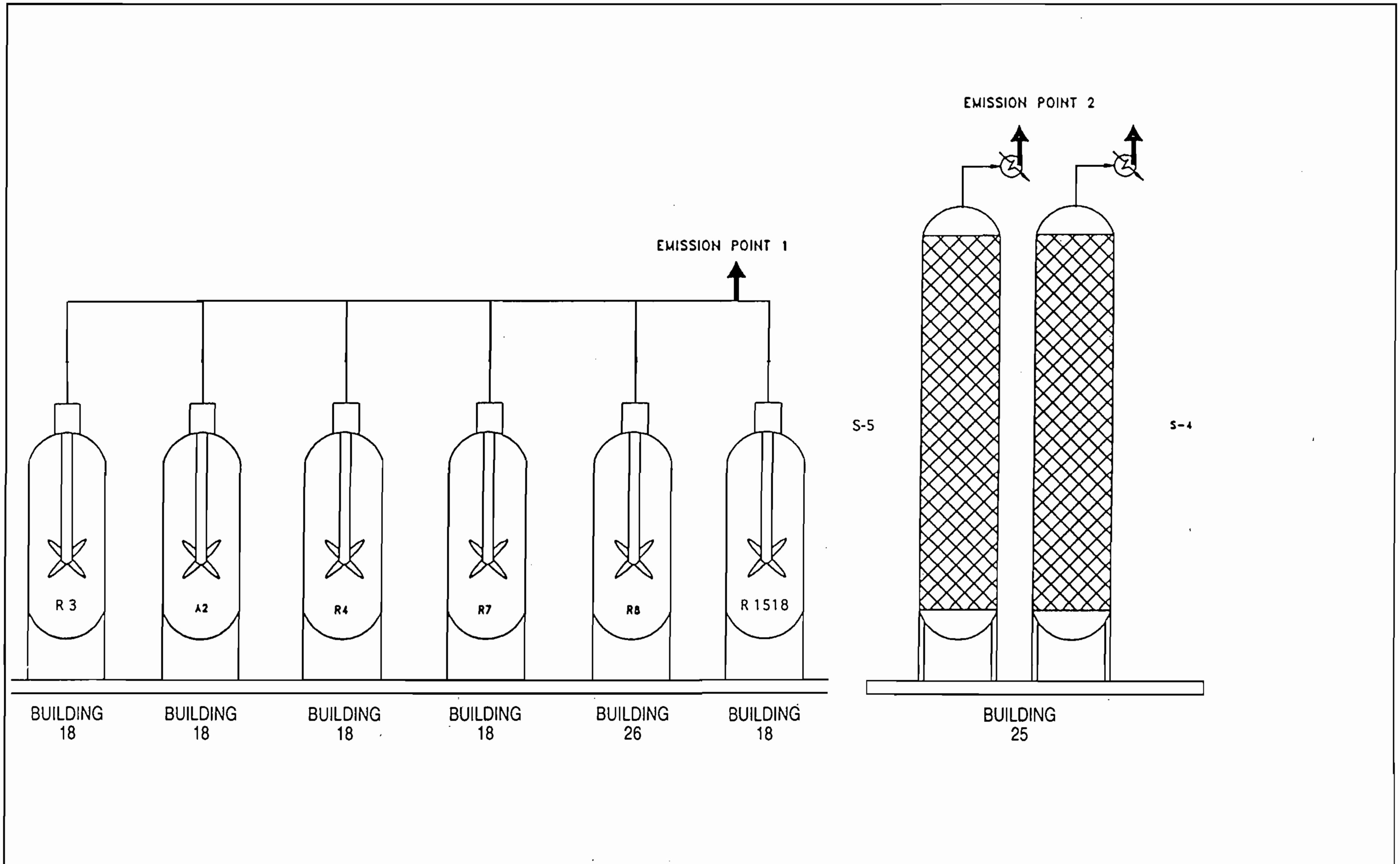

Figure 2-6
Reactors and Distillation Columns for Ammoniation Process

Source: Alexander Whitmer, Inc., 1993.

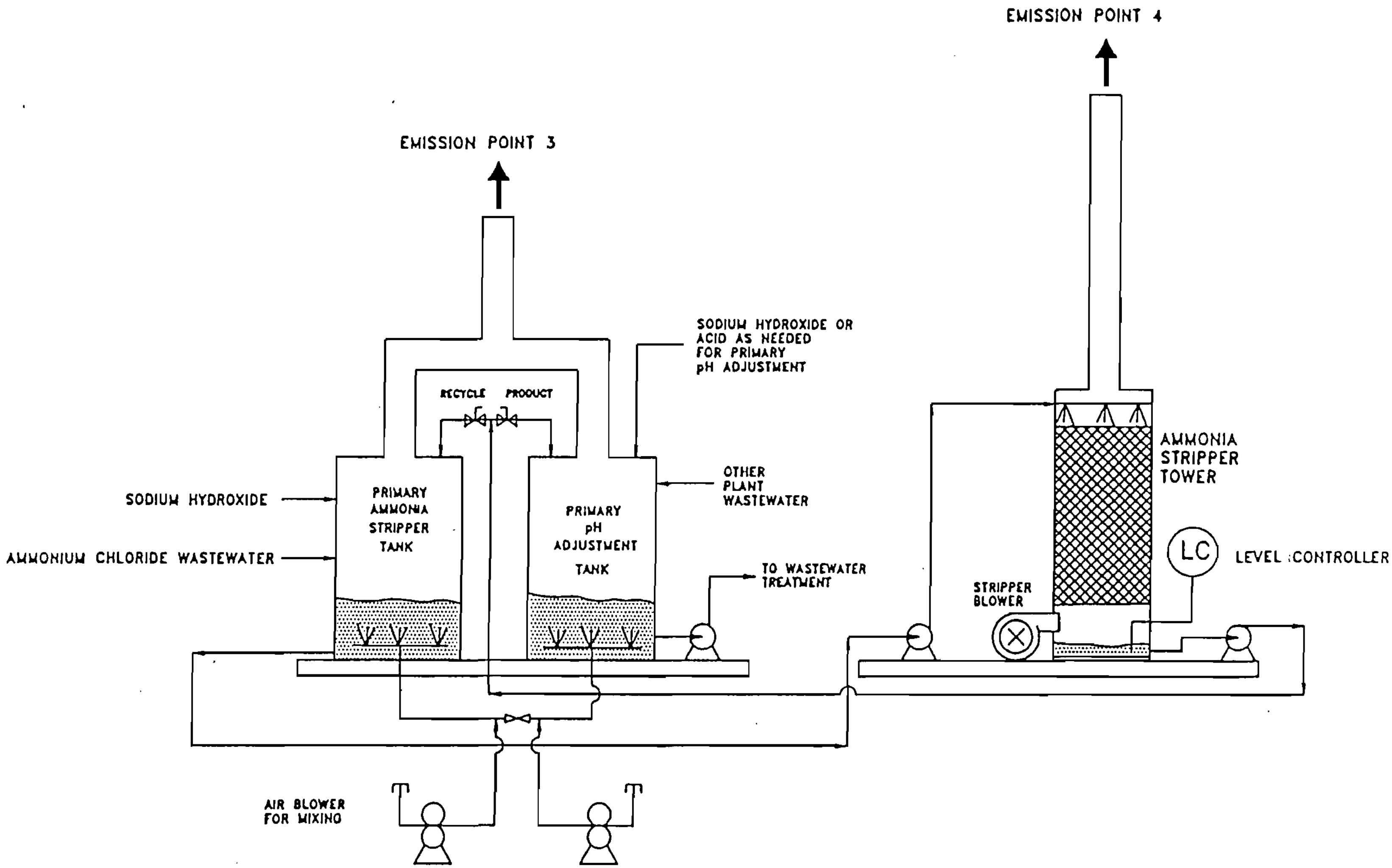

Figure 2-7
pH Adjustment and Ammonia Stripper Tower

Source: Alexander Whitmer, Inc., 1993.

Emission Point 1 is the vent exhaust from four reactor vents (Figure 2-6). Ammonia in the head space of these reactors is released at the end of the reaction period.

Emission Point 2 is a vent for two distillation columns (Figure 2-6). At the beginning of each distillation cycle, dissolved ammonia is released from the crude mixture as it separates during distillation.

Emission Points 3 and 4 are releases of ammonia from process water treatment. To meet the discharge limits, PCR utilizes an air sparged primary ammonia stripper tank and an ammonia stripper column to air strip ammonia from process water to acceptable levels (Figure 2-7). Ammonium chloride process water is pumped to the primary ammonia stripper where sodium hydroxide is added. Mixing is provided by sparging air into this tank using a positive displacement blower. Since the pH in the primary ammonia stripper tank is high enough to lower ammonia solubility, a considerable amount of ammonia is released through the vent of this tank (Ammonia Emission Point 3, Figure 2-7). To further remove ammonia, the material in the primary ammonia stripper tank is fed into a packed tower equipped with a blower to move air through the system (Ammonia Emission Point 4, Figure 2-7). Air containing ammonia leaves the system through an elevated stack. Stripped process water can either be recycled back to the holding tank or taken to the primary pH adjustment tank where it is combined with other plant process water flows.

Ultimately, the treated water flows through the remaining unit operations in the plant process water pretreatment system prior to discharge to the Gainesville Regional Utilities sewer system. Emissions from the Ammoniation process include ammonia, volatile organic compounds (VOCs), and hexane (HAP). Refer to Section 3.1 for estimated ammonia emissions.

Emission Points 1 and 2 are simple vents from reactors and distillation columns. The velocity in the vent pipes depends upon the pressure being released from the process equipment and thus varies with time. The maximum velocity has been estimated from pressure drop calculations and is listed in the table below.

The air sparged primary ammonia stripper tank is vented to a stack also shared by the primary pH adjustment tank (Figure 2-7, Emission Point 3). Tanks are mixed by either a positive displacement blower that delivers approximately 400 acfm of air or an agitator. The blower connected to the stripper column is rated at 710 acfm and delivers about 728 acfm at the stack (Figure 2-7, Emission Point 4). Both emission points operate at approximately ambient temperature or slightly warmer due to the addition of steam heat. Each stack operates saturated with water vapor since the air is in contact with an aqueous stream, and therefore, the water vapor content and the concentration (dscfm) will vary with the ambient temperature. Emission stack geometry and flow characteristics are summarized in the table below.

Ammonia Stripper Emission Stack Geometry and Flow Characteristics

Parameter	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4
Stack Height (ft)	70	70	65	65
Stack Diameter (ft)	0.333	0.167	1.0	0.666
Gas Flow Rate (acfm)	127	127	800	728
Gas Exit Temperature	Ambient	Ambient	Ambient	Ambient
Water Vapor Content	Dry	Dry	Saturated	Saturated
Velocity (fps)[a]	25	96.7	17.0	34.8

[a] Velocity (fps) = (Flow, acfm) x 4.0 / (Stack Diameter, ft)^2 x minute / 60 s

Building 32c - Volatile Organic Compound (VOC) Stripper

An Andersen 2000 VOC stripping system is located at Building 32a to remove VOCs from the Prosil process water. The stripping system is designed with the capacity to treat up to 100 gallons per minute of water at 70°F. The system consists of three packed columns in series. Liquid is fed to the first column by gravity from a 300-gallon surge tank. This liquid passes counter-currently through a packed column and is fed by a recirculation pump to a recirculation tank. Recycled liquid from the recirculation tank also is fed by gravity to the packed column. A centrifugal blower sends approximately 4,000 acfm of air counter-currently through the packing of each column to achieve an overall VOC removal efficiency. The treated water is sent to a publicly owned treatment works (POTW). A flow diagram of this system is presented in

Figure 2-8. Each packed column is equipped with a centrifugal blower, recirculation pump, and recirculation tank. The three air strippers exhaust out a common stack.

Building 32d - Ammoniation Stripper

The processes and emissions from this area were included under the ammoniation process permit application previously submitted. For description and additional details, refer to Building 32b - Ammoniation Process.

Building 32e - Magnesium Hydroxide Storage & Delivery

This area contains enclosed storage vessels of magnesium hydroxide; therefore, there are no emissions.

Building 33 - Fluids Lab

Fluorinated fluids are manufactured here. The products are produced on a laboratory-scale basis with 4 lab hoods and 4 walk-in enclosures in the west area and 5 lab hoods and 2 walk-in enclosures in the east area. Emissions from these areas are extremely small; therefore, it is requested that they be exempt from permitting. Emissions estimates can be found in Section 3.3, Insignificant Emissions.

This area contains a mechanical chiller which uses a mixture of ethylene glycol and water to cool non-contact water from the Fluids lab. Ethylene glycol is emitted in extremely small quantities from the enclosed holding tanks. Therefore, it is requested that these emissions be exempt as an insignificant source. Refer to Section 3.3, Insignificant Emissions.

Building 34 - R&D Trailer Offices

This area contains only offices; therefore, there are no air pollutant emissions.

Building 35 - Catalog Manufacturing

Two lab areas are located here. The labs are used to manufacture catalog chemicals in small quantities when necessary. Vents from the hoods are connected to a scrubber (WS 35-1). This scrubber is used only for OSHA purposes and is therefore not required for ambient air quality purposes. Emissions from this area are extremely small; therefore, it is requested that they be

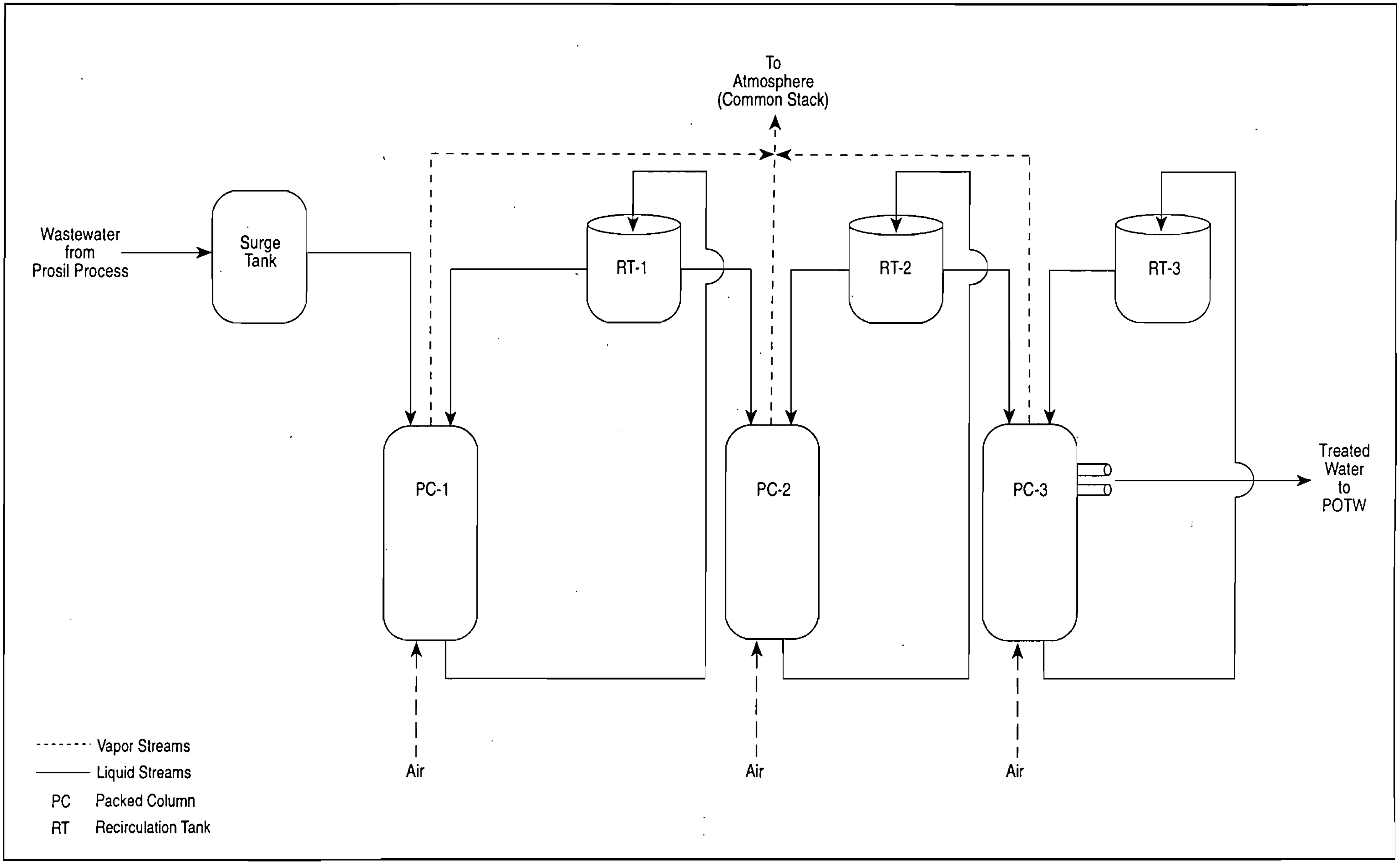

Figure 2-8
Simplified Flow Diagram of VOC Stripping System

exempt from permitting. Emissions estimates can be found in Section 3.3, Insignificant Emissions.

Building 36 - Engineering Trailer Offices

This area contains only offices; therefore, there are no air pollutant emissions.

Building 37 - Material Control Warehouse

This area contains bottled and drummed materials. All storage vessels are closed; however, fugitive HAP and VOC emissions may escape from the seals. These emissions are extremely small; therefore, it is requested that this area be exempt from permitting as an insignificant source.

Building 38 - Intermediate/Raw Material/90 Day Pad

This area contains drummed materials. All storage vessels are closed; however, fugitive HAP and VOC emissions may escape from the seals. These emissions are extremely small; therefore, it is requested that this area be exempt from permitting as an insignificant source.

Building 39 - R-10 Process

Building 39 is now under construction and will house the R-10 process. The R-10 process was permitted in February 1994 under permit AC01-235570. The process results in VOC and HAP emissions. The R-10 process scrubbers (WS 39-1 and WS 39-2) will be located in this area.

Building 40 - Intermediate Storage Pad

This area contains drummed materials. All storage vessels are closed; however, fugitive HAP and VOC emissions may escape from the seals. These emissions are extremely small; therefore, it is requested that this area be exempt from permitting as an insignificant source.

Building 41 - Intermediate Storage Pad

This area contains drummed materials. All storage vessels are closed; however, fugitive HAP and VOC emissions may escape from the seals. These emissions are extremely small; therefore, it is requested that this area be exempt from permitting as an insignificant source.

Building 42 - Fire Pump House

This building contains fire fighting equipment consisting of an emergency diesel engine. Therefore, emissions from this area are exempt from being permitted, pursuant to Rule 62-210.300(3)(u) and (v).

Building 43 - Proposed Norbornadiene Process

The following discussion presents a description of the proposed Norbornadiene (NBD) process. A flow diagram of the process is presented in Figure 2-9. NBD is produced from the vapor phase Diels-Alder reaction between acetylene and cyclopentadiene. The reaction is carried out in a jacketed carbon steel plug flow reactor at elevated temperature and pressure. The reactor discharge is quenched, expanded, and then separated in a light ends distillation column. A large vapor phase recycle stream is taken off of the light ends column back to the reactor. A small portion of that stream is vented continuously through a control valve to a flare. The stream is vented to prevent the buildup of nitrogen within the system. The vent flow rates are approximately 1.0 pound per hour acetylene, 1.0 pound per hour cyclopentadiene, and a small amount of nitrogen.

The light ends column bottoms, after leaving the column, are partially vaporized. The vaporized fraction is condensed and stored in a crude product storage tank from which a continuous flow of quench liquid is supplied to cool the reactants. The crude product storage tank contains NBD along with other higher and lower boiling compounds. The un-vaporized fraction is bled off to a tank and disposed off-site or may be used for boiler fuel. Prior to any use as boiler fuel, appropriate FDEP notification and any necessary permits will be obtained.

These NBD processes operate continuously for periods of time between 7 to 14 days. The process is then shut down for clean up for approximately 4 days. During normal shutdown of the system, the reactor, piping, and light ends column are vented to a flare until atmospheric pressure is reached, then purged with nitrogen. The quantity of vapor removed during this procedure is approximately 5 lb/hr of acetylene and 5 lb/hr of cyclopentadiene over a 1-hour period.

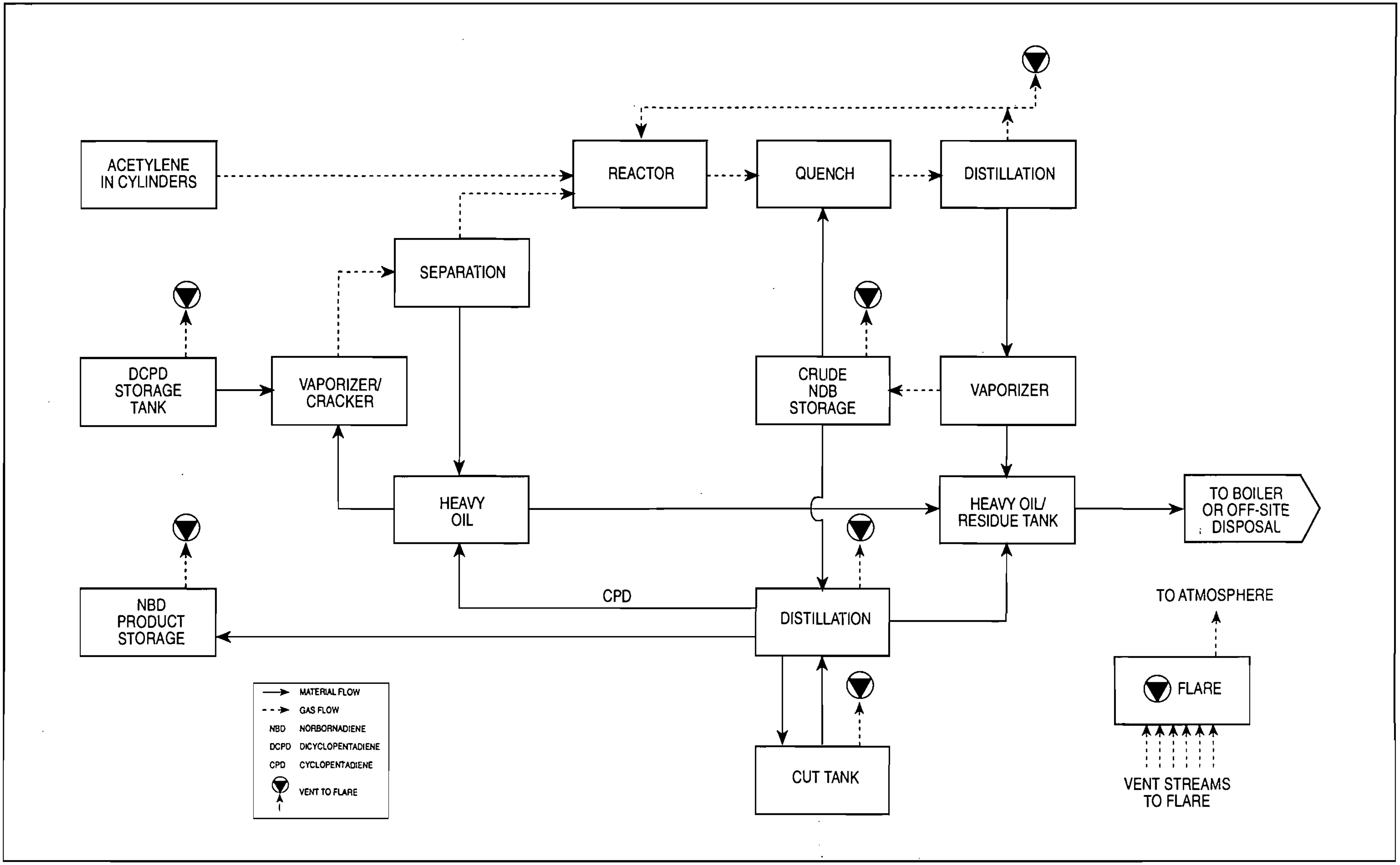

Figure 2-9
Simplified Flow Diagram of Proposed Norbornadiene Process

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3.0 EMISSIONS ESTIMATIONS

3.1 FACILITY EMISSIONS

Approximately 1,500 chemicals can be produced at PCR in a variety of reactors and other process equipment. The majority of these are produced in small laboratory-scale quantities, while approximately 100 chemicals are produced in larger quantities. Due to the variety of specialty chemicals manufactured at PCR and their frequency of production, total annual emissions will depend on which specific products are manufactured in a given year. Therefore, specific emission estimates are not presented in this application. Overall facility emissions, including fugitive emissions, will not exceed the following:

1. 10 tons per year (TPY) of any one HAP,
2. 25 TPY of any combination of HAPs, or
3. 100 TPY of any regulated air pollutant (i.e. VOCs).

Ammonia is not currently classified as a regulated pollutant; however, PCR's ammoniation process has the potential to emit 380 TPY of ammonia, with a maximum hourly rate of approximately 258 pounds per hour. Although ammonia is not required to be regulated, PCR plans to report these emissions on a routine basis. A list of hazardous air pollutants (HAPs) which may potentially be emitted from the PCR facility is presented in Table 3-1. Insignificant emissions are identified in Section 3.3, Insignificant Emissions. The product group numbers refer to the product categories listed in Section 2.0, Building 18. The methodology used to estimate pollutant emissions is described below. After permit issuance, PCR will calculate and tabulate actual pollutant emissions for the entire facility on a monthly basis. Calculations will include all emission sources, including those sources exempt from permitting due to being insignificant and fugitive emissions.

3.2 EMISSION CALCULATION METHODOLOGY

This section describes the general methodology that will be used by PCR to calculate the monthly emissions of VOC, HAP, and ammonia under the facility permit. In order to estimate the pollutant emissions that are potentially discharged from the facility, some general assumptions must be made. These assumptions are based on basic principles that govern the areas of chemical engineering and batch chemical processing. All assumptions are conservative for estimating the outgassing rates of vapor, the product recovery rates, the emission control efficiency, and

Table 3-1. List of Hazardous Air Pollutants Potentially Emitted by PCR (Page 1 of 4)

Chemical Name	CAS Number
Acetaldehyde	75070
Acetamide	60355
Acetonitrile	75058
Acetophenone	98862
2-Acetylaminofluorene	53963
Acrolein	107028
Acrylamide	79061
Acrylic acid	79107
Acrylonitrile	107131
Allyl chloride	107051
4-Aminobiphenyl	92671
Aniline	62533
o-Anisidine	90040
Antimony Compounds	
Arsenic Compounds	
Asbestos	1332214
Benzene	71432
Benzidine	92875
Benzotrichloride	98077
Benzyl chloride	100447
Biphenyl	92524
Bis(2-ethylhexyl)phthalate (DEHP)	117817
Bis(chloromethyl)ether	542881
Bromoform	75252
1,3-Butadiene	106990
Cadmium Compounds	
Calcium cyanamide	156627
Caprolactam	105602
Carbon disulfide	75150
Carbon tetrachloride	56235
Carbonyl sulfide	463581
Catechol	120809
Chlorine	7782505
Chloroacetic acid	79118
2-Chloroacetophenone	532274
Chlorobenzene	108907
Chlorobenzilate	510156
Chloroform	67663
Chloromethyl methyl ether	107302
Chloroprene	126998
Chromium Compounds	
Cobalt Compounds	
Cresols/Cresylic acid	1319773
o-Cresol	95487
m-Cresol	108394
p-Cresol	106445

Table 3-1. List of Hazardous Air Pollutants Potentially Emitted by PCR (Page 2 of 4)

Chemical Name	CAS Number
Cumene	98828
Cyanide Compounds	
Diazomethane	334883
Dibenzofurans	132649
1,2-Dibromo-3-chloropropane	96128
Dibutylphthalate	84742
1,4-Dichlorobenzene(p)	106467
3,3-Dichlorobenzidene	91941
Dichloroethyl ether (Bis(2-chloroethyl)ether)	111444
1,3-Dichloropropene	542756
Diethanolamine	111422
N,N-Diethyl aniline (N,N-Dimethylaniline)	121697
Diethyl sulfate	64675
3,3-Dimethoxybenzidine	119904
3,3-Dimethyl benzidine	1119937
Dimethyl carbamoyl chloride	79447
Dimethyl formamide	68122
1,1-Dimethyl hydrazine	57147
Dimethyl phthalate	131113
Dimethyl sulfate	77781
4,6-Dinitro-o-cresol and salts	534521
2,4-Dinitrophenol	51258
2,4-Dinitrotoluene	121142
1,4-Dioxane (1,4-Diethyleneoxide)	123911
1,2-Diphenylhydrazine	122667
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	106898
1,2-Epoxybutane	106887
Ethyl acrylate	140885
Ethyl benzene	100414
Ethyl carbamate (Urethane)	51796
Ethyl chloride (Chloroethane)	75003
Ethylene dibromide (Dibromoethane)	106934
Ethylene dichloride (1,2-Dichloroethane)	107062
Ethylene glycol	107211
Ethylene imine (Aziridine)	151564
Ethylene oxide	75218
Ethylene thiourea	96457
Ethylidene dichloride (1,1-Dichloroethane)	75343
Formaldehyde	50000
Glycol ethers	
Hexachlorobenzene	118741
Hexachlorobutadiene	87683
Hexachlorocyclopentadiene	77474
Hexachloroethane	67721
Hexamethylene-1,6-diisocyanate	822060
Hexamethylphosphoramide	680319

Table 3-1. List of Hazardous Air Pollutants Potentially Emitted by PCR (Page 3 of 4)

Chemical Name	CAS Number
Hexane	110543
Hydrazine	302012
Hydrochloric acid	7647010
Hydrogen fluoride (Hydrofluoric acid)	7664393
Hydroquinone	123319
Isophorone	78591
Lead Compounds	
Maleic anhydride	108316
Manganese Compounds	
Mercury Compounds	
Methanol	67561
Methyl bromide (Bromomethane)	74839
Methyl chloride (Chloromethane)	74873
Methyl chloroform (1,1,1-Trichloroethane)	71556
Methyl ethyl ketone (2-Butanone)	78933
Methyl hydrazine	60344
Methyl iodide (Iodomethane)	74884
Methyl isobutyl ketone (Hexone)	108101
Methyl isocyanate	624839
Methyl methacrylate	80626
Methyl tert butyl ether	1634044
4,4-Methylene bis (2-chloroaniline)	101144
Methylene chloride (Dichloromethane)	75092
Methylene diphenyl diisocyanate (MDI)	101688
4,4-Methylenedianiline	101779
Mineral fibers (fine)	
Naphthalene	91203
Nickel Compounds	
Nitrobenzene	98953
4-Nitrobiphenyl	92933
4-Nitrophenol	100027
2-Nitropropane	79496
Pentachloronitrobenzene (Quintobenzene)	82688
Pentachlorophenol	87865
Phenol	108952
p-Phenylenediamine	106503
Phosgene	75445
Phosphine	7803512
Phosphorus	7723140
Phthalic anhydride	85449
Polycyclic organic matter	
1,3-Propane sultone	1120714
beta-Propiolactone	57578
Propionaldehyde	123386
Propylene dichloride (1,2-Dichloropropane)	78875
Propylene oxide	75569

Table 3-1. List of Hazardous Air Pollutants Potentially Emitted by PCR (Page 4 of 4)

Chemical Name	CAS Number
1,2-Propylenimine (2-Methyl aziridine)	75558
Quinoline	91225
Quinone	106514
Selenium Compounds	
Styrene	100425
Styrene oxide	96093
1,1,2,2-Tetrachloroethane	79345
Tetrachloroethylene (Perchloroethylene)	127184
Titanium tetrachloride	7550450
Toluene	108883
2,4-Toluene diamine	95807
2,4-Toluene diisocyanate	584849
o-Toluidine	95534
1,2,4-Trichlorobenzene	120821
1,1,2-Trichloroethane	79005
Trichloroethylene	79016
2,4,5-Trichlorophenol	95954
2,4,6-Trichlorophenol	88062
Triethylamine	121448
2,2,4-Trimethylpentane	540841
Vinyl acetate	108054
Vinyl bromide	593602
Vinyl chloride	75014
Vinylidene chloride (1,1-Dichloroethylene)	75354
Xylenes	1330207
o-Xylenes	95476
m-Xylenes	108383
p-Xylenes	106423

subsequently the potential emissions from each process step. The following assumptions are applied in this methodology:

1. Emissions estimated from the reactor, distillation, and transferring processes are primarily gaseous chemical compounds that occupy or pass through the vapor headspace portion of the processing unit. The gases are considered to be at static equilibrium condition for a closed system or at continuous flow equilibrium condition for an open system. The processing unit for a typical processing step could consist of any combination of reactor, distillation column, condenser, holding tank, and piping segment required for that particular processing step.
2. Only the processing step that potentially generates emissions to the atmosphere will be included in the emission estimations. Typical non-emission processing steps include evacuating the clean vessel at startup or loading the reactor vessel by pulling a vacuum. Processing steps that generate emissions are associated with any processing condition in which a noncondensable inert gas (i.e., nitrogen) is present. Nitrogen is typically used as the noncondensable gas when the system is relieved from under a vacuum condition. As the noncondensable gas is released from the system (e.g., via heating or vacuum evacuation), the saturated vapors present in the escaped gas volume constitute the potential emissions.
3. The vapor headspace for a processing unit is the difference between the total volume of the processing unit and the total volume of the liquids and solids residing in the system at the instant which potential emissions are being estimated.
4. The vapor headspace for the cleaning process is assumed to be equivalent to the total processing equipment volume.
5. Calculations performed for a processing unit operated under continuous vacuum consider leakage of air into the system. The process systems are designed for processing moisture-sensitive chemicals; therefore, the systems are nearly air tight.
6. All production process startups begin with a clean reactor vessel or system.

In general, the calculation methodology will determine the type and the amount of emissions on a per batch basis for each of the products. The total monthly emissions will be calculated based on the total monthly batch production rates. The emission factors for each batch of product will be determined by a step-wise process from reactor filling through to the last cleaning step.

Each of the previously mentioned steps are associated with a processing unit and a total processing volume from which emissions are calculated. These processing steps that generate emissions can be grouped under 10 general categories: charging, static purge, continuous heating, reaction, vacuum evacuation or pump down, boilup, vacuum distillation, product recovery, filling cut tanks, filtration, and packaging. Assumptions and equations used for emission calculation under each processing step are discussed below. There are processing steps that do not produce emissions, such as charging the reactor by drawing the raw materials into the vessel by its vacuum, and relieving the vacuum by nitrogen gas.

Charging Step--Charging a reactor with liquid from a drum, tankwagon, or storage tank. The volume of liquid charged is equal to the volume of saturated nitrogen displaced when equilibrium is assumed. Therefore, emissions can be estimated using this assumption and Raoult's law as detailed below:

x_i = mole fraction of component i (pollutant) in the liquid phase.

y_i = mole fraction of component i (pollutant) in the vapor phase.

$p_i^*(T)$ = pure vapor pressure of component i (pollutant) at temperature T (°C).

P_T = total system pressure.

$$y_i = \frac{x_i \, p_i^*(T)}{P_T}$$

The pollutant emission rate is equal to the vapor fraction multiplied by the charge volume over the frequency of charges per hour, its molecular weight, and all applicable conversion factors.

When a component's pure vapor pressure, $p^*(T)$ is unknown, it can be estimated using two or three sets of temperatures and pressures. These values can be substituted into the Antoine's equation and solved simultaneously to derive Antoine's parameters. These Antoine's parameters can then be used to estimate that component's pure vapor pressure at a specific temperature. This estimate correlates the vapor pressure-temperature data extremely well when the temperature of reference is within the ranges specified for the Antoine equation constants.

The Antoine equation is an empirical equation that correlates vapor pressure-temperature data extremely well and is generally used for estimating the pure vapor pressure of any component:

$$\log_{10} p_i^* = P_i^*(T) = A - \frac{B}{T+C}$$

where,

$p_i^* = P_i^*(T)$ = pure vapor pressure of component i, in mmHg or torr

A, B, and C = empirical parameters given in various handbooks, i.e., Lange's chemistry handbook

T = temperature, in C°

For a given system of multiple chemical components, Raoult's law states that the vapor mole fraction of component i can be approximated by the ratio between the pure partial pressure of component i and the total system pressure at the equilibrium temperature of the mixture as specified previously.

For a system in equilibrium, the total pressure is equal to the sum of the partial vapor pressures of all components existing in the system:

$$P_T = \sum P_i = \sum x_i \cdot P_i^*(T)$$

Static Purge Step--This condition occurs when the reactor has been held constant after the initial charging of raw materials, during the charging of raw materials, or after the reaction process is finished. Nitrogen gas is pumped into the reactor during this purging step. Raoult's law can be used to approximate the amount of vapor for each component that exists in equilibrium prior to the static purging step. Refer to calculation in charging step for molar rate and multiply it by a mixing factor which represents saturation level. This factor can be assumed to be 1.0 under equilibrium (i.e., assume instantaneous saturation, which is conservative).

Continuous Heating Step--This step generates potential emissions when the reactor is being heated from the initial temperature to a higher temperature as required by a reaction or during a distillation. The heating process will expand the inert nitrogen gas and displace a small volume of gas from the headspace of the system. Since the nitrogen gas is assumed to be saturated with the pollutant vapors, some of the pollutants are emitted from the system.

Applying the ideal gas law, the gas displaced, n_d, equals the pollutant emission rate. Emissions due to the heating process can be calculated as follows:

$$n_d \equiv n_1 - n_2 = \frac{P_T V_H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

where
V_H = head space of the reactor system in ft^3
R = constant = 10.73 psia-ft^3/lb-mole °R
n_d = moles of gas displaced by the heating process
n_1 = moles of gas, initial
n_2 = moles of gas, final
P_T = total pressure of system
T_1 = temperature, initial
T_2 = temperature, final.

This equation was derived assuming constant pressure and volume with the volume displaced equal to the volume in the headspace of the reactor. The emission rate is calculated by multiplying the mole fraction of pollutant, n_d, by its molecular weight, and all applicable conversion factors.

Reaction Step--Emissions also occur during the reaction. Non-condensible gases such as HCl (during an alkoxylation) and acetylene (during an alkene reaction) may be emitted. Emission rates can be calculated using stoichiometry and partial pressures. Partial pressure will provide the mole fraction of each component when Raoult's law is manipulated. The emission rate is obtained by applying stoichiometry to the mole fraction, and utilizing all relevant conversion factors. A mole fraction of 1 may be assumed to obtain a conservative estimate.

Vacuum Evacuation Step--Saturated nitrogen is removed to create a vacuum at a specified pressure prior to distillation. The emission rate is calculated using the method described in the charging step. The emission estimate for the vacuum evacuation process assumes a constant temperature equal to the initial temperature. The emission rate for each component is calculated by dividing the total vapor moles of the component (n_i) by the evacuation time (t). Thus,

$$\dot{n}_i = \frac{n_i}{t}$$

The moles of each component (n_i) can be determined by using Raoult's law as detailed in the charging step. The evacuation time is calculated by the following equation:

$$t = \frac{2.3\,V_{headspace}}{S_p} \cdot \log\left[\frac{P_i}{P_f}\right]$$

where,

t = pump down time in minutes

$V_{headspace}$ = volume of system to be evacuated in ft^3

S_p = average pumping speed in ft^3/min from P_i to P_f

P_i, P_f = initial pressure and final pressure in arbitrary unit dimensions

Assume the entire headspace volume is evacuated.

Boilup Prior to Distillation Step--Saturated nitrogen vapor in the reactor or reboiler headspace is displaced during boilup. Assume the entire headspace volume of saturated nitrogen is removed. The emission rate is calculated using the same method as described in the heating step.

Vacuum Distillation Step--The vacuum distillation step occurs after the vacuum evacuation step and boilup step described above. This step involves holding a constant vacuum while external non-condensible air is leaking into the system. The emission estimation is based on knowing (or estimating) the leak rate and distillation time then manipulating Raoult's law as above.

Product Recovery System--The product recovery is accomplished through a condensation process. Condensation is the process of converting all or part of the condensable components of a vapor into a liquid. This vapor-to-liquid phase transfer is achieved by the transfer of heat from the vapor phase to a cooling medium. If only part of the vapor phase is condensed, the newly formed liquid phase and the remaining vapor phase will be in equilibrium. The equilibrium relationship at the operating temperature must be considered. The heat removed from the vapor phase should be sufficient to lower the vapor-phase temperature to at or below its dew point temperature (i.e., temperature at which the first drop of liquid is formed).

The condensers at PCR are shell-and-tube heat exchangers designed to avoid direct contact between the product vapor and the cooling medium. The vapor flows through the tube-side, and the cooling medium is passed through the shell-side. Chilled water or cooling tower water is passed through the shell-side to cool the metal tubes below the dew point temperature of most product vapors entering the condenser. As the product vapors pass through the tube, heat from the product vapors is absorbed by the tube-side surface and droplets are formed and collected into a liquid stream leaving the unit. The condensed vapors are recovered as products or byproducts. When non-condensible vapors are present, air emissions may occur. These emissions may be estimated by partial pressure as calculated and mentioned previously as in the heating step, except the temperatures are at the approach temperature of the condenser. The vapor removal of the condenser system is nearly complete except for a small residual amount of non-condensible vapors which may escape downstream carrying emissions.

Filling/Emptying Cut Tanks--The filling of cut tanks displace equal volumes of saturated nitrogen and emissions are calculated similarly to the charging step. The temperature is the same as the vent condenser or the last condenser vented. When the cut tank is considered empty while also being under pressure, the pressure in the tank is relieved to the atmosphere. Emissions from relieving this pressure can be calculated using Raoult's law. The volume emitted is calculated by correcting the tank volume for system pressure.

Filtration/Drumming--Emissions from filtration can be calculated similarly to the charging step procedures.

Packaging--Packaging emission are also calculated using the same methodology as in the charging step.

3.3 INSIGNIFICANT SOURCES

Several processes/areas of the PCR facility have extremely low emission rates; therefore, it is requested that these areas be exempt from permitting pursuant to FDEP Rule 62-4.040. A summary of emission estimates for these areas is provided in Table 3-2. These estimates are based on production quantities and chemical and engineering judgment as described below:

1. The initial estimates are based on batch material balance.
2. Emissions were estimated from major chemical products produced in each area or building.
3. Future estimates (monthly) for insignificant sources shall be calculated using a factor based on the monthly production quantities.

Although exempt from permitting, all potential emission sources at PCR will be accounted for in the monthly pollutant emission estimates, in order to demonstrate compliance with the facility emission limits.

Emissions estimates for the mechanical chillers located in Buildings 18, 26b, and 33 are based on several assumptions. The chiller in Building 18 holds 150 gallons and the chillers in Buildings 26b and 33 contain 1,500 and 1,000 gallons, respectively. All these chillers are occasionally refilled. Emissions occur primarily during filling. Since the chillers in Buildings 26b and 33 are rarely refilled, emissions are extremely insignificant. For emission estimate purposes, a total volume of 1,500 gallons is assumed. Using this volume will cause emission estimates to be high since the liquid volume in Building 18 is only 150 gallons. Emissions are estimated assuming that during tank filling, the volume of vapor displaced is equal to the volume filled and this vapor is saturated with the liquid. Breathing losses were not included in the estimate since the working emissions are conservative.

Table 3-2. Estimates of Insignificant Emissions (Page 1 of 6)

Product Group	Product/Material	Pollutant	Air Emissions (TPY) VOC	HAP	Other
Building 2 West: Research & Development Lab					
		acetone	0.0011		
		toluene	0.0044	0.0044	
		other organic compounds	0.00066		
Building 2 East: Catalog Manufacturing					
7	perfluorooctyl triethoxysilane	ethyl chloride	0.23		
7	trimethylysilyltrifluoromethane sulfonate	hydrogen chloride		0.02	
8	BTFE hydrogen bromide	bromine			0.018
		ethanol	0.018		
8	2-bromo-1, 1-difluoroethylene	2-bromo-1, 1-difluoroethylene	0.01		
8	bromohexafluoropropane	hexafluoropropane	0.005		
		bromohexafluoropropane	0.005		
8	bromotrifluoroacetone	bromine			0.00025
8	carbonyl fluoride	chlorofluoro carbonyl	0.0025		
8	1-chloro-2 fluoroethane	sulfur tetrafluoride			0.00025
		thionyl fluoride			0.001
8	chlorotrifluoroethyl ethyl ether (CTFE)	CTFE	0.0025		
8	chloromethyl trichlorosilane	chlorine		0.015	
		methyltrichlorosilane	0.005		
	hexafluoro cyclobutane	hexafluoro cyclobutane	0.001		
9	allylmagnesium bromide (in ethyl ether)	ethyl ether	0.001		
9	methyl magnesium bromide (in ethyl ether)	ethyl ether	0.001		
9	methyl magnesium iodide (in ethyl ether)	ethyl ether	0.001		
9	phenyl magnesium bromide (in ethyl ether)	ethyl ether	0.001		
	hexafluoro gluteryl chloride	chlorine		0.005	
	iodotrifluoro methane	iodine			0.01

Table 3-2. Estimates of Insignificant Emissions (Page 2 of 6)

Product Group	Product/Material	Pollutant	Air Emissions (TPY) VOC	HAP	Other
	pentafluoro propene	pentafluoro propene	0.005		
	trifluoro trichloro cyclobutane	CTFE	0.005		
		chlorine		0.05	
		1,4-dioxane	0.0005	0.0005	
		ethyl chloride	0.025	0.025	
		hexachlorobutadiene	0.001	0.001	
		hexachlorocyclopentadiene	0.001	0.001	
		hexane	0.005	0.005	
		hydrochloric acid		0.05	
		p-phenylenediamine	0.0005	0.0005	
		toluene	0.0025	0.0025	
Building 5: Pilot Plant					
8	chlorotrifluoroethyl ethyl ether hydrogen bromide (CTFE HBr)	hydrogen bromide			0.0066
		CTFE	0.066		
Building 7: Research & Development Lab		VOC	0.0132		
		Toluene	0.00265	0.00265	
Building 8: Catalog Manufacturing Lab		acetonitrile		<0.0025	
Building 9: Material Control Setting					
	hexamethyl disilazane (HMDS)	HMDS	0.016		
	propylene glycol monomethyl ether acetate (PGMEA)	PGMEA	0.0027		
Building 10 - R&D Chemical Storage			Negligible	Negligible	Negligible
Building 15: Material Control Shipping/Receiving Offices					
	Bottling Catalog Chemicals	various	0.144	0.068	0.028
Building 15a			Negligible	Negligible	Negligible
Building 18: Mechanical Chiller		ethylene glycol	$8x10^{-6}$	8×10^{-6}	

Table 3-2. Estimates of Insignificant Emissions (Page 3 of 6)

Product Group	Product/Material	Pollutant	Air Emissions (TPY)		
			VOC	HAP	Other
Building 18: Drum Washing					
	chlorosilanes	chlorosilanes			0.267
	HMDS	HMDS	0.0174		
	hexane	hexane	0.25	0.25	
	methanol	methanol	0.125		
	xylene	xylene	0.00033	0.00033	
	acetone	acetone	0.0051		
	2-ethyl hexanol	2-ethyl hexanol	0.000024		
	toluene	toluene	0.025	0.025	
	siloxanes	siloxanes	0.231		
	gamma amino propyl (GAP)	GAP	0.00333		
	cyclics	cyclics	1.77×10^{-9}		
	high boiler residue	high boiler residue	1.77×10^{-9}		
Building 20 and 20a: Autoclave Bunkers for Catalog Manufacturing					
8	dicyclohexyl 18 crown 6	t-butanol	0.00077		
5 gallon autoclave					
10	perfluoro octyl trichlorosilane	trichlorosilane			0.0033
5 gallon autoclave					
8	penta fluoropropane	propionyl fluoride			0.071
20 gallon autoclave		sulfur tetrafluoride			0.0035
Building 21: Uracil Manufacturing					
	Uracil	carbon monoxide			0.14
Building 23: Mechanical Chiller		ethylene glycol		8×10^{-6}	
Building 24: Raw Material Storage			Negligible	Negligible	Negligible
Building 26: Mechanical Chiller		ethylene glycol		8×10^{-6}	
Building 26: Tank Farm					
	organochlorosilane (Tank T-12)	hydrochloric acid		0.371	

Table 3-2. Estimates of Insignificant Emissions (Page 4 of 6)

Product Group	Product/Material	Pollutant	Air Emissions (TPY) VOC	HAP	Other
	organochlorosilane (Tank T-15)	hydrochloric acid		0.109	
	chlorosilane (Tank T-16)	hydrochloric acid		1.45	
	ethanol (Tank T-18)	ethyl alcohol	0.196		
	organochlorosilane (Tank T-19)	hydrochloric acid		0.00133	
	organochlorosilane (Tank T-21)	hydrochloric acid		0.391	
	organochlorosilane (Tank T-22)	hydrochloric acid		0.0257	
	octene	octene	0.0174		
Building 26: Drumming Operations					
	organosilane	hydrochloric acid		negligible	
	xylene	xylene	0.00428	0.00428	
	OTCS	OTCS	0.000058		
	2-ethylhexanol	2-ethylhexanol	0.000005		
	hexane	hexane	0.010	0.010	
	cumene	cumene	0.010	0.010	
	VMDCS	vinyl methyl dichlorosilane	0.020		
	VTCS	vinyl trichlorosilane	0.012		
	TMCS	trimethyl chlorosilane	0.036		
	VDMCS	vinyl dimethyl chlorosilane	0.050		
	IBTCS	isobutyl trichlorosilane	0.00093		
	HMDS	hexamethyl dichlorosilane	0.13		
	HMDSO	hexamethyl dichlorosiloxane	0.070		
	TMDSO	trimethyl disiloxane	0.027		
	methanol	methanol		0.012	
	ethanol	ethanol	0.0068		
Building 28: West Maintenance Shop					
	Safety-Kleen 105	VOC	0.104		
		xylene	[a]	0.00104	
		ethylbenzene	[a]	0.00052	
		toluene	[a]	0.00052	

Table 3-2. Estimates of Insignificant Emissions (Page 5 of 6)

Product Group	Product/Material	Pollutant	Air Emissions (TPY)		
			VOC	HAP	Other
		1,1,1-trichloroethane	[a]	0.00052	
		perchloroethylene	[a]	0.00052	
Building 31: Material Coating Storage					
	Polyurethane enamel	VOC	0.454		
		MEK	[a]	0.112	
		Toluene	[a]	0.0231	
	Epoxy Mastic	VOC	0.431		
		Aromatics	[a]	0.431	
	Activator for 25P	VOC	0.189		
		Toluene	[a]	0.02	
	Activator for 326	VOC	0.131		
		Toluene	[a]	0.0365	
		Xylene	[a]	0.0088	
		Aromatics	[a]	0.0046	
Building 32: Process Water Reservoir					
		VOC	0.1		
Building 32a: Hydrochloric Acid Storage Tank					
	hydrochloric acid (HCl)	HCl		0.0014	
Building 33: Fluids Lab					
		trichloro trifluoroethane (Freon 113)			0.78
		acetone	0.16		
		perfluorohexane	0.067		
		anhydrol	0.026		
		ammonia			0.0065
		hydrogen chloride		0.0015	
		chloroform	<0.0005	<0.0005	
		methylene chloride		<0.0005	
Building 33: Mechanical Chiller		ethylene glycol	<0.0029	<0.0029	

Table 3-2. Estimates of Insignificant Emissions (Page 6 of 6)

Product Group	Product/Material	Pollutant	Air Emissions (TPY)		
			VOC	HAP	Other
Building 35: Catalog Manufacturing					
8	perfluorokerosene	fluorine			0.0017
		hydrogen fluoride		0.026	
	5-fluoroorotic acid (5-FOA)	fluorine			0.019
		trifluoro acetic acid			0.18
Buildings 37, 38, 40, and 41			Negligible	Negligible	Negligible

[a] Included in the VOC emission total for each product.

4.0 CONTROL DEVICE PARAMETERS

Control devices are present in eight areas of the PCR facility. Operating parameters for each control device are presented in Table 4-1. Supportive information is provided in Attachment B.

Building 18 contains a carbon bed adsorber which can be connected in combination with any of the other process equipment located within the building to manufacture PCR's specialty chemicals. This adsorber has a carbon bed depth and diameter of 3 feet and height of 4 feet. With a carbon weight of 800 pounds, it has a maximum flow rate of 900 cubic feet per minute (cfm). Based on engineering judgment, the absorber can achieve 99.9 percent efficiency. It is manufactured by Calgon Carbon.

The Uracil manufacturing area (Building 21) contains a packed bed and a natural gas flare to control reaction by-products (carbon monoxide, sulfur trioxide, and sulfuric acid vapor) from the R-5 reactor system. The packed bed is manufactured by Satsuma. Design parameters are provided in Table 4-1. The flare is manufactured by John Zink Company.

The Uracil processing area also contains a mist eliminator to control sulfuric acid vapors from the centrifuges (C-2, C-3, C-5, and C-6 in the R-5 reactor system and C-4 in the R-6 reactor system). Vapors from the oleum storage tank are also passed through the mist eliminator. Design parameters are presented in Table 4-1.

As described in Section 2.0, Manufacturing Processes, the following control devices are utilized for OSHA purposes and are not required for ambient air quality purposes;

Type of Control Device	Building Location	Abbreviation
Vertical Packed-Bed Fume Scrubber	2 (West)	WS 2-1
Vertical Packed-Bed Fume Scrubber	7	WS 7-1
Vertical Packed-Bed Fume Scrubber	20 (South)	WS 20-1
Venturi Eductor	32a	WS 32-1
Vertical Packed-Bed Fume Scrubber	35	WS 35-1

The venturi eductor in Building 35 is a proposed device and has not yet been selected. The emissions vented to these scrubbers are insignificant as detailed in Section 3.3, Insignificant

Emissions. However, PCR shall report the uncontrolled emissions from these sources on a monthly basis. The flare for the Norbornadiene process has not yet been selected. Once selected, this information will be submitted to FDEP.

Table 4-1. Control Device Parameters (Page 1 of 2)

					Design Parameters			Stack Parameters		
Type of Control Device	Building Location	Abbreviation	Manufacturer	Scrubbing Media	Air Flow Rate (cfm)	Static Pressure (w.g.)	Recycle Rate (GPM)	Stack Velocity (fps)	Stack Height (feet)	Stack Diameter (inches)
Custom Designed Vertical Packed-Bed Fume Scrubber	5	WS 5-1	Unknown	caustic	1000-2000	3	60	133	32	6
Vertical Venturi Packed-Bed Fume Scrubber with Demister	18 (East)	WS 18-1	Met-Pro Corp. Duall Division	caustic	500-1000	3	80	20	25	11
Sulfuric Acid Vertical Packed-Bed Fume Scrubber	18 (West)	WS 18-2	Met-Pro Corp. Duall Division	sulfuric acid	500-1000	3	80	20	25	11
Dual Vertical Packed-Bed Fume Scrubber	18 (NW)	WS 18-3	Met-Pro Corp. Duall Division	caustic and/or solvents	80-200	0.5-9.5	55 caustic 65 solvent	13	8	6
Carbon Adsorber	18		Unknown	carbon	100-900		NA	34	25	8
Vertical Packed-Bed Fume Scrubber	20 (East)	WS 20-2	Met-Pro Corp. Duall Division	caustic	200-500	2	1.5	48	16	5
Sulfuric Acid Mist Eliminator	21	WS 21-1	Met-Pro Corp. Duall Division	caustic and solvent	500-1000	3	80	38	20	8
Uracil Flare Scrubber[a]	21	WS 21-2	John Zink	water	17 (CO)		30	NA	NA	NA
Silane Absorber (original)	26	WS 26-1	Unknown	Et Hex	160 (HCl)	1-25	150	None	None	None
Silane Absorber	26	WS 26-2	Met-Pro Corp Duall Division	caustic and/or solvents	80-200	1-25	65	None	None	None
HCl Absorber	26	WS 26-3	Corning	water	35 (HCl)	1-25	NA	None	None	None
HCl Absorber	26	WS 26-4	Carbone	water	160 (HCl)	1-25	NA	None	None	None

Table 4-1. Control Device Parameters (Page 2 of 2)

					Design Parameters			Stack Parameters		
Type of Control Device	Building Location	Abbreviation	Manufacturer	Scrubbing Media	Air Flow Rate (cfm)	Static Pressure (w.g.)	Recycle Rate (GPM)	Stack Velocity (fps)	Stack Height (feet)	Stack Diameter (inches)
HCl Absorber	26	WS 26-4	Carbone	water	160 (HCl)	1-25	NA	None	None	None
Caustic Vertical Packed-Bed Fume Scrubber (Prosil, original)	26	WS 26-5	Met-Pro Corp. Duall Division	caustic	80-200	3	80	5	70	10
Venturi Vertical Packed-Bed Fume Scrubber	26	WS 26-6	Met-Pro Corp. Duall Division	caustic	80-500	3	80	12	42	10
Venturi Vertical Packed-Bed Fume Scrubber (R-10)	39	WS 39-1	Met-Pro Corp. Duall Division	caustic and water	4,600	1-2	140	71.7	60	14
Packed Bed Scrubber	39	WS 39-2	Met-Pro Corp. Duall Division	caustic and water	4,600	1-6	80	Common stack with WS 39-1		
Flare (Norbornadiene)	43		Not yet selected							

Note: The values given in this table are derived from manufacturers specifications. Actual field parameters may vary from the listed values.

CO = carbon monoxide.
Et Hex = 2-ethyl hexanol.
HCl = hydrochloric acid.
NA = not applicable.

[a] FRP tank 3 ft diameter by 5 ft height with 12 inch by 6 ft packed bed, using a March Model TE-7S-MD pump.

5.0 REGULATORY APPLICABILITY

As described in the previous sections, PCR will emit less than 100 TPY of any regulated pollutant except ammonia, less than 10 TPY of any single HAP, and less than 25 TPY of all HAPs combined. As a result, PCR will be a minor source of air emissions in regard to prevention of significant deterioration (PSD) regulations, and will be a minor source of HAP emissions. Ammonia is neither a PSD regulated pollutant nor a HAP.

There are several new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAP) source categories which could potentially apply to PCR. These standards were reviewed in regards to PCR's operations. A discussion of the applicability of these standards to PCR follows below.

40 CFR Part 60 - NSPS

Subpart Kb - Volatile Organic Liquid Storage Tanks

The NSPS does not currently apply to PCR. However, a new VOL storage tank of 15,000 gal capacity is planned to be constructed for the Norbornadiene process. This would trigger a recordkeeping requirement under Subpart Kb (maintain a record of design capacity and dimensions onsite for life of tank). No emission limit or work practice standard would apply.

Subpart VV - SOCMI Equipment Leaks

Not applicable - PCR does not produce as intermediates or final products any of the chemicals listed under Subpart VV.

Subpart DDD - Polymer Manufacturing Industry

Not applicable - PCR does not produce any of the following polymers: polypropylene, polyethylene, polystyrene, or poly (ethylene terephthalate).

Subpart HHH - Synthetic Fiber Production

Not applicable - PCR does not produce any synthetic fibers.

Subpart III - SOCMI Air Oxidation Units

Not applicable - PCR does not have any air oxidation units.

Subpart NNN - SOCMI Distillation Operations

This NSPS exempts distillation operations which are batch operations. Currently, all of PCR's distillation operations are batch operations. However, the proposed Norboradiene project will include a continuous distillation operation. The design capacity of the process will be less than one gigagram per year (1,000 TPY). Therefore, PCR would be exempt from all requirements of the NSPS except for certain recordkeeping and reporting requirements, once this new process is installed.

Subpart RRR - SOCMI Reactor Processes

This NSPS exempts reactor processes which are batch operations. Currently, all of PCR's reactor processes are batch operations. However, the proposed Norboradiene project will include a continuous reactor process. This continuous reactor process will not produce any of the chemicals listed in §60.667 as a product, co-product, byproduct or intermediate. Therefore, PCR would be exempt from all requirements of the NSPS once this new process is installed.

<u>40 CFR Part 61 - NESHAPs</u>

Subpart FF - Benzene Waste Operations

The only potential Part 61 NESHAP applicable to PCR is Subpart FF. This subpart applies to all chemical manufacturing plants, even if they have no benzene on-site. PCR does use a small amount of benzene as an analytical tool in its laboratory. In addition, a small amount is formed as a byproduct of phenyl Grignard use in laboratory scale work. Although the amount of benzene on-site would exempt PCR from all substantiative requirements (< 1 Mg/yr benzene usage), the NESHAP would require recordkeeping and reporting.

40 CFR Part 63 - NESHAPs for Source Categories

Subparts F, G, H and I - SOCMI

Not applicable - PCR is not a major source of HAPs, nor do they use as a reactant or manufacture as a primary product, by-product or co-product any of the listed chemicals.

Subpart T - Halogenated Solvent Cleaning (proposed rule)

PCR currently uses a halogenated solvent cleaner in a batch cold cleaner. If PCR continues to use this solvent, then PCR would be subject to the MACT (maximum achievable control technology) standards if the rule is passed as proposed.

Subpart Q - Chromium Cooling Towers (proposed rule)

Not applicable - only applies to major sources of HAPs.

ATTACHMENT B

URACIL FLARE SPECIFICATIONS

Model EEP-210-SM/FF Spark-Ignited Flare Pilot

It's dependable, affordable, and completely adaptable to your current operation. And it's only available from John Zink.

PILOT FEATURES

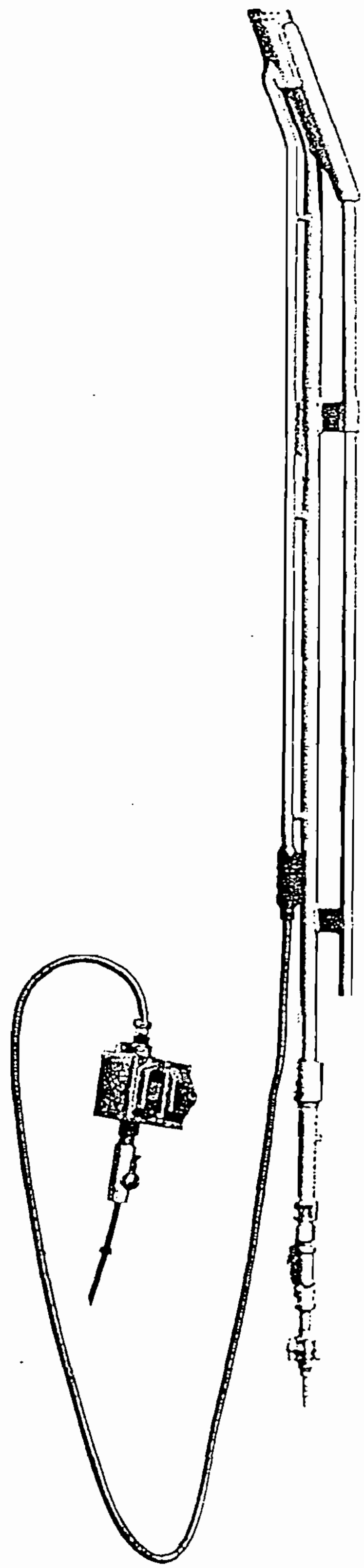
Stable in winds over 100 MPH
Integral thermowell for thermocouple
High-alloy, heat resistant materials
Reliable pre-mix pilot design
Pilot gas strainer
Integral ignition hood
Low fuel gas consumption

IGNITOR FEATURES

Solid-state electronics
Control electronics can be up to 1500 feet from pilot
High-energy spark produced
Air-cooled sparking tip
Available for 220VAC, 110VAC, 12VDC or 24VDC
Ignitor located remote from heat source
NEMA 4 or NEMA 7 enclosures

ADVANTAGES

Doesn't require flame-front lines
Suitable for sub-zero climates
High reliability
Easily operated
Can be fitted to any type of flare
No compressed air required
John Zink worldwide service



COMPANY BACKGROUND

John Zink Company has been a leader in the field of combustion technology for more than 50 years. The expertise of the Company in combustion, flaring, resource recovery, incineration and waste heat recovery is incomparable. The Company's complete engineering staff and modern manufacturing facilities are unique in the industry.

John Zink's International Research Center is the largest and most comprehensive of its kind. Both full-scale and semi-commercial equipment is utilized to simulate actual field conditions for the evaluation of systems and processes. Sample liquid, gaseous and solid wastes can be burned to demonstrate destruction efficiencies and validate equipment design parameters.

PRINCIPAL LOCATIONS

In the U.S.

CENTRAL REGION
4401 South Peoria
P.O. Box 702220
Tulsa, OK 74170
(918) 592-4541

EASTERN REGION
P.O. Box 3130
Cherry Hill, NJ 08034
(609) 424-4343

GULF COAST REGION
11211 Katy Freeway
Suite 330
Houston, TX 77079
(713) 973-2373

LOUISIANA DISTRICT
P.O. Box 15366
Baton Rouge, LA 70895-5366
(504) 275-5123

WESTERN REGION
11540 South Street
Suite 69
P.O. Box 2047
Cerritos, CA 90701
(213) 402-0119

In Mexico

ZINK-HOJEL, S.A. de C.V.
Campos Eliseos No. 385B-4 Piso
Colonia Polanco C
Mexico 5, D.F.
52-5/540-0163,4050,4038

In Canada

JOHN ZINK CANADA, LTD.
Suite 302
801 York Mills Road
Don Mills (Toronto), Ontario M3B 1X7
(416) 444-1145

JOHN ZINK CANADA, LTD.
Glenmore Centre III, Suite 210
7710 - 5th Street S.E.
Calgary, AB T2H 2L9
CANADA
(403) 258-2417

In Europe

JOHN ZINK EUROPE S.A.
P.O. Box 83
L-3401 Dudelange
Grand Duchy of Luxembourg
LUXEMBOURG
352/51899-1

JOHN ZINK BENELUX B.V.
Westblaak 98
3012 KM Rotterdam
THE NETHERLANDS
31-10/116-374

JOHN ZINK DE ESPANA S.A.
Calle Goya 115,5
Officina No. 5
28009 Madrid
SPAIN
341-401-09-56

JOHN ZINK GmbH
Friesstrasse 5
6000 Frankfurt/Main 60
FEDERAL REPUBLIC OF GERMANY
49-69/42-09-740

JOHN ZINK LIMITED
Alban Park, Hatfield Rd.
St. Albans AL4 OJJ
Hertsfordshire
ENGLAND
44-727/61451

JOHN ZINK S.A.R.L.
11, rue Guy Moquet Z.I.
95100 Argenteuil
FRANCE
33-1/3982-21-32

JOHN ZINK S.R.L.
Via A. Campanini 4
20124 Milano
ITALY
39-2/66-9812-32

In the Far East

JOHN ZINK KK
Sankaido Building, 8th Floor
1-9-13 Akasaka
Minato-ku
Tokyo 107
JAPAN
81-3-589-3262

JOHN ZINK COMPANY
A Division of
KOCH
KOCH ENGINEERING COMPANY INC

International Headquarters
4401 South Peoria Avenue
P.O. Box 702220
Tulsa, Oklahoma 74170
(918) 747-1371

Other offices are located in major cities around the world.

OPERATION AND MAINTENANCE MANUAL

FOR

EEF-U-3 FLARE WITH MOLE SEAL & EEP-210-SM/FF PILOT WITH FM/FF IGNITORS

LOCATION: Gainesville, Florida

WARNING

Do not attempt to operate or maintain the equipment covered in these instructions without first familiarizing yourself with these operating instructions! Improper operation of the equipment may result in injury to persons or damage to equipment.

Prepared for:

Purchasing Co. : PCR, INC.
End User Co. : PCR, Inc.
Purchase Order No. : 18265

Prepared by:

John Zink Company
11920 E. Apache
Tulsa, Oklahoma 74116-1300
Shop Order No. : FS-AO4675
Prepared : January 3, 1994

For assistance contact John Zink Company as follows :

Service	: 918-743-8882	Emergency	: 918-234-1800
Spare Parts	: 918-234-2751	Fax	: 918-234-2700

Request field service and spare parts during our normal office hours from 8:00 a.m. to 5:00 p.m. (CST).

TABLE OF CONTENTS

I. GENERAL INFORMATION & EQUIPMENT DESCRIPTION

The John Zink EEF Series Flare is a waste vapor combustor custom designed to operate under the conditions stated in the Design Basis description below. The following mutually agreed upon clarifications and exceptions stated in John Zink Quotation were taken into consideration.

The John Zink EEF Series Flare is a waste vapor combustor custom designed to operate under the conditions stated in John Zink Quotation . The following mutually agreed upon clarifications and exceptions were taken into consideration.

The John Zink EEF Series Flare is a waste vapor combustor selected as a replacement in kind for existing equipment. No design conditions were specified for this equipment. The following mutually agreed upon clarifications and exceptions stated in John Zink Quotation were taken into consideration.

Scope of Supply

Flare Tip:	EEF-U-3 with one (1) pilot
Pilot Style:	EEP-210 SM/FF burning natural gas
Ignition Device:	SM/FF
Purge Reduction Device:	3" Molecular Seal
Purge Rate:	5 SCFH

The flare tip is mounted on a self-supported riser.

Design Basis

		Maximum	Smokeless
1.	Flow Rate (LB/HR)	8000	5293
2.	Molecular Weight	28	
3.	Gas Temperature ($^{\circ}$ F)	176°	

WARNING

Do not operate this equipment outside the design limits or make any modifications, adjustments, or changes affecting the design criteria without John Zink's prior written consent. Injury to persons and damage to equipment may result.

MS-3 Molecular Seal

The MS-3 Molecular Seal is a diffusion driven purge reduction device. The Molecular Seal is designed to maintain a zero oxygen level at the base of the stack. In the event of a loss of purge gas, a zero oxygen level can be maintained for some period of time depending on weather conditions and flaring duty. A continuous purge rate of 0.01 ft/sec stack velocity is required during normal operation. Minimum purge rate is 5 SCFH. Refer to Section II, "Safety in Flare Operation and Purging" for more details.

EEP-210 Energy Efficient Pilot

The pilot provided is a model EEP-210. Prior to installation or startup, perform a visual inspection of the pilot to assure all passages are clear and have not been fouled during storage or erection at the job site.

Also prior to connecting any of the pilot connections the lines to the pilot should be cleared by high velocity air or some other means to eliminate potential fouling material. The gas orifice at the pilot has a small sacrificial strainer immediately ahead of it, but should it plug due to weld slag, mill scale, etc. the pilot which is the main safety device would be eliminated.

John Zink recommends a separate filter at grade suitable for particulates to allow removal of foreign material at an accessible location.

Fuel gas supplied to the pilot must be a regulated supply with a regulator of a design to prevent pressure swings. The supply should also be liquid-free. Liquids can cause pilot failure by momentarily blocking the restriction orifice at the pilot.

Fuel	Supply Pressure	Fuel Consumption	
Natural Gas	10 - 15 PSIG	50 - 75 SCFH	IS 50 SCFH

NOTE

The standard pilot is subject to flash back at hydrogen contents above 30% by volume. For higher contents the EEP-210-H_2 hydrogen pilot which is specifically designed for hydrogen should be used.

EEP-210-FM/FF Spark Ignited Pilot

The pilot provided is a model EEP-210-FM/FF. This pilot is equipped with an electric spark ignitor (FM) as the primary pilot ignition source. The conventional FFG ignition system can be used as a backup to the FM ignitor.

Prior to installation or startup a visual inspection of the pilot to assure all passages are clear and have not been fouled during storage or erection at the job site.

Also prior to connecting any of the pilot connections the lines to the pilot should be cleared by high velocity air or some other means to eliminate potential fouling material. The gas orifice at the pilot has a small sacrificial strainer immediately ahead of it, but should it plug due to weld slag, mill scale, etc. the pilot which is the main safety device would be eliminated.

John Zink recommends a separate filter at grade suitable for particulates to allow removal of foreign material at an accessible location.

Fuel gas supplied to the pilot must be a regulated supply with a regulator of a design to prevent pressure swings.. The supply should also be liquid-free. Liquids can cause pilot failure by momentarily blocking the restriction orifice at the pilot.

Fuel	Supply Pressure	Fuel Consumption
Natural Gas	10 - 15 PSIG	50 - 75 SCFH

NOTE

The standard pilot is subject to flash back at hydrogen contents above 30% by volume. For higher contents the EEP-210-FM/FF-H_2 hydrogen pilot which is specifically designed for hydrogen should be used.

Temperature Switches

The temperature switches used to monitor the thermocouples are documented in the vendor literature attached. The following points should be noted for field calbration.

Normal field setting 4.5 - 5.0 mv (~250°F)

The thermocouple shield at the pilot will induce a time delay both in acknowledgement and in failure alarm. For single pilots on critical reliefs we would recommend a higher field setting to minimize the failure alarm time lag. For flares with redundant pilots, we recommend the normal setting.

Electric Spark Ignitor (FM)

The Electric Spark Ignitor (FM) delivers a spark at the end of a probe mounted on the FM/FF pilot. The spark ignites a small slip stream of gas/air mixture taken from the main pilot supply above the pilot mixer. The flame front generated at the pilot travels a short distance from the end of the probe to the pilot ignition hood where it lights the pilot. The FM Ignitor control box located in a panel at grade uses a capacitive discharge to generate a spark approximately every 8 seconds.

JOHN ZINK COMPANY (JZ) A DIVISION OF KOCH ENGINEERING	SPECIFICATION MISCELLANEOUS INSTRUMENTS FLARE GAS FLOW SWITCH HIGH LOW	SPEC.NO. 4 S.O.NO. FS -A04675 PAGE 1 OF 1

LOCATION: GAINSVILLE FL.		CUSTOMER: PCR INC	
FACILITY:		TAG.NO. : FSH/L201	
INO.:	JZ.PO.NO:	CUST.PO.NO.:45675	QTY.: 1

DESCRIPTION

TAG NO.	
MANUFACTURER	: FLUID COMPONENTS INTL (FCI)
MODEL NO.	: FLT93AB-1A103C-100-00
ENCLOSURE	: NEMA 4/7
INSTRUMENT CONN.	: 1/2"N.P.T.
PROCESS CONN.	: 3/4"N.P.T.
POWER REQ'D.	: 120VAC
CONTACT RATING/ TYPE	: 10 AMP SPDT CONTACT (BOTH RELAYS)
PROBE MAT.	: 316SS
SERVICE CONDITIONS	
FLUID	: FLARE GAS (99.4% CO)
FLOW	: 3,700 LB./HR. (MAX. FLOW)
PRESS.	: 5 P.S.I.G. MAX.
TEMP.	: 20° TO 80°C
SETPOINTS:	HIGH INCR. FLOW 200 S.C.F.H
	LOW DECR. FLOW 100 S.C.F.H

SHIP LOOSE

PREPARED : M BOWLING	DATE: 11/11/1993	REV 4 DATE:	APP:	Release for Purchase: / /
CHECKED :	DATE: / /	REV 3 DATE:	APP:	No. Vendor Lit. Req'd:
SECT.APP.:	DATE: / /	REV 2 DATE:	APP:	Quotation Att'd: ___ Yes ___ No
PROJ.APP.:	DATE: / /	REV 1 DATE:	APP:	Shipment Promise Date: / /

Patty - file

Memorandum

Florida Department of
Environmental Protection

PL
INFO
file

TO: Chris Kirts, District Air Program Administrator
Northeast District

FROM: Clair Fancy, Chief, Bureau of Air Regulation

DATE: May 13, 1994

SUBJECT: PCR, Inc.

On Monday, May 9, John Reynolds and I met with Attorney Jim Alves, David Buff, and employees of PCR, Inc., to discuss permit conditions that would protect the environment, give a meaningful compliance determination mechanism, insure that the source (facility) is a non-Title V source, and still allow this company the operational flexibility for them to be able to develop and manufacture customized chemical products on a rapid basis. The attached letter and specific conditions (particularly #4, 5a, b, and c, 6, 10, and 11) should meet all of these needs. Please utilize the attached conditions for the permit. If you or your staff have any questions, call me.

CHF/ch

attachments

cc: John Brown
John Reynolds

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET

POST OFFICE BOX 6526

TALLAHASSEE, FLORIDA 32314

(904) 222-7500

FAX (904) 224-8551

FAX (904) 681-2964

RECEIVED

MAY 12 1994

Bureau of
Air Regulation

May 12, 1994

BY HAND DELIVERY

Mr. Clair Fancy
Chief, Bureau of Air Regulation
Florida Department of
Environmental Protection
111 South Magnolia, Suite 4
Tallahassee, FL 32301

RE: PCR, Inc.

Dear Clair:

PCR sincerely appreciates the time that you and John Reynolds took this past Monday to discuss the pending air permits for the company's small-scale chemical manufacturing operations in Gainesville. Our meeting was very productive; after an assessment of the plant's operational needs and expected air quality impacts, we developed a mutually acceptable compilation of specific conditions that satisfy the twin goals of maintaining operational flexibility in a competitive business market and ensuring compliance with environmental standards.

Attached for your review is a redraft of the specific conditions for PCR's ammoniation process permit, containing all of the changes that you requested during our meeting. We have formatted this document in a manner that will make it possible to address PCR's R-10 and prosil processes as well, although we recognize that the details of such consolidation still need to be worked out. Our understanding is that the Bureau of Air Regulation will assure the Northeast District that this overall -- i.e., flexible -- approach to permitting PCR's operations fits comfortably within the Department's regulations. (The precedential impact of this determination is very limited due to the unique nature of PCR's operations.) PCR contemplates working with the Northeast District to finalize various details.

As you will see, we also have taken the liberty of developing greater specificity on a few issues. For example, paragraph 11 of the enclosed draft distinguishes between air emissions associated with laboratory production (not reported) and larger scale production (reported). In this respect, air emissions associated with PCR's laboratory production account for a very small fraction of total plant-wide air emissions, making record-keeping and reporting for these emissions unnecessary. Also, we have included guidance with respect to what manner of operational changes would require notification to the Department.

We hope that you and John find this redraft acceptable. If you have any questions or concerns, please give me a call.

Again, thank you for your help.

Sincerely,

Jim

James S. Alves

JSA:lb
enclosure

cc: John Reynolds

PROPOSED WORDING FOR AC01-235570 DRAFT

Page 1 of 7 of Permit

For the construction (after-the-fact) of a small scale batch organic chemical manufacturing facility, which develops and manufactures customized chemical products on laboratory and larger scale. Manufacturing areas consist of: 1) Prosil process area, controlled by one wet scrubber; 2) Process water pretreatment, with the ammoniation process with one packed bed air stripper and three packed bed VOC air strippers; 3) Uracil process area, controlled by one wet scrubber and one flare; 4) Building 18 process area, controlled by four wet scrubbers and one carbon bed adsorber; 5) Building 39 process area, controlled by one wet scrubber; 6) Pilot plant process area, controlled by one wet scrubber; and 7) 200-gallon autoclave process area, controlled by one wet scrubber.

Specific Conditions

1. The ID Number and Project Name for this source shall be used on all correspondence.

2. Construction of the facility shall reasonably conform to the plans described in the application.

3. The air pollution control equipment specified in this permit shall be in conformance with the design information presented in the application.

4. The permittee shall limit emissions of volatile organic compounds (VOC) from this facility to less than 100 tons per year (TPY).

5. The Permittee shall limit the emissions of hazardous air pollutants (HAPs) (as defined in Section 112(g) of the Clean Air Act) as follows:
   a. Emissions of any single HAP from all sources at the facility shall not exceed ~~10.0 TPY.~~ 9.9 TPY.
   b. Emissions of all HAPs combined from all sources at the facility shall not exceed ~~25.0 TPY.~~ ~~9.9~~ 24.9 TPY.
   c. Any of the HAPs listed in Table 1 (attached) may be emitted by the facility, not to exceed the limits in Specific Condition 5.a. and 5.b. above.

6. The Permittee shall limit the emissions of ammonia from the facility to less than 380 TPY. Ammonia emissions from the facility shall not cause the annual Florida Air Reference

Concentration (FARC) to be exceeded. Compliance with this condition shall be demonstrated prior to the expiration date of this permit by the professional engineer's calculations based on actual conditions.

7. The Permittee shall meet the following operational requirements.
   (a) The Permittee shall conduct all necessary maintenance and make all necessary attempts to maintain the air pollution control equipment specified in this permit in proper operating condition at all times.
   (b) The air pollution control equipment specified in this permit shall be operated at all times during which the process equipment associated with the control equipment is operated, except during periods of malfunctions or emergencies when operation of such equipment is not feasible. The control equipment shall be operated and maintained in a manner consistent with the information presented in the application.
   (c) The Permittee shall comply with Rule 17-210.700, Excess Emissions.

8. The facility is allowed to operate 8,760 hr/yr.

9. The facility shall not cause objectionable odors beyond the property line (Rule 17-296.320(2)).

10. The permitted source consists of a small scale batch organic chemical manufacturing operation, which develops and manufactures customized chemical products on laboratory and larger scale. The Permittee is authorized to operate equipment, vary production rates and schedules, and make operating adjustments as needed to support this business activity provided that Specific Conditions 4, 5 and 6 are adhered to at all times.

11. The Permittee will calculate the cumulative 12-month rolling average emissions of VOC, each HAP listed in Table 1, and ammonia, on a monthly basis to facilitate the emissions tracking needed to document compliance with Specific Conditions 4, 5 and 6. The calculations will be based on the following method:
    a. A roster of all processes run in each piece of equipment will be prepared and kept current. The roster will include a traceable identification code and title for each process, the nominal product amount (in pounds) for each process, and factors for determining the emissions of each listed pollutant emitted by the process each time it is run.
    b. However, air emissions associated with small scale laboratory production (i.e., batches less than 50 gallons) have been determined to be de minimis and therefore exempted from reporting under Specific Conditions 11, 12 and 13.

DRAFT

c. The factors for determining the emissions of each air pollutant emitted by the process each time it is run will be based on scientifically sound engineering calculations or estimates and will be expressed in terms of the pounds of pollutant emitted each time the process is run.

d. A traceable record of all production batches run in each piece of equipment will be documented in a production summary for the purpose of calculating the cumulative 12-month rolling average emissions of each pollutant.

e. The cumulative 12-month rolling average emissions of each pollutant will be calculated using the process emission factors and the production summary.

f. A monthly summation of the cumulative 12-month rolling average emissions of each pollutant emitted by the facility will be maintained.

12. The Permittee will regularly review the cumulative 12-month rolling average emissions of VOC, each HAP, and ammonia, and compare them to the limitations described in Specific Conditions 4, 5 and 6 in order to verify compliance. This review will also enable the Permittee to operate equipment, vary production rates and schedules, and make operating adjustments in a manner that is consistent with meeting the limitations described in Specific Conditions 4, 5 and 6.

13. The Permittee shall submit monthly reports to the Northeast District office which summarize the emissions for the previous month and the cumulative 12-month rolling average emissions for VOC, each HAP, and ammonia, and compare these emissions to the emission limits in Specific Conditions 4, 5 and 6. The report shall also contain a summary of all significant physical changes associated with the emissions units at the facility which occurred during the month, excluding changes due to routine repair, replacement and maintenance. This summary must include equipment removed during the month. The monthly report shall be submitted by the 28th day of the following month.

14. An annual operating report [FDEP Form 17-210.900(4)] shall be submitted to the Northeast District by March 1 of each year for the preceding calendar year.

15. All records or reports required as a condition of this permit shall be retained for at least 5 years.

16. The Prosil process area scrubber shall be tested for VOC emissions using Method 25 or 25A prior to expiration of this permit.

17. The three packed bed VOC air strippers in the process water pretreatment area shall be tested for VOC emissions prior to the expiration of this permit. Testing shall be conducted by sampling and analyzing the influent and effluent water stream of the air strippers.

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET
POST OFFICE BOX 6526
TALLAHASSEE, FLORIDA 32314
(904) 222-7500
FAX (904) 224-8551
FAX (904) 681-2964

May 12, 1994

BY HAND DELIVERY

Mr. Clair Fancy
Chief, Bureau of Air Regulation
Florida Department of
Environmental Protection
111 South Magnolia, Suite 4
Tallahassee, FL 32301

RE: PCR, Inc.

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We hope that you and John find this redraft acceptable. If you have any questions or concerns, please give me a call.

Again, thank you for your help.

Sincerely,

Jim

James S. Alves

JSA:lb
enclosure

cc: John Reynolds

PROPOSED WORDING FOR AC01-235570 DRAFT

Page 1 of 7 of Permit

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3. The air pollution control equipment specified in this permit shall be in conformance with the design information presented in the application.

4. The permittee shall limit emissions of volatile organic compounds (VOC) from this facility to less than 100 tons per year (TPY).

5. The Permittee shall limit the emissions of hazardous air pollutants (HAPs) (as defined in Section 112(g) of the Clean Air Act) as follows:
   a. Emissions of any single HAP from all sources at the facility shall not exceed 10.0 TPY.
   b. Emissions of all HAPs combined from all sources at the facility shall not exceed 25.0 TPY.
   c. Any of the HAPs listed in Table 1 (attached) may be emitted by the facility, not to exceed the limits in Specific Condition 5.a. and 5.b. above.

6. The Permittee shall limit the emissions of ammonia from the facility to less than 380 TPY. Ammonia emissions from the facility shall not cause the annual Florida Air Reference

Concentration (FARC) to be exceeded. Compliance with this condition shall be demonstrated prior to the expiration date of this permit by the professional engineer's calculations based on actual conditions.

7. The Permittee shall meet the following operational requirements.
   (a) The Permittee shall conduct all necessary maintenance and make all necessary attempts to maintain the air pollution control equipment specified in this permit in proper operating condition at all times.
   (b) The air pollution control equipment specified in this permit shall be operated at all times during which the process equipment associated with the control equipment is operated, except during periods of malfunctions or emergencies when operation of such equipment is not feasible. The control equipment shall be operated and maintained in a manner consistent with the information presented in the application.
   (c) The Permittee shall comply with Rule 17-210.700, Excess Emissions.

8. The facility is allowed to operate 8,760 hr/yr.

9. The facility shall not cause objectionable odors beyond the property line (Rule 17-296.320(2)).

10. The permitted source consists of a small scale batch organic chemical manufacturing operation, which develops and manufactures customized chemical products on laboratory and larger scale. The Permittee is authorized to operate equipment, vary production rates and schedules, and make operating adjustments as needed to support this business activity provided that Specific Conditions 4, 5 and 6 are adhered to at all times.

11. The Permittee will calculate the cumulative 12-month rolling average emissions of VOC, each HAP listed in Table 1, and ammonia, on a monthly basis to facilitate the emissions tracking needed to document compliance with Specific Conditions 4, 5 and 6. The calculations will be based on the following method:
    a. A roster of all processes run in each piece of equipment will be prepared and kept current. The roster will include a traceable identification code and title for each process, the nominal product amount (in pounds) for each process, and factors for determining the emissions of each listed pollutant emitted by the process each time it is run.
    b. However, air emissions associated with small scale laboratory production (i.e., batches less than 50 gallons) have been determined to be de minimis and therefore exempted from reporting under Specific Conditions 11, 12 and 13.

DRAFT

c. The factors for determining the emissions of each air pollutant emitted by the process each time it is run will be based on scientifically sound engineering calculations or estimates and will be expressed in terms of the pounds of pollutant emitted each time the process is run.

d. A traceable record of all production batches run in each piece of equipment will be documented in a production summary for the purpose of calculating the cumulative 12-month rolling average emissions of each pollutant.

e. The cumulative 12-month rolling average emissions of each pollutant will be calculated using the process emission factors and the production summary.

f. A monthly summation of the cumulative 12-month rolling average emissions of each pollutant emitted by the facility will be maintained.

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16. The Prosil process area scrubber shall be tested for VOC emissions using Method 25 or 25A prior to expiration of this permit.

17. The three packed bed VOC air strippers in the process water pretreatment area shall be tested for VOC emissions prior to the expiration of this permit. Testing shall be conducted by sampling and analyzing the influent and effluent water stream of the air strippers.